



Year Book

Semmelweis University

Faculty of Medicine • Faculty of Dentistry • Faculty of Pharmaceutical Sciences
Faculty of Health Sciences • András Pető Faculty

2025 / 2026

Budapest

www.semmelweis.hu

“Medical students can only be prepared for patient care
when practising by hospital beds;
Not only the teachers explaining diseases will teach them then,
but diseases themselves...
Let theory be combined with practice as it is in real life,
and make students visit sickhouses once they
are studying to be medical doctors;
also have them take care of patients with all the
knowledge that is expected from doctors.”

Lajos Markusovszky (1815-1893)

YEAR BOOK

SEMMELWEIS UNIVERSITY



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Detailed history of Semmelweis University

I. The history of the Medical Faculty (1769-1951)

The Nagyszombat (now Trnava) university founded in 1635 by PÁZMÁNY Péter archbishop of Esztergom and the former Jesuit order institution was given a royal rank during Maria Theresa's reign and turned from a truncated university to a real one with the addition of the missing fourth faculty, the Medical Faculty. All of the above formed an integral part of the comprehensive, imperial level reform process with the recognition in the background that health care is a key interest of the state and requires a high level of public intervention. The plans of the Medical Faculty in Nagyszombat was elaborated by the royal physician of the queen, the Dutchman Gerard van Swieten, based on the Medical Faculty in Vienna reformed by him as well. Organisation started with the decree of Maria Theresa dated on 7 November 1769. Before this, the whole university had received a royal rank with a royal charter on 17 July that year. To host the new faculty, a separate building was constructed according to the plans of Franz Anton Hillebrandt, which was completed in May 1772. Education was able to start in 1770, first with five faculties: Physiology and Pharmacology (PRANDT Ádám Ignác), Anatomy (TRNKA Vencel), Surgery (PLENCK József Jakab), Botany and Chemistry (WINTERL Jakab József) and General Pathology (SHORETITS Mihály), i.e. the actual clinics. Due to the lack of an own clinics, the education of general pathology faced severe difficulties, and the lack of the corpses and the botanical garden was also a great problem. By moving the university to Buda in 1777, these problems seemed to be solved.

The Ratio Educationis I issued simultaneously with the transfer to Buda modified the management of the University. The consistory considered as the representative of the state, which had been heading the university since 1767, was replaced by the university council (senate), however, practically with the same members. The magistratus academicus re-elected every year, which administered mostly the ritual issues, remained on. To lead the whole institution, a president and a director general and to lead the faculties, faculty directors (faculty presidents) were elected. A bit later (in 1786), Joseph II deleted this position (except the Medical Faculty) and their scope of authority was taken away by the previously marginalised deans. This time, the method of appointment of the tutors was also regulated. Based on the opinion of the

faculty, the senate submitted a proposal to the king who decided on the appointment through the Royal Council of Governors.

It was on 25 March 1780 when Maria Theresa issued the Diploma Inaugurale, called as the "Magna Charta" of the university, in which she set among other general regulations the legal status of the university and the financial basis of the maintenance thereof. The successor of the Queen, Joseph II was also dealing with the fate of the University. During his personal visits he decided on the translocation of the institution to Pest, which took place in 1784. The Medical Faculty found a home in a former Jesuits' monastery at the corner of Hatvani (now Kossuth Lajos) and Újvilág (now Semmelweis) streets. The frequent relocations held back educational activity, since the majority of resources was directed to the establishment of the conditions. The rapidly developing Pest provided a larger and more diverse patient population than before and the number of clinical beds also increased up to 16. The reconstructed building of the monastery proved to be small for the growing number of departments (Theoretical Medicine, Natural History in 1784; Veterinary in 1787; Public Medicine and Special Medical Studies in 1793; Theoretical Surgery in 1808; Obstetrics in 1812 and Ophthalmology in 1817) and the increasing number of students. Practical Training was strongly held back by that contrary to the international practice, the clinics were located not in the city hospital, but in the building of the faculty, therefore, there was no possibility to regularly change the patient population necessary for education. Although there were many attempts by the faculty to involve the Saint Roch Hospital to expand the institutions of the faculty, they were systematically rejected due to the resistance of the city magistrate. Contrary to this, from the 20's, the clinical trend emphasising practical education was established, the main representative of which was BENE Ferenc, the introducer of vaccinations against pox.

Initially, based on the idea of van Swieten, the duration of the medical training was not regulated. First, a decree in 1774 determined the training period of physicians to be 5 years and according to the study regulation in 1786, it became 4 years. After tightening the examinations, the mutual recognition of medical diplomas had been valid since the reign of Joseph II (the principle of the

so-called conformetur), at least as regards Vienna-Prague-Cracow-Pest. In 1804, Vienna left this agreement and obtained a privilege against the others. The surgeon master and civil surgeon training were 2 years long, while the pharmacist training was of 1 year. Midwives were trained in short courses started each semester. In 1787, the Veterinary course joined as well.

The end of the century, showing a vivid university life was replaced by the retrograde mentality of the era of Francis I. This is reflected by the Ratio Educationis II in 1806, created in the spirit of centralisation and the deprivation of the freedom of education, which was dealing with the Medical Faculty in a much deeper level than the previous one. It stipulated in details the teaching material and the obligations of the professors, it updated the order of the education and comprehensive exam and increased the length of education to 5 years. The president (praeses universitatis) executing the intent of the government and his deputy and the vice president (vice-praeses) who was at the same time the chancellor of the university played a key role in the management of the university. The university magistrate consisting of rectors, deans and seniors had only limited power. At the end of the 1810's, even the faculty director position was reset, however, the professional supervision of the Medical Faculty was exercised by the national chief medical officer.

As in terms of the French revolutionary ideas feared by the government, medical training was a neutral area, at the beginning of the 19th Century, this was the only faculty able to perform considerable scientific activity and more significant developments. Contrary to the efforts, the substantial conditions of education became worse and worse due to overcrowding and the increasing demands. The devastation of the icy flood in 1838 increased on the problems in an extent that even the parliament was dealing with the situation of the Medical Faculty.

Under these narrow circumstances, the tutors of the faculty tried to keep up with the pace of international medical science which started to develop and specialise that time. In the light of the above should one consider that overtaking Vienna, Pest was one of the first cities to found an individual faculty of veterinary in 1793, which included the contracted forensic medicine and public health as well. Vaccination against pox has been applied in Hungary since 1799 and in 1824, headed by GEBHARDT Ferenc, a Central Vaccination Institute was established within the Medical Faculty. One of the most significant scientist of his era, KITAIBEL Pál was also among the tutors of this faculty. The Institute of Pathology founded in 1844 by ARÁNYI Lajos was one of the oldest similar institution in the world. At the beginning of 1847, only few months after the first experiment in the Massachusetts Hospital, Balassa tried anaesthesia with ether. The first anaesthetic surgery was performed few days later by SCHOEPPF-MEREI Ágost. The faculty was continuously playing key role in the fight against the great Hungarian epidemics (typhus, yellow fever, pox and the cholera leading to riots in 1831 and 1848-49).

The medical and surgical training courses were taught in Latin from the beginning. Education in Hungarian was first dealt with at the end of the 18th Century. RÁCZ Sámuel, who was the fifth professor of the medical faculty in 1793/94 to hold the position of rector, issued the first Hungarian physiology book in 1789 with the title "A physiologia rövid sommája" (Short summary of physiology), which was considered as the first Hungarian university textbook as well. In 1830, law allowed the use of Hungarian language and 3 years later, the first doctorate was written in Hungarian by FLÓR Ferenc and in 1844, Hungarian became the official language. Contrary to the national partiality of the tutors, the education in Hungarian was accepted by the Medical Faculty with reservations, since many of the students – and even some of the tutors – did not speak Hungarian and the Hungarian medical

language was practically missing. Finally, the Hungarian as the language of education was introduced in 1848. The lower degree courses (surgeon master, midwife, veterinarian) had been held in the national languages since the beginnings, i.e. in Hungarian, German and Slovakian.

In the legal code of April 1848, a separate article (Art. XIX, 1848) was dealing with the university and promulgated the independence of the university and the principle of liberal freedom of education. The majority of the tutors and students actively took part in the freedom fight. Therefore, the reprisal after the surrender severely affected the tutors of the university. Many were forced to go to prison (BALASSA János), to hide (BUGÁT Pál) or to emigrate (e.g. SCHOEPPF-MEREI who later founded a children's hospital in Manchester). Certification procedures were performed, the tutors might hold their position depending on their loyalty and authority harassments were permanent. Tutors loyal to the emperor, but often of secondary level were employed by the faculty. At the time of the absolutism, the language of education and administration became the German instead of the Hungarian. Instead of the educational order of 1848, in the spirit of the "conformetur" principle, the Vienna order of 1833 was introduced. At the same time, there were modernisations as well. In this way, the secondary school maturity became obligatory and the faculty director position was deleted. Although experts were trained still in 9 faculties, the surgeon master course slowly faded and based on the pattern in Lemberg, Olmütz and Salzburg, this training was suspended also in Pest. In 1872, the guilds were also dissolved. As regards the language issue, a shift occurred only after the large foreign policy defeat of the royal court. In 1859, a delegation of students went to Vienna to restore the Hungarian language. In 1860, the right of autonomous rector and dean election was extended also to the university of Pest. As a result of the October Diploma, the main subjects were taught in Hungarian and the others in German, Slovakian or Latin depending on the demands. Finally, it was the Article XLIV of 1868 after the Austro-Hungarian Compromise to reinstate the Hungarian language. This time, many tutors not speaking Hungarian left the university, e.g. the outstanding physiologist, Jan Nepomuk Czermák resigned as well contrary to the efforts of his Hungarian colleagues to make him stay.

The harmonised medical training was introduced in 1872, thus, since 1878, only one medical diploma has been existed with the name "doctor of the universal medical sciences". The new university decree in 1875 determined the order of the new and universal medical doctor comprehensive exam in addition to the provision of the freedom of education and the autonomy. In 1881, the duration of the academic year also changed. Earlier it had been between November and August and since that time, it has been between September and June.

Due to the poor facilities, the main problem of the medical faculty was the lack of space. Although in 1848, the clinics were transferred from the Újvilág utca building, it proved to be only temporary, since after the suppression of the freedom fight, they returned there. The Saint Roch Hospital refused on to host the clinics and the capital failed to provide a site for the constructions for a long time. The acquisition of the Kunewalder house (located that time in the Országút, today in the Múzeum körút) in 1858 was a temporary relief that time, which was originally bought for the Institute of Veterinary. The surgery (Balassa), the zoology, the physiology and the obstetrics headed by Semmelweis that time were able to move here. The administration of the faculty and the library got temporary home in buildings nearby. A real solution was brought only by the large-scale constructions started in 1873 with a cost of 25 million kronen, which were finished only in 1911. This time, the Üllői út considered that time as a rather outer belt area became the axis of the Medical Faculty, where the clinics, the institutions and the administration were located in two sites. Simultaneously,

new, often parallel departments sufficiently equipped in the level of the era were established one after the other. The number of such departments almost quadrupled until the 1880's. In these still unique developments, EÖTVÖS József and TREFORT Ágoston ministers of the Ministry of Religion and Public Education, BERZEVICZY Albert state secretary, MARKUSOVSKY Lajos councillor and on behalf of the Medical Faculty BALASSA János, KORÁNYI Frigyes and the later secretary of state, TÓTH Lajos played key role.

With the rapid development of the clinics, the catch-up of the lagging behind was successful. Parallely to the constructions, the "medical school of Budapest" became clear around Balassa having launched a medical weekly "Orvosi Hetilap" and Markusovszky. As an effect of Semmelweis, this was the place where the deliberate prevention of surgical infections was started. Public health was among the first to get a department in Budapest, headed by the outstanding bacteriologist, FODOR József. By continuing the work of Schoepf-Merei and Sauer, KORÁNYI Frigyes was the one to begin the establishment of a Hungarian internal medicine school on a state-of-the-art foundation. His work was carried on by his son, Sándor. JENDRASSIK Ernő, named also as the Hungarian Charcot was one of the founders of neurology, DOLLINGER Gyula was that of orthopaedics and TAUFFER Vilmos was that of the surgical obstetrics and gynaecology. LUMNICZER Sándor, the founder of modern surgery was the first to use the Lister's system of antiseptics. Owing to the work of SCHULEK Vilmos, GRÓSZ Emil and IMRE József, Hungarian ophthalmology became this time famous throughout Europe. As regards paediatrics, the Bókays and KOPITS Jenő, the international expert of hip dislocation deserve mention. The first director of the Hungarian Pasteur Institution, HÖGYES Endre set the foundations of the later Nobel prize winner invention of BÁRÁNY Róbert. With the research of the fine structure of the nervous system, the anatomist LENHOSSÉK Mihály achieved the recognition of his Nobel prize winner colleague, Santiago Ramón y Cajal who considered him as his fellow during the creation of neuron studies. In stomatology, the work of ÁRKÖVI József, while in pharmacology, that of BALOGH Kálmán were outstanding. In 1907, the Radiology got a separate institute headed by the founder of radiology in Hungary, ALEXANDER Béla. Physiology became a modern science in the Medical Faculty owing to the outstanding Czermak of Czech origin. He was followed by JENDRASSIK Jenő whose aim was the foundation of the modern Hungarian physiology school.

The number of students drastically increased. In the 1860's, their number was between 400-500, while in the 1880's, it exceeded 1000. In the 1860's, the first student associations were established. In 1862, aid society and 5 years later, a self-education association was founded. The end of the century was the first time when the issue of the admission of women arose. The medical faculty had generally a rejecting opinion thereabout. The first Hungarian female physician, countess HUGONNAY Vilma succeeded to achieve the recognition of her diploma obtained in 1879 only after 17 years of administrative struggling. In 1895, a decree made it possible for women to participate in trainings and practices in humanities, medical studies and pharmacology. The first female physician graduated in Budapest, STEINBERGER Sarolta was inaugurated on 3 November 1900. A real change in the training of female physicians was brought only by the world war.

During the World War I, the majority of the students and the tutors joined the army and the half of the beds the number of which increased to 2000 were maintained for the injured. The change to war industry and the economic exhaustion of the Monarchy drastically decreased the financial supply of education and also of the university. The war almost eliminated the students, however, after their disarmament, there was a dumping. Compared to the last year in peace, more than twice as many (6526) medical students wanted to continue their interrupted studies.

The revolution and the dictatorship of the proletariat triggered further chaos in 1918-19. The university was made subject to stringent central administration and there were significant transformations. There were changes in the personnel and the tutors considered as right wing were deprived of their positions. During the short existence of the Council Government, its measures could not be long-lasting. By rising to power of the counterrevolution, the faculty council qualified the events after 31 October 1919 as "ex lex" and further changes in personnel and certification procedures were started. Tutors were removed from the faculty, among others HEVESY György, one of the founders of nuclear medicine who later won the Nobel prize abroad or the outstanding ophthalmologist, GRÓSZ Emil, but his removal was only temporary.

From the annexed areas, a smaller migration started to the remaining "Mutilated Hungary" and especially to Budapest. Mostly the state-employed intellectuals (public officers, physicians, teachers etc.) were forced to migrate, partly as their job was linked to the language and partly as they could have been hardly employed by a newly settling foreign state. The largest overcapacity was experienced in the field of physicians, mostly in Budapest, therefore, the fight for making a living was quite harsh. In addition to the too large number of students and the experience from the revolutions, this was also a reason of the issue of the Act XXV of 1920 also known as "numerus clausus", the initiation of which just started from the Medical Faculty of Budapest. The point of this act was to tighten the conditions of the admission to university, with which on the one hand, they tried to decrease the number of students in further education and on the other they tried to exclude anyone who had taken part in the revolution and to limit the number of Jewish students. This latter affected especially the Medical Faculty, since as it was a course of open access, many Jewish youngsters have selected the medical profession since the beginning. On the other hand, this act was beneficial for the spread of protectionism. At the same time, the faculty tried to block the admission of women as well. On 14 April 1921, the university in Budapest took the name of its founder, PÁZMÁNY Péter and had this name until 1950.

The economic crisis aggravated on by the mutilation of the country led to a financial crisis for the university it had never experienced before. The situation had just begun to normalise when the crisis in 1929 resulted again the decrease in the financial resources spent on education and health care. Unemployment appeared among the physicians as well, the workforce reduction in the university exceeded 10%, the investments stopped and the quarter of the beds had to be left empty due to financial reasons. The number of students sharply decreased as well (in 1925-26 there were 1729, in 1930-31 only 1234 students), contrary to the international trends.

The reform of the medical training which had been on agenda for a long time was introduced in 1922. As a main principle, the researcher and practising physician trainings were in focus. The duration of the education increased to 6 years instead of 5, the comprehensive exams were separated in four cycles and the number of the courses announced was also increased. Later, the system of comprehensive exams was modified on, but it was entered into force only in 1943. In 1936, the classification of the diplomas changed. This was the time when the qualifications used even today, i.e. the rite, the cum laude and the summa cum laude were introduced. After a long time, also the pharmacist education was renewed by increasing the duration of the education from 2 years to 4 and by decreasing the practice from two years to one. Thereafter, the start of the pharmaceutical studies was not linked to a prior practice in a pharmacy, but after the maturity exam, one could immediately enrol.

Between the two world wars, internationally acknowledged

schools were operating in the Medical Faculty, such as the school of KORÁNYI Sándor who developed on the school founded by his father. Among his results, the elaboration of the functional examination methods of kidney and the reduction of tuberculosis are outstanding. Many of his students became academicians and heads of department, such as RUSZNYÁK István, HETÉNYI Géza and HAYNAL Imre. The research on cancer made by KROMPECHER Ödön who described the basocellular cancer, that on nucleins, complementaries and enzymes by LIEBERMANN Leó or that on morphology by SCHAFFER Károly were significant. As regards pathoanatomy, BUDAY Kálmán clarified the pathogenesis of necrotic stomatitis and mellitis. In microbiology PREISZ Hugó, in biochemistry HÁRI Pál, in physiology FARKAS Géza and in biology HUZELLA Tivadar can be mentioned. In the fields of clinical medicine, the paediatrician HEIM Pál, BÓKAY János and BÁLINT Rezső, the surgeon VEREBÉLY Tibor and the ophthalmologists GRÓSZ Emil and BLASKOVICS László were the outstanding experts of their fields.

Apart from the military duty affecting the tutors as well and the care of the injured, the World War II had not trigger any special disturbance in the life of the Medical Faculty until 1944. With the approach of the front, the majority of the tutors were deployed. The rise to power of the Arrow Cross Party on 15 October 1944 posed new threats on the university and thus, the Medical Faculty as well. Contrary to the categorical order of the government, the university denied to move to Germany. Afterwards, there were plans to transfer the clinics and laboratories to Buda, however, they were mostly thwarted partly due to the repeat resistance of the faculty and partly due to the difficulties in transportation. Before the closure of the shell of fortress lines, the engineering, medicine, pharmacy and veterinary senior students were carried to Germany with a military call-up, i.e. the representatives of every programme considered as important regarding the continuation of the war. In this way, about 600 medical and pharmacist students from the Medical Faculty Budapest were settled partly to Halle and partly to Austria with some of the education staff. They succeeded to return only after the war among huge difficulties and with the mediation of the university, with American passport.

Together with the city, the faculty was also heavily hit by the siege of Budapest. The damage in the buildings were enormous (four clinics were severely hit) and the majority of the equipment was also destroyed. The total damage was around 13 million golden pengő (at 1938). The largest devastation affected the Internal Medicine II, the Gynaecology I, the Dermatology, the Surgery II and the Paediatric Clinics, but several other buildings were dam-

aged as well. This was aggravated by the freezing of the drainage system and the plundering affecting the whole city. Contrary to all these, the clinics were operating even in case of the siege, often under impossible circumstances. Even the Institute of Physiology and the Pathoanatomy department started to perform the care of the injured.

After the war, the tutors were significantly changed according to the taste of the new political forces having the power. The main tool of this was the certification procedure. It describes the ratios well that against 15 out of the 27 regular tutors of the medical faculty, procedures were launched or they were dismissed with various sanctions. In addition to this, in January 1945, IMRE József professor died which led the Ophthalmology Clinic to get empty. In addition to them, 6 honorary extraordinary tutors, 17 private professors and 11 physicians were dismissed. Out of the physicians above, 44 were still in Germany with the students carried there.

From June 1945 until his emigration, the Nobel Prize winner professor SZENT-GYÖRGYI Albert was among the tutors of the faculty, who was that time the head of the Department of Physiology and Medical Chemistry. From 1945, there was a sharp increase in the number of the students, which exceeded multiple times the capacity of the faculty, therefore, from 1947/48 onwards, they were forced to introduce admission examination. After the rising of the Communist Party to power, one of the most important factors became the origin of the candidate, therefore, the social composition of the students significantly changed. Soon, almost 25% was the ratio of the students from worker or pawn origin. The National Association of Peoples' Colleges was founded and from the academic year 1951/52, the Scientific Students' Association movement was introduced based on Soviet pattern. In 1948, education was reformed again. The examinations were tightened, education turned more pragmatic and the medical chemistry and physics were included into the curriculum, in addition to the biology in 1950. Due to political reasons, the Marxism and Leninism, the Russian language and the national defence knowledge were also added.

In this period, multiple hospitals were attached to universities by forming clinics. Therefore, the number of beds increased to 3167 in 1955 from the 1178 in 1946. In parallel, specialisation was going on within the disciplines, which led to further separations in the clinics as well. Areas with larger and larger costs entered into research, therefore, fallback behind the rich countries was evident. This was worsened on by the isolation policy in the 1950's when there was Soviet influence also in science.

II. History of the separate Medical University: BOTE, SOTE (1951-2000)

After 1949, the Hungarian higher education underwent consecutive reforms. Due to the fight against churches, the name of the university was modified, therefore, instead of its founder, PÁZMÁNY Péter, the university got the name of one of its most prominent scientist tutors, EÖTVÖS Loránd on 1 September 1950. At the end of 1950, the Council of Ministers discontinued the former practice and traditions and decided the creation of specialist universities subject to the sectoral ministries. They wanted to reach it partly by founding new institutions and partly by the division of the currently existing ones. During the reorganisation, the Soviet higher education system of the 1930's was taken as example, disregarding that since that time, this had been significantly modified also in the Soviet Union by resetting the unified management of higher education. The deadline of the comple-

tion of the action was planned to be on 1 February 1951. Within the framework of this, the medical faculties of the universities were separated and transformed into separate specialist universities. In a parallel way, the new medical universities were subordinated not to the Ministry of Religion and Public Education, but the newly formed Ministry of Health. Therefore, from 1 February 1951, the Faculty of Medicine of the Eötvös Loránd University continued its operation as a separate Medical University of Budapest.

In 1955, the organisational transformations went on. Within the University, 3 faculties were formed (with their former names: Faculty of General Medicine, Faculty of Dentistry and Faculty of Pharmacy). On 1 September 1955, the rectorate was established. The pharmacist training was transferred permanently to the medical

university from the Eötvös Loránd University back in 1951 and in 1952, the dentist training of new system was started. Finally, on 7 November 1969, for the 200th Anniversary of the Faculty of Medicine, the university took the name of SEMMELWEIS Ignác.

Separation had, however, some disadvantages as well. From certain aspects, the distance from the humanities and the Faculty of Sciences led to drawbacks for the medical profession. The everyday life of the new university was made more difficult by that it had only the narrowest professional institutes and the conditions for the cultural and sports life or the rooms suitable for hosting large events were missing. They were able to be terminated only by the large investments of the 1970's. After the separation of the university, the separation from the BEAC university sports club also took place to form the Orvosegyetem Sport Club (OSC, Medical University Sports Club). The fencers and waterpolo players of the OSC have been the regular and successful participants of the Olympic Games and world championships.

The prints of the war had not even disappeared when as a protest against the communist power, the revolution broke out on 23 October 1956. In the student movements, the students of the medical university also took place and after the breaking out of the armed fight, the role of our university aimed mostly at the care of the injured, since our institutions were in the centre of the war in Budapest. The staff of the affected clinics and institutions exhibited superhuman and heroic withstand multiple times. Further buildings were damaged and the most severely hit building

was the Dermatology clinic. The reprisal after the communist restoration did not avoid our university either. The victim of this reprisal was the innocently slandered and executed TÓTH Ilona senior physician student who is considered today as the martyr of our university.

After consolidation, the emerging external relations from the 1960's facilitated us to keep up with the scientific international profession. In the following decades, serious developments were performed as well. The most important of them were the reconstruction of the Dermatology clinics demolished in 1956, the huge theoretical building finished in 1978, the Ophthalmology clinic I and the delivery of the Transplantation and Surgery Clinics in the beginning of the 1990's. In the clinics, healing and education took place this time with more than 3100 beds.

The increase of the ratio of the international students has started to grow since the 1970's. This time, they arrived mostly from the developing countries and mostly from the so-called democratic countries. Education in German language started in 1983 and after an experiment in 1987, the regular education in English language started in 1989.

The Act LXXX of 1993 on Higher Education made it the task of the universities to prepare for scientific degree and to award the PhD degree, based on which the Semmelweis University got its Doctoral School accredited in the same year and until 2018, it started 47 programmes.

III. The history of Semmelweis University (2000–2021)

At the end of the 1990's, the transformation of the Hungarian higher education network was put on agenda with the aim of institutional integration. The final stage of this process was determined by the Act LII of 1999 on the Transformation of the Higher Education Institutional Network. Accordingly, even in July that year, three universities (the Semmelweis University of Medicine, the Haynal Imre University of Health Sciences and the University of Physical Education) elaborated the plan of the organisational, operational and financial policy of the university to be created, together with the call for application for the rector and the director general. After the preparatory work, on 1 January 2000, Semmelweis University was established by the merger of the Semmelweis University of Medicine, the Haynal Imre University of Health Sciences and the University of Physical Education, which consisted of the following faculties: Faculty of General Medicine, Faculty of Health Sciences, College Faculty of Health, Faculty of Dentistry, Faculty of Pharmacy and Faculty of Physical Education and Sport Sciences. From this group, the Faculty of Health Sciences of the Haynal Imre University of Health Sciences was removed and based on a governmental decree, it ceased to exist. (The successor of the Haynal Imre University of Health Sciences was the new organisation, the National Medical Centre formed from it, which was known as Szabolcs utca Hospital until its closure in 2007.) The College Faculty of Health of the Haynal Imre University of Health Sciences remained on the part of the university, which continued its operation from the end of 2001 with 5 faculties: Faculty of General Medicine, College Faculty of Health (from 2007 with the name of Faculty of Health Sciences), Faculty of Dentistry, Faculty of Pharmacy and Faculty of Physical Education and Sport Sciences. In its decision no 62/2008 on 29 May 2008, the Senate of Semmelweis University decided to found its sixth faculty, the Faculty of Health and Public Services with the participation of three institutions working in the border of natural sciences and social sciences, i.e. the Health Services Management Training Centre,

the Institute of Mental Health and the Institute of Health Informatics, Development and Further Training. The faculty started its activity in January 2010 and the inaugural meeting of the Faculty Council was held on 21 April 2010. The new faculty has mostly social science orientation, however, it integrated interdisciplinary trainings at the border of sciences. With its programmes, it covers the whole educational spectrum including the basic training, the master training, the doctoral training and the postgraduate specialist training courses in the field of healthcare management, mental and community health and health informatics.

In addition to the structural reorganisation, the new millennium brought significant developments as well. In 2003, the College Faculty of Health succeeded to move to a new site instead of its earlier fragmentation (Óbuda, Újpest, Józsefváros), to the Vas utca close to the centre of the university, into the fastidiously renovated building of the former Pajor sanatorium and later Balassa János Hospital. The Educational Centre of the Faculty of Dentistry was built between 2006-2007 in the site of the Pátria printing house, in the Szentkirályi utca. Almost all of the clinics and departments of the faculty moved to this state-of-the-art building. In September 2008, the plan of a long-standing desire of a second theoretical building, back from the 1960's came true in the form of the Theoretical Medical Centre in the Tüzoltó utca, which won several architectural professional prizes. In the gross 27,000 m² of the building, there are research laboratories, study rooms, student laboratories, lecture rooms, a modern animal house and seven seminar rooms. The two latter investment was performed in the so-called PPP construction. Among the renovations of buildings, the multistage project of the Central Management Building (Üllői út 26) started in 2008 has to be mentioned, the first stage of which, the renovation, was finished in 2009 and the project was completed by the formation of the loft in 2012. The Ophthalmology Clinic in the Mária utca and the 1st Department of Pathology and Experi-

mental Cancer Research were renovated in 2013. In the summer of 2012, the large-scale development of the Outer Clinical Site, the Korányi project was started, which is one of the most significant investment of the previous century of the university.

Between 2008 and 2010, Semmelweis University started three off-site trainings abroad. The first was the Asklepios Campus Hamburg, within the framework of which the students studying in German language continue their studies in the Hamburg campus according to the Hungarian curriculum, after the theoretical training in Budapest and they get the medical (M.D.) diploma of the Semmelweis University at the end of the training. In cooperation with the L.U.de.S University, Lugano, Switzerland, the Italian and English language physiotherapy basic training (BSc) started in 2009, with the same curriculum as the Faculty of Health. In 2010, the Faculty of Health and Public Services established an off-site training in Bratislava. The postgraduate health management training programme organised jointly with the Health Management Academy, Bratislava was held in Slovakian language with two groups, one in 2010 and in 2012.

In 2010, Semmelweis University won the title of Prestigious Research University related to which it performed a large-scale tender with the title "Modern Medical Science Technologies in the Semmelweis University". Within the framework of a tender of almost 3 billion Hungarian Forints, outstanding results were achieved in five distinguished fields of research: personalised medicine, imaging procedures and bioimaging, bio-engineering and nanomedicine, molecular medicine and in the integrative educational module. The university won the Research University qualification for the period 2013-16 as well, which is still possessed.

In Hungary in 2011, Semmelweis University was the first among the medical universities to develop e-learning learning materials within the framework of a two-year Social Renewal Operational Programme (TÁMOP) and the possibility became open to hold on-line examinations. Even in that year, the E-learning and Digital Content Development Centre was founded, which performs the coordination tasks of the development of the university learning materials.

In 2013, the Central Institute of Stomatology was terminated, the role of which was taken away by the Department of Community Dentistry within the university. This Department renovated in 2019 is the largest institute of the Faculty of Dentistry in terms of staff and floor area and in addition to the continuous patient care, it takes part in the education, specialist physician training and further education tasks as well. In 2014, the Thoracic Surgery Department was established, which is operating on the basis of the National Institute of Oncology. In December 2015, the first successful lung transplantation in Hungary was performed here.

On 1 September 2014, the Faculty of Physical Education and Sport Sciences spun off Semmelweis University and it continued its operation separately again, with the name of University of Physical Education.

In the end of 2014, similarly to many Hungarian institutes of higher education, with the introduction of the chancellor position, the management system of Semmelweis University was changed. Education, research and patient care are managed by the rector, while the tasks regarding the operation and the management of the university were transferred to the chancellor. From 2015, the management of the Clinical Centre of the university was taken by the vice-rector for clinical affairs from the rector. In 2016, as a separate patient care institution of the university, the Centre of Oncology was formed after its spin-off from the Department of Radiology and Oncotherapy. On 1 August 2017, the Pető András College and its part, the Institute of Conductive Education joined the University, which has been operating as the Pető András Faculty. In this way, the number of faculties increased to six again.

In 2018, the university celebrated the 200th anniversary of the birth of Semmelweis Ignác after whom the university got its name and with the solemn opening ceremony of the academic year 2019/2020, the jubilee year of the university starts, with which we pay tribute to the 250th anniversary of the foundation of the university.

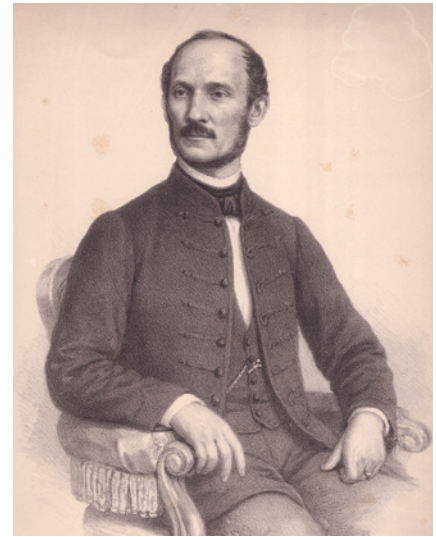
Compiled by
dr. László Molnár–Zenina Sági–Pálma Dobozi



BENE Ferenc,
tutor of internal medicine
1775-1858



BÓKAI János,
tutor of paediatrics
1822-1884



BALASSA János,
tutor of surgery, the director of
the Medical Faculty in 1848/49
1814-1868



ARÁNYI Lajos,
the first tutor of pathology
1812-1887



SEMMELWEIS Ignác,
painted by THAN Mór
1818-1865



WAGNER János,
tutor of internal medicine
1811-1889



JENDRASSIK Jenő,
tutor of physiology
1824-1891



LENHOSSÉK József from 1864,
tutor of anatomy
1818-1888



GENERICH Antal,
tutor of pathology
1842-1918



LUMNICZER Sándor,
tutor of surgery
1821-1892



MIHALKOVICS Géza,
tutor of anatomy
1844-1899



HÖGYES Endre,
tutor of general medicine
1847-1906



FODOR József,
the first tutor of the independent
public health
1843-1901



TAUFFER Vilmos,
tutor of obstetrics and gynaecology
1851-1934



KORÁNYI Sándor,
tutor of internal medicine
1866-1944



NÉKÁM Lajos,
tutor of dermatology
1868-1957



KROMPECHER Ödön,
tutor of pathology
1870-1926



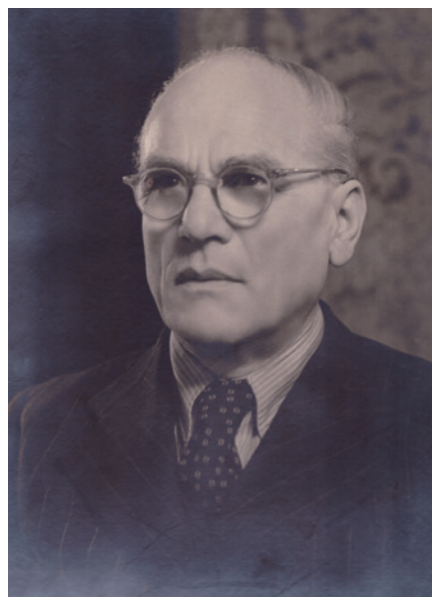
HUZZELLA Tivadar,
the director of the Institute of
Histology and Embryology
1886-1950



BALOGH Károly,
the first dean of the Faculty of
Dentistry
1895-1973



HAYNAL Imre,
the director of the Department of
Internal Medicine II
1892-1979



MOZSONYI Sándor,
the first dean of the
Faculty of Pharmacy
1889-1976



SZENT-GYÖRGYI Albert,
Nobel Prize winner,
tutor of biochemistry
1893-1986



BALÓ József,
tutor of pathology
1895-1979



SZENTÁGOTHAJ János,
neuroscientist,
tutor of anatomy
1912-1994

Changing the operating model (2021—)

On its decision 1/2021 (I. 28.) the Senate of Semmelweis University - including its six faculties, public education and vocational institutions, as well as its clinical centre forming an organic unit with its medical and health sciences training - supported the change of the operating model of Semmelweis University. The state transfers its maintenance rights to a public interest foundation to be established by the state for the maintenance of Semmelweis University, thus contributing to the achievement of the university's strategic goals and the development of Hungarian medical and health science education and patient care.

Semmelweis University is already an elite university of international reputation, known and respected, which has reached the limits of its development due to current environmental constraints. A change of model could create the opportunity to achieve the goal of becoming one of the world's top 100 universities.

The vision of Semmelweis University is to be recognised as one of the world's leading universities, and as such, ensuring the unity of theoretical education, basic and translational research and clinical care, while respecting tradition. The university's further goal is to implement the training of excellent professionals in medical and health sciences along with closely related pedagogical fields by widely applying the results of modern technology. The university employs methods of the highest level of healing, focusing on the areas of health preservation, disease prevention, personalized medicine, and societal expectations, and serving the rise of the nation.

The operational model (public law framework) of the University has not changed significantly in the last three decades. Since its establishment, it has operated as a central budgetary body, as part of public finances, regarding its management, financing, employment and motivation. The socio-economic environment of the University, as well as the sectoral governance of higher education, poses challenges to the current operating model which the institution can hardly meet within its current operational framework.

A change in operation model is necessary to enable the university to meet its own quality expectations and those of the market and knowledge industry.

The new model that will emerge as a result of the transformation will make it possible to achieve strategic goals:

- 1. By 2030, Semmelweis University will become one of Europe's five most successful universities in the medical sciences and one of the top 100 out of 28,000 universities in the world.**
- 2. Ensuring the sovereignty of Hungarian-language health-care in Hungary and the nation, the entire system of medical and health professional training will be renewed as part of the curriculum reform launched in the year of the 250th anniversary of Semmelweis University.**
- 3. Semmelweis University will train some of Europe's top doctors, dentists, pharmacists, conductors, health and health related management as well as social science professionals.**

- 4. A key export product of Semmelweis University is its foreign-language medical training, which generates significant revenues at national level, and which can be expanded by various means in the coming years.**
- 5. Graduates of Semmelweis University are doctors and health professionals who know the Christian cultural roots that are so important in the field of medicine, and who not only understand the value of health, but live it.**
- 6. Semmelweis University's clinical patient care activities will be renewed by developing a complete public care portfolio., thus enhancing the health security of the Hungarian population and increasing trust in healthcare.**
- 7. Health and pharmaceutical developments that ensure national sovereignty are implemented on the research and innovation base of the University.**
- 8. The research output of Semmelweis University can be significantly increased in a practical, translational direction as a result of patient-centred health industry cooperation with national and international partners in line with governmental goals. In this process domestic health industry players will be given a prominent role.**
- 9. Leadership in data-driven support for health and healthcare industry paradigm shift.**

The aim of Semmelweis University is to contribute to the creation of a world-class medical and health sciences university in Hungary, to become a national educational and scientific base for disease management, and to support the re-launch of the economy through its developments.

In accordance with the provisions of Act XX of 2021 on „public trusts funds performing public function” and Act XX of 2021 on the “National Foundation for Health and Medical Training, the transfer of assets to the Foundation for National Health Care and Medical Education and Semmelweis University”, the Semmelweis University will continue to operate as a public interest university in the form of a foundation from 1 August 2021. The executive body of the foundation is the board of trustees, which exercises all the powers that do not fall within the competence of the founder or other foundation organization or body, in particular the maintenance rights of the university specified in the act on higher education. The Board of Trustees consists of five (5) natural persons. The members of the Board of Trustees are the Chairman and the members of the Board of Trustees.

Written by:
dr. László Molnár
Zenina Sági
Pálma Dobozi
Beatrix Valyon

HONORARY DOCTORS OF THE MEDICAL FACULTY OF BUDAPEST DURING THE UNIVERSITY'S SCIENCE ERA

1895/96	Tivadar Károly, royal prince from Bavaria John Shaw Billings, professor from Philadelphia Rudolf Virchow, professor from Berlin Joseph Lister, professor from London Adolf Anders Retzius, professor from Stockholm Guido Bacelli, professor from Rome Pierre-Paul-Émile Roux, professor from Paris Károly Than, professor of Budapest	1930/31	Harvey Williams Cushing, professor of Harvard University in Cambridge
1899/1900	Tivadar Duka, chief doctor Col. Emeritus of the royal Bengal army of England, on the occasion of his 50th anniversary of operation	1934/35	Jenő Sipőcz, Lord Mayor of Budapest
1909/10	Albert Apponyi, Minister of Culture, on the occasion of the XVI. International Medical Congress held in Budapest	1935/36	Ferdinand-Jean Darier, Chairman of the French Society of Dermatology Anton Freiherr von Eiselsberg, professor from Vienna Karl Albert Ludwig Aschoff, professor from Freiburg August Krogh, professor from Copenhagen Granville Harrison Ross, professor at Yale University Charles Scott Sherrington, professor from Oxford Frederick Gowland Hopkins, professor from Cambridge Gustave Roussy, professor from Paris
1911/12	Heinrich Wilhelm Waldeyer, professor from Berlin, on occasion of his 50th jubilee as a doctor	1942/43	Károly Szendy, Mayor of Budapest
1914/15	Otto Karl Schjerning, professor of Berlin		
1928/29	Friedrich Schmidt-Ott, Minister of State of Prussia		

LIST OF PERSONS AWARDED WITH THE „DOCTOR HONORIS CAUSA” TITLE AT THE BUDAPEST/SEMMELWEIS UNIVERSITY OF MEDICAL SCIENCES

1967	Boris Vasilyevich Petrovsky (Soviet Union)	1987	John Gergely (USA) Halfdan I. Mahler (Denmark) Shogo Sasaki (Japan) Ludwig Mecklinger (Germany) F. Gotthard Schettler (Germany)
1969	Pyotr Kuzmich Anohin (Soviet Union) Assen Hadyolov (Bulgaria) György Békéssy (USA) Vasily Vasilyevich Parin (Soviet Union) Daniel Bovet (Italy) Stefan Milcu (Romania) Karl Fellinger (Austria) Samuel Rapaport (Germany) Jules François (Belgium) Pyotr Grigoryevich Sergiyev (Soviet Union)	1988	László Ernster (Sweden) Jan Solich (Czechoslovakia) Dieter Schleger (Germany) Emeric Szilágyi (USA) Thomas P. Singer (USA) George B. Udvarhelyi (USA)
1972	Marcelino G. Candau (Switzerland)	1989	Douve D. Breimer (Netherlands)
1976	Britton Chance (USA) Leonid Semyonovich Persyanilov (Soviet Union) Tadeusz Krwawicz (Poland) Vasyl Vasilyevich Zakusov (Soviet Union)	1990	Yoshinori Nozawa (Japan) Walter Künzel (Germany) Herbert Oelshcläger (Germany) Jerzy Maj (Poland) Martin Reivich (USA)
1978	Uktam Aripov (Soviet Union)	1991	Friedrich Wilhelm Ahnefeld (Germany) László Róbert (France) Endre A. Balázs (USA) Benno Runnebaum (Germany) Herbert Braunsteiner (Austria) Heitaroh Iwata (Japan)
1980	Nikolai Nikolaevich Blohin (Soviet Union)	1992	Merton Sandler (England) Hans Weidinger (Germany)
1982	George Weder (USA)	1993	György Ács (USA) László Iffy (USA)
1983	Philip Gerald Mechanick (USA) Viking Olov Björk (Sweden)		
1984	Walter Birkmayer (Austria) Arje Scheinen (Finland)		
1985	Jens J. Pintborg (Denmark) Armand Hammer (USA) Klaus Thureau (Germany)		
1986	Hans Altmann (Austria) Mitropan Studenikin (Soviet Union)		

1994	Ursula Lachnit-Fixon (Germany) Milan Chalabala (Slovakia) Felix Unger (Austria) Ulrich Joos (Germany) Isaac van der Wald (Netherlands) Sergio Ferri (Italy)	1998	Bernd Brinkmann (Germany) Frank A. Chervenak (USA) Asim Kurjak (Croatia) Ferenc Robicsek (USA) Werner Schmidt (Germany) André Haynal (Switzerland)
1995	Takao Yamauro (Japan) H. W. Wouters (Netherlands)	1999	Luis Gabriel Navar (USA) Nikolaus Freudenberg (Germany) Stefan Pollak (Germany) Tamás Hacki (Germany) Norbert Schwenzer (Germany) Thomas D. Kerényi (USA) Georg Stingl (Austria) Thomas Michael Krieg (Germany) Michael Wahl (Germany) Juhani Leppäluoto (Finland) Klaus Wolff (Austria)
1996	Károly Balogh (USA) Thomas Rabe (Germany) Horst Cotta (Germany) Eberhard Ritz (Germany) Viktor E. Frankl (Austria) Heikki Ruskoaho (Finland) John A. Hobkirk (England) Thomas Schiff (USA) Dieter Ernst Lange (Germany) Volkmar Schneider (Germany)		
1997	Theodor Hellbrügge (Germany) Hans-Günter Sonntag (Germany) Thomas Kenner (Austria) Moussa B. H. Youdim (Israel) Edward R. Perl (USA)		

LIST OF PERSONS AWARDED WITH THE „DOCTOR HONORIS CAUSA” TITLE AT SEMMELWEIS UNIVERSITY

2000	Allen Cowley (USA) Péter Illés (Germany) Iván Kiss (Germany) Ryszard Jerzy Gryglewski (Poland) Emmanuel van Praagh (France) Claes B. Wollheim (Switzerland) Gottfried O. H. Naumann (Germany) Gabriel P. Haas (USA) Gerd Schmitz (Germany) Elemér Zsigmond (USA)	2004	Stephen Katz (USA) Sebastian G. B. Amyes (England) Sir George Radda (England) Michael Marberger (Austria) István Seri (USA) Peter Gängler (Germany) Osmo Hänninen (Finland) Albert William Taylor (USA) Barry D. Kahan (USA)
2001	Pekka Juhani Saukko (Finland) Leo M. Sreebny (USA) N. Joan Abbott (England) Christopher Squier (USA) Ádám Tegzess (Netherlands) Gottfried Heinisch (Austria) Herbert Rübben (Germany) Han C. G. Kemper (Netherlands)	2005	Vilmos Vécsei (Austria) Louis Ignarro (USA) Gyöngyi Szabó (USA) Heinrich Schmidt-Gayk (Germany) Jos Hendrik Willem Hoogmartens (Belgium) Cynthia K. Larive (USA) Tibor Hortobágyi (USA) Vladimir Brusic (Australia)
2002	Jacques Rogge (Belgium, Switzerland) Sataro Goto (Japan) Matthias Brandis (Germany) John Holloszy (USA) János Alpár (USA) Denys Wheatley (England) Angelo Benedetti (Italy) Ferenc Jolesz (USA) Tatsuo Nagai (Japan)	2006	Uwe Wilhelm Joseph Heemann (Germany) Philippe Morel (Switzerland) Rolf Christian Gaillard (Switzerland) Mátyás Sándor (USA) Hideki Ohno (Japan)
2003	Thomas E. Andreoli (USA) Michael Georgieff (Germany) László Víg (Hungary) György Gosztonyi (Germany) Martin Black (England) Helmut Hahn (Germany) Thomas Detre (USA) Carl Hermann Lücking (Germany) David B. Ferguson (England) Marteen J. H. Slooff (Netherlands)	2007	John Raymond Garrett (England) Michael Landthaler (Germany) Kamal K. Midha (Canada) Gertrud Pfister (Denmark) Roberto Romero (USA) Heinz Schilcher (Germany) Jörg Schubert (Germany) Clemens Sorg (Austria)
		2008	Olaf Bodamer (Austria) Péter Pál Bucsky (Germany) Kelvin Davies (USA) Gabor Kaley (USA) Anton Sculean (Netherlands)

2009	Maynard R. Case (England) Christopher R. Chapple (England) László Endrényi (Canada) Zsuzsanna Fábry (Hungary – USA) Bruno Grandi (Italy) Jerzy Kosiewicz (Poland) Karl-Heinz Kuck (Germany) Peter Malfertheiner (Germany) Franco Mantero (Italy) Éva Mezey (Hungary – USA) Georg Petroianu (Germany – USA) Tamás Péter Sótónyi (Hungary)	2017	Gerhard Hindricks (Germany) Christine Baylis (USA) Rainer Schulz (Germany) Mikael Björnstedt (Sweden) Keiichi Maruyama (Japan) Josef Smolen (Austria) Clive G. Wilson (England) Stefan Offermanns (Germany)
2010	Roger Y. Tsien (USA) Masaki Kitajima (Japan) Hartmut P. H. Neumann (Germany) István Boldogh (USA) Constantin Copotoiu (Marosvásárhely, Romania)	2018	Dr. Miklos Sahin-Toth (USA) Dr. Maria Antonietta Stazi (Italy) Dr. Piotr L. Chlost (Poland) Dr. Jianguang Xu (China) Dr. Daan J. A. Crommelin (Netherlands) Dr. Olavi Pelkonen (Finland) Prof. Dr. Scott David Solomon (USA) Offermanns, Stefan (Germany)
2011	Péter Ferenczi (Austria) Dirk Pickuth (Germany) Andrzej Wiecek (Poland) Renato V. Iozzo (USA) Örs Nagy (Romania) István Bocskai (Romania) James S. Skinner (USA)	2019	Komajda, Michel (France) Hausenloy, Derek John (Singapore) Bax, Jeroen (Netherlands) Hogendoorn, Pancras (Netherlands) Madonna, Rosalinda (Italy-USA) Schirmacher, Peter (Germany) Mühlebach, Stefan (Switzerland) István Tóth (Australia)
2012	Pierre Corvol (France) Tibor Juhász (USA) George Berci (USA) Axel Ullrich (Germany) Jozef Corveleyn (Belgium) Joseph Kutzin (Switzerland) Daan Braveman (USA) Imre G. Csizmadia (Canada) Árpád Gyéresi (Marosvásárhely, Romania) Vinod P. Shah (JSS University of Mysore, India) Jürgen Michael Steinacker (Germany)	2020	Prof. Hans Henkes (Germany) Prof. Gerasimos Filipatto (Greece) Dr. Markó-Varga György (Sweden) Prof. Dr. Jude Fitzgibbon (England) Prof. Dr. Udo Hoffmann (USA)
2013	Peter Gabor Medveczky (USA) Arthur J. Moss (USA) Gerhard M. Kostner (Austria) Marie T. O'Toole (USA) Peep Veski (Estonia) Kai-Ming Chan (China) Paul G. M. Luiten (Netherlands)	2021	Prof. Stefan Anker (Germany) Prof. Mariann Pavone-Gyöngyösi (Austria) Prof. Gary Francis Baxter (England) Prof. Olschewski Andrea (Austria) Prof. Shahrokh Francis Shariat (Austria) Prof. Carlos J. Bustamante (USA) Prof. Ondrej Viklicky (Czech Republic) Prof. Hans Henri Marcel Paul Kluge (Denmark)
2014	Richard M. Satava (USA) René Sylvain Kahn (Netherlands) Péter Gloviczki (USA) Herbert Ehringer (Austria)	2022	Prof. Dr. Alan B. Lumsden (USA) Prof. Dr. Bruno Podesser (Austria) Prof. Dr. Henk L. Granzier (USA) Prof. Dr. Marc Dewey (Germany) Prof. Dr. Falkai Péter (Germany) Prof. Dr. Rade D. Paravina (USA) László Záborszky (USA) Prof. Franz Weidinger (Austria) Prof. Marc Alan Pfeffer (USA) Prof. Thomas G. Allison (USA)
2015	Shigeru Saito (Japan) Pál Pacher (USA) Jacques Marescaux (France) Leena Kaarina Bruckner-Tudermann (Germany) Stephan Züchner (Germany) Fausto J. Pinto (Portugal) György Kálmán Béla Sándor (Finland) Panos Macheras (Greece) Attila A. Hincal (Turkey)	2023	Dr. Ralf Konrad Bergmann (Germany) Dr. Robert Hatala (Slovakia) Dr. Gerd Heusch (Germany) Dr. Hendrik Scholl (Switzerland/USA) Dr. Martin Werner (Germany) Dr. Kaan Orhan (Turkey) Dr. Dimitrios Lamprou (UK)
2016	László Bögre (England) Walter Klepetko (Austria) Lajos Okolicsányi (Italy) György Kúnos (USA) Josep Figueras (Spain) Henning H. Blume (Germany) Gábor Tigyi (USA)	2024	Dr. András Khoor Dr. Tünde Pető Dr. Tienush Rassaf Dr. Claus Peter Schmitt Dr. Ajay Singh Dr. Antonio Toscano Dr. Masashi Yoshida Dr. Francesco Guido Mangano Dr. Walter Renne Dr. Scott R. Woolley

PRIVATE TUTORS OF SEMMELWEIS UNIVERSITY

1995	Dr. Árpád Mayer head physician, Uzsoki Hospital, Oncology Centre Dr. László Takácsi Nagy deputy head physician, Uzsoki street Hospital, Oncology Centre		Dr. István Vermes chief physician, Medical Spectrum, Twente (Netherlands) Dr. Bosco Camelo associate professor, University of Rome Dr. Péter Göblyös head physician, National Institute of Hematology and Immunology
1996	Dr. Elemér Nemesánszky head physician, Buda Hospital of the Hospitaller Order of Saint John of God Dr. István Hartyánszky, chief physician, National Institute Of Cardiology Dr. János Strausz medical director, Törökbálint Institute of Pulmonology Dr. Szabolcs Ottó deputy director-general chief physician, National Oncological Institute Dr. András S. Szabó associate professor, Head of Department, Saint Stephen University Dr. Endre Ludwig head physician, Péterfy Sándor street Hospital	2000	Dr. Miklós Bély head physician, Buda Hospital of the Hospitaller Order of Saint John of God Dr. György Berencsi head physician, Béla Johan National Epidemiology Centre Dr. Tamás Szabó Head of the scientific group, Central School of Sport
1997	Dr. Béla Goldschmidt head physician, Saint Roch Hospital Dr. János Hamar head physician, National Institute of Traumatology Dr. György Jermendy head physician, Bajcsy-Zsilinszky Metropolitan Hospital Dr. György Karmos senior research fellow, Hungarian Academy of Sciences, Institute of Psychology Dr. Elek Kisida head physician, Buda Hospital of the Hospitaller Order of Saint John of God Dr. Tibor Raposa head physician, Saint Stephen Metropolitan Hospital Dr. Géza Tasnádi head physician, Pál Heim Metropolitan Municipality Children's Hospital Dr. István Péter Temesvári head physician, National Institute of Rheumatology and Physiotherapy Dr. József Tóth head physician, National Oncological Institute Dr. Károly Sándor Tóth head physician, Saint Margaret Hospital Dr. Valéria Váradi head physician, Saint Margaret Hospital Dr. Gábor Pethő director of quality assurance, Pharmavit Ltd.	2001	Dr. Sándor Frenyó head physician, National Traumatology Institute Dr. Ferenc Horkay head physician, National Cardiology Institute Dr. Krisztina Kádár chief physician, National Cardiology Institute Dr. Lajos Kotsis chief physician, National Korányi Institute of TBC and Pulmonology Dr. Ilona Kovalszky senior research fellow, No. I. Institute of Pathology and Experimental Cancer Research Dr. Aladár Rónaszéki head physician, Elizabeth Hospital of Péterfy Sándor street Hospital Dr. Ágnes Szebeni head physician Emeritus, Ministry of Home Affairs Central Hospital Dr. András Végh head physician, Pál Heim Metropolitan Municipality Children's Hospital Dr. Gábor Winkler head physician, Saint John Hospital
1998	Dr. Hedvig Bodánszky consultant, National Medical Centre Dr. István Láng chief physician, National Oncology Institute Dr. Béla Lombay head physician, B-A-Z County Hospital, Radiology Institute, Department of Paediatric Radiology Dr. János Radó physician, Virányos Clinic Dr. Károly Simon head physician, Saint Emeric Hospital-Clinic	2002	Dr. Mátyás J. Baló (Banga) head physician, Central Hospital of the Hungarian Homeland Defence Forces, Department of Internal Medicine Dr. Béla Büki chief physician, Kremsi Hospital, Department of Otolaryngology Dr. Sándor Czirják chief physician, Deputy Director-General, National Scientific Institute of Neurosurgery Dr. Gyula Domján head physician, Saint Roch Hospital, No. I. Department of Internal Medicine Dr. Sándor Dubecz chief physician, National Oncology Institute, Department of General Surgery and Thoracic Surgery Dr. Lajos Kullmann director-general chief physician, National Medical Rehabilitative Institute Dr. Ádám László head physician, Bajcsy-Zsilinszky Hospital, Department of Obstetrics and Gynecology Dr. Károly Nagy deputy scientific director, National Institute of Dermatology and Venereology Dr. Erzsébet Temesvári senior research fellow, National Institute of Dermatology and Venereology
1999	Dr. György Bodoky chief physician, Saint Ladislaus Hospital Dr. Kristóf Nékám head physician, Buda Hospital of the Hospitaller Order of Saint John of God Dr. Gyula Poór director-general chief physician, National Institute of Rheumatology and Physiotherapy Dr. László Simon head physician, Tolna County Municipal Hospital, Szekszárd Dr. Attila Tankó medical specialist, District II. Municipality Clinic Dr. Gábor Veres director-general chief physician, Balatonfüred State Hospital	2003	Dr. Áron Altorjay head physician, Fejér County Saint George Hospital Dr. István Bodrogi head physician, National Oncology Institute Dr. Károly Cseh head physician, Sándor Korányi Hospital and Clinic Dr. Gábor Faludi head physician, Kútvölgyi Clinical Array Dr. Irén Herjavec head physician, National Korányi Institute of TBC and Pulmonology

	Dr. Kálmán Róna scientific consultant, Department of Forensic Medicine Dr. György Szeifert chief physician, National Scientific Institute of Neurosurgery Dr. Imre Klebovics head of science department, EGIS Pharmaceuticals PLC		Dr. Miklós Merksz head physician, Pál Heim Metropolitan Municipality Children's Hospital, Department of Urologic Surgery Dr. András Telekes head physician, Bajcsy-Zsilinszky Metropolitan Hospital-Clinic, Department of Oncology
2004	Dr. Jenő Julow head physician, National Scientific Institute of Neurosurgery Dr. László Bognár head physician, National Scientific Institute of Neurosurgery	2013	Dr. Attila Vörös chief physician, State Medical Centre - Central Hospital of the Hungarian Homeland Defence Forces Dr. Zoltán Takács-Nagy head physician, National Oncology Institute, Department of Radiotherapy
2005	Dr. György Bagdy head of laboratory, scientific director, National Institute of Psychiatry and Neurology Dr. Katalin Borbély head physician, National Scientific Institute of Neurosurgery	2014	Dr. György Ostoharics-Horváth chief physician, Aladár Petz County Hospital, Department of Psychiatry, Mental Hygiene and Addictology
2006	Dr. Ildikó Horváth head physician, National Korányi Institute of TBC and Pulmonology, doctor of the Hungarian Academy of Sciences Dr. László Dézsi research supervisor, Gedeon Richter PLC Research Department of Pharmacology and Drug Safety Dr. Tamás Szamosi consultant, No. II. Clinic of Paediatrics	2015	Dr. Sándor Bende chief physician, titular associate professor, B-A-Z County Hospital and University Teaching Hospital Dr. Tamás Sándor chief physician, (retired volunteer assistant), 2nd Department of Surgery
2007	Dr. Róbert Veres head physician, National Scientific Institute of Neurosurgery	2016	Dr. Ferenc Ender chief physician, Joint Saint Emeric and Saint Ladislaus Metropolitan Hospital, Surgery Department
2008	Dr. Attila Csekeő head physician, National Korányi Institute of TBC and Pulmonology	2017	Virág Katalin Bognár self-employed sociology instructor Dr. Bertalan Meskó, Webicina Kft., manager Dr. Gamal Eldin Mohamed Elmowag head physician, Budaörs Healthcare Centre Dr. Miklós Szokoly director-general consultant, Péterfy Sándor street Hospital, Clinic and Casualty Centre Dr. Tamás Iváncsy associate professor, Budapest University of Technology and Economics, Faculty of Electrical Engineering and Informatics, Department of Electric Power Engineering Dr. Judit Moldvay chief physician, National Korányi Pulmonology Institute, Tumor Biology Department Dr. Géza Nagy college professor, Semmelweis Hospital, head physician, University of Miskolc, Faculty of Healthcare
2009	Dr. Péter Andréka head physician, György Gottsegen National Cardiology Institute, Department of Cardiology Dr. István Szikora deputy director-general chief physician, National Neuroscience Institute	2021	Prof. Dr. Róza Ádány academic lecturer, Department of Public Health Prof. Dr. Tamás Fülöp academic lecturer, Department of Public Health Dr. Miklós Tunyogi Csapó, Department of Spinal Medicine
2010	Dr. Tamás Görcs lecturer, Department of Anatomy, Histology and Embryology Dr. György Keleti head physician comm. Joint Saint Emeric and Saint Ladislaus Hospital, Surgery Department Dr. Ödön Gaál graduate chemist emeritus, National Institute of Nutritional Science (1972-2005)		
2011	Dr. Béla Schumann director, Laborexper Kft. Dr. Miklós Lőw chemist emeritus, Gedeon Richter PLC Dr. András Bálint project manager chief physician, Saint Emeric Municipal Hospital, General Surgery Section		

FOUNDATION FOR NATIONAL HEALTH CARE AND MEDICAL EDUCATION

Act IX of 2021 on „public trusts funds performing public function” and Act XX of 2021 on the “Foundation for National Health Care and Medical Education, the transfer of assets to the Foundation for National Health Care and Medical Education and Semmelweis University” The executive body of the foundation is the Board of Trustees, which exercises all the powers that do not fall within the competence of the founder or other foundation organization or body, in particular the maintenance rights of the university specified in the act on higher education. The Board of Trustees consists of five (5) natural persons. The members of the Board of Trustees are the Chairman and the members of the Board of Trustees.

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CHAIRMAN	Dr. Gábor Orbán (Chief Executive Officer of Gedeon Richter Plc.)
MEMBERS	Dr. Jonathán Róbert Bedros (Director General of Szent Imre University Training Hospital) Dr. Péter Gloviczki (Professor of Vascular Surgery at Mayo Clinic) Dr. Béla Péter Merkely (Rector of Semmelweis University, Director of the Heart and Vascular Centre) Dr. Miklós Szócska (Director of the Health Services Management Training Centre and the Institute of Digital Health Sciences, Dean of the Faculty of Health and Public Administration)

Supervisory Board

CHAIRWOMAN	Dr. Róza Nagy (Chief Adviser to the President of Magyar Nemzeti Bank i.e. Hungarian National Bank)
MEMBERS	Dr. Zoltán Hankó (President of the Hungarian Chamber of Pharmacists) István Havas (Executive Director)

Senate

The Senate is the supreme autonomous leading body endowed with rights of decisional authority, initiative, review and control. The chairman of the Senate is the rector of Semmelweis University.

The makeup of the Senate

The member of the Senate may be such a person – excluding representatives of the Student’s Union and other representative organisations – who is employed by Semmelweis University in an employment relationship or as a full-time working public servant, i.e. lecturer, researcher, teacher, or other scope of activity. The Senate consists of 45 members. This number is determined according to the seats available based on position, election and delegation as a result of election, defined in Section 13, part (4)-(5) of the Organisational and Operational Rules. The Rector and Chancellor are ex officio members of the Senate.

Members of the Senate

RECTOR

CHANCELLOR

VICE RECTORS

FACULTY OF MEDICINE

FACULTY OF HEALTH SCIENCES

FACULTY OF DENTISTRY

FACULTY OF PHARMACEUTICAL SCIENCES

FACULTY OF HEALTH AND PUBLIC ADMINISTRATION

ANDRÁS PETHŐ FACULTY

KÁROLY RÁCZ SCHOOL OF PHD STUDIES CLINICAL CENTRE

STUDENT'S UNION

DOCTORANDUS STUDENT UNION PUBLIC SERVICE COUNCIL

SEMMELWEIS LABOUR ORGANISATION (according to Section 13. Parts (2) and (3) of the Organisational and Operational Rules)

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Dr. Béla Merkely

Dr. Lívía Pavlik

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Dr. Éva Szabó Feketéné

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Tünde Falatovics

Dóra Szepesi

Dr. Zsolt Antóny

Gábor Orbán

Prof. Dr. Zoltán Nagy

Prof. Imre Klebovich

Dr. Zoltán Szabolcs



RECTOR: **Prof. Dr. Béla Merkely** M.D., Ph.D., D.Sc.



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PRESIDENT OF THE DOCTORAL COUNCIL:	Prof. Dr. Zoltán Benyó M.D., Ph.D., D.Sc.		
HEAD OF THE CENTER OF INTERNATIONAL TRAINING PROGRAMS	Prof. Dr. Alán Alpár M.D., Ph.D., D.Sc.		
DIRECTOR of the DIRECTORATE OF INTERNATIONAL STUDIES and ACADEMIC PROGRAM DIRECTOR FOR MEDICINE, DENTISTRY AND PHARMACEUTICAL SCIENCES IN ENGLISH:	Prof. Dr. Miklós Csala M.D., Ph.D., D.Sc.		
Division of English Language Programs	Office: Basic Medical Science Center 1094 Budapest IX., Tűzoltó u. 37-47, first floor 1.604/a Phone: (36-1) 266-0452 e-mail: studies@semmelweis.hu Website https://semmelweis.hu/registrar		
Head of Division:	Ms. Andrea Kevi (459-1500 ext 60081; kevi.andrea@semmelweis.hu)		
Directorate Office	Ms. Zsuzsanna Busa (459-1500 ext 60069; busa.zsuzsanna@semmelweis.hu)		
Manager:			
Office hours:	Monday: 013:00-15:00 Wednesday: closed Thursday: 10:00-12:00	Tuesday: 10:00-12:00 Friday: closed	

SCHEDULE FOR THE 2025/2026 ACADEMIC YEAR

(Faculty of Medicine, Faculty of Dentistry, Faculty of Pharmaceutical Sciences)

The dates are subject to change!

University events

Summer University (NET)	August 27-29, 2025
Freshman Camp	September 4 – September 7, 2025
Opening Ceremony (MVM Dome)	August 30, 2025
National Holiday	October 23, 2025
Semmelweis Symposium – EOK	November 17-19, 2025
Winter Break	December 23, 2025 – January 5, 2026
TDK Conference	February 5-6-7, 2026
National Holidays	March 15, 2026
	April 3 – April 6, 2026
	May 1, 2026
	May 25, 2026
Exam Outside Academic Year	August 21 – August 27, 2026

Faculty of Medicine

Enrollment	I year	August 25-26, 2025
Registration	VI year	July 4 – July 10, 2025
Registration 1st semester	II – V year	August 25 – September 5, 2025
Fall Study Period	I – III year	September 8 – December 12, 2025
	IV – V year	September 8, 2025 – January/February 2026
	VI year	July 14, 2025 – January 2026 (TBA)
Fall Exam Period	I – III year	December 15 – December 19, 2025 and January 5 – February 13, 2026
Board Exam Period		November 18 – November 28, 2025
Written Board Exam		November 18, 2025
Oral and Practical Board Exam (plan)		November 19 - November 28, 2025
Registration 2nd semester	I – VI year	February 2 – 13, 2026
Spring Study Period	I – III year	February 16 – May 22, 2026
	IV – V year	January/February 2026 – July 3 + 2 make up weeks until July 17
	VI year	January, 2026 – April 24, 2026
Spring Exam Period	I – III year	May 26 – July 10, 2026
Board Exam Period		May 27 – June 12, 2026
Written Board Exam		May 27, 2026
Oral and Practical Board Exam		between May 28 - June 12, 2026

Faculty of Dentistry

Enrollment	I year	August 25-26, 2025
Registration 1st semester	II – V year	August 25–29, 2025
Late Registration		September 1-2, 2025
Fall Study Period		September 8 – December 12, 2025
Fall Exam Period	I – III year	December 15 – December 19, 2025
	IV– V year	and January 5 – February 13, 2025
		December 8 – December 19, 2025
		and January 5 – February 6, 2025
Registration 2nd semester	I – III year	February 9 – February 13, 2026
	IV – V year	January 26 – February 6, 2026
Late Registration		February 9-10, 2026
Spring Study Period	I – III year	February 16 – May 22, 2026
	IV year	February 11 – May 26, 2026
	V year	February 2 – April 24, 2026
Spring Exam Period	I – III year	May 26 – July 10, 2026
	IV year	May 11 – June 26, 2026
	V year	April 27 – June 12, 2026
Board Exam Period		June 15-19, 2026
Graduation Ceremony		July, 2026 (TBA)

Faculty of Pharmaceutical Sciences

Enrollment	I year	August 27, 2025
Registration	V year	July 14-18, 2025
Registration 1st semester	II – IV year	August 18 – September 7, 2025
Fall Study Period	I – IV year	September 8 – December 12, 2025
	V year	September 15 – December 19, 2025
Fall Exam Period	I – V year	December 15 – December 19, 2025
		and January 5 – February 13, 2026
Registration 2nd semester	I – IV year	February 9-13, 2026
	V year	January 28 – February 13, 2026
Spring Study Period	I – IV year	February 16 – May 22, 2026
4 months internship practice for	V year	January 28 – May 28, 2026
Spring Exam Period	I – IV year	May 26 – July 10, 2026
Board Exam Period		June 3-26, 2026
Graduation Ceremony		Late June, Early July, 2026

THE WORDS OF THE VOW AT REGISTRATION

I....., student of Semmelweis University promise under oath that I will respect the Hungarian laws and the Fundamental Law of Hungary. I promise that I shall abide by the regulations of Semmelweis University. I promise solemnly that I will respect the professors and teachers of the University, and that my conduct will be in keeping with the honor of my profession. I will keep the secrets of the patients that I learn about in the course of my studies. I will pursue my studies with full sense of responsibility to prepare myself to the best of my abilities for all my duties and obligations in my profession so as to be able to serve with my knowledge the progress of mankind. So help me God!

THE WORDS OF OATH AT GRADUATION

Faculties of Medicine and Dentistry

"I, ... swear that I will devote myself to the medical profession at all times. I will use the knowledge acquired in the field of medicine to prevent and cure diseases, and to benefit the physical and mental well-being of my patients. I will not betray the confidence of those who turn to me, I will not take advantage of their defenselessness, nor will I disclose their secrets. I will treat every person with equal care and attention. I will maintain the high quality of my knowledge and skills through continuous education, but will also acknowledge the limits of my knowledge and abilities. I will respect the ethical requirements of my medical practice. I will strive to enhance the reputation of the medical profession and of SEMMELWEIS University."

"Én, ... esküszöm, hogy orvosi hivatásomhoz mindenkor méltó magatartást tanúsítok. Orvosi tudásomat a betegségek megelőzésére, a betegek testi-lelki javára, betegségük gyógyítására fordítom. A hozzám fordulók bizalmával, kiszolgáltatott helyzetével visszaélni nem fogok, titkaikat fel nem fedem. Egyenlő figyelemmel és gondossággal gyógyítok minden embert. Tudásomat és gyakorlati ismereteimet állandó képzéssel magas szinten tartom, de ismereteim és képességeim korlátait is tudomásul veszem. Az orvosi működéssel kapcsolatos etikai követelményeket tiszteletben tartom. Arra törekszem, hogy az orvostudomány, valamint a SEMMELWEIS Egyetem jó hírnevét öregbítsem és megbecsülését előmozdítsam."

Faculty of Pharmaceutical Sciences

I, ... swear that in virtue of my acquired knowledge of pharmaceutical sciences, I shall do my professional duty with the utmost diligence, and I shall always behave worthy of my profession. I shall place before all things the care for and the healing of my patients. I shall not reveal any data concerning the health status or the medication of my patients. I shall maintain my theoretical and practical knowledge at a high level. I shall never use my knowledge for activities that are contrary to the ethical code of pharmacists. As a participant in the activity of healing, I shall use my knowledge only for the defense and restitution of health to my fellow humans. I shall do my best to promote the science of pharmacy and keep the good name of the Semmelweis University.

PLAGIARISM DECLARATION

at the Faculty of Medicine

(Declaration on compliance with regulations on preparing thesis work)

I, the undersigned, name:

(Neptun code:) hereby declare by signing this declaration that this thesis work, entitled:

.....
.....
....."

is my own work, and I adhered to the provisions of Act LXXVI of 1999 on Copyright in the preparation of the thesis work and respected the rules laid down by the University.

I acknowledge by signing this declaration that Semmelweis University refuses accepting the thesis provided it can be proved that this thesis work was not carried out by me or violation of copyright law arises with regard to the thesis.

I am also aware, that the authorization holders may take action against me because of violation of copyright law, which may result in legal consequences, including consequences of civil law, infringements act and criminal law.

Budapest, ..., 20.....

.....
student's signature

Rectorial Circular

on the independent work of students and on certain questions concerning lecture and practice policies

In order to meet the requirement for independent student work and to ensure the smooth functioning of lectures and practices, I hereby draw the attention of the students of Semmelweis University to the following:

- I. In the course of testing one's knowledge and practical skills, it is prohibited, under disciplinary liability, to use any unauthorized material, or to secure any illicit advantage. For the purpose of this provision, advantages ensured to disabled students in accordance with legal provisions or university regulations and allowances based upon individual decisions made in accordance with Chapter III Part III of The Rules of Operation and Organization of Semmelweis University qualify as allowed advantages.
- II. The independent creation of original work, as well as the true and accurate citation, and the precise and complete indication of the sources used are not only scientific requirements, but also obligations arising from legal regulation. Intellectual property is protected by the laws of Hungary. The content of this protection is defined particularly by the Copyright Act, the acts on inventions and patents, and on trademarks and the Civil Code of Hungary. The intellectual property of another person is only allowed to be used in accordance with these regulations.
All creations of literature, science and art shall fall under copy-

right protection as defined by Act No LXXVI of 1999 on copyright. According to this act, from a work disclosed to the public any part may be cited by indication of the source and naming the author indicated therein. Such citation shall be true to the original and its scope shall be justified by the nature and purpose of the borrowing work. The free use is permitted only so far as it does not conflict with a normal exploitation of the work and does not unreasonably prejudice the legitimate interests of the author, and it is in compliance with the requirements of fairness and is not designed for a purpose incompatible with the intention of free use.

The consequences of the abuse of rights relating to intellectual property are provided by law, thus the abuse of these rights may also fall under disciplinary liability.

- III. In the absence of previous authorization, it is prohibited, under disciplinary liability, to take photos or make video or sound recordings at lectures and practices. In addition, any misuse of the likeness or recorded voice of another person shall be deemed as a violation of inherent rights and may result in other consequences. The disclosure of likeness or recorded voice of another person shall be authorized by that person.

I request all students to take notice of the above.

Attention to Students of Foreign Language Programs at Semmelweis University

In recent years, Semmelweis University has built a valuable student community by maintaining high academic standards and placing much emphasis on the ethical integrity of our education. The overwhelming majority of our students appreciate our efforts. Unfortunately, a small minority does not want to accept our ethical guidelines, and tries to take undue advantage at exams by using unacceptable techniques.

We therefore do implement the following sanctions:

Against students who are found at exams possessing forbidden items, including electrical devices, such as mobile phones, ipods, etc. a disciplinary action will be initiated that can end with immediate discharge with disgrace from Semmelweis University. By implementing this rule, we wish to preserve the academic and material value of the Semmelweis Diploma.

NEPTUN.NET Unified Education System

Summary for Students

At Semmelweis University, the education system NEPTUN.Net is used for performing administrative tasks related to education. The users of the system – registry clerks, faculty secretaries, instructors and students – have different authorities to access the information stored in the system.

For the students of the institution, the system provides the following functions:

- To check their personal data and information related to their studies,
- To register for subjects,
- To register for exams,
- To check grades entered into the system,
- To monitor the grants transferred,
- To get information on their payment obligations,
- To manage their finances,
- To receive messages within the system from registry clerks, secretaries of institutions and instructors.

You get your user ID and password to the NEPTUN.Net system

Entering the system

On the Neptun Portal, click on the Student icon to enter. Then choose the server you wish to use. Enter the Neptun code (ID) and the password on the window which appears.

Once you enter you can choose from the following data groups at the top of the page:

Personal data, Studies, Subjects, Exams, Finances, Information, Administration

Registration

You can access the registration function in the “Administration” menu. Here you can register for the next term by clicking on the link “Registration”. On the page “Registration requests”, when clicking on “New” in the status column of the current semester, a window is displayed where you have to declare whether you choose to register with an “Active” or a “Passive” status. After you have chosen the appropriate option, click on the button “I declare”. (Such registration is only available if Registration period is displayed under “Periods” in the “Information” menu! If you have

Subject registration (choosing subjects, choosing courses)

Choose the link “*Subject registration*” in the “*Subjects*” menu.

1. Displaying the list of subjects: Select the appropriate semester (e.g. 2022/23/1) and the curriculum, then select “Subject list of the chosen curriculum” under „Subject type” to display obligatory and elective subjects. The option “Other elective subjects” may be used if the institution concerned manages

from the Dean’s Office or the Registry of the Faculty where you have been admitted. Users with students’ rights may only manage their own data. In order to prevent unauthorized access, it is very important that you change your password from time to time. It is recommended that you change the password immediately upon entering the system for the first time. The password should be minimum 6 characters long, consisting of letters, numbers or a mixture of both.

Students can access the NEPTUN.Net system on any computer located in students’ terminal rooms (in the Student Centre /NET/ and in the Central Library) or any other computer with Internet access using a browser (Internet Explorer 7 or Mozilla Firefox version 2) from the official university Neptun Portal (**<http://net.neptun.sote.hu>**).

(For a detailed description of the Students’ WEB please check the Neptun Portal – Support / Neptun usage / Aids by role / Aids for students).

Upon entering the Neptun.Net system, students have to perform the following operations during a term:

- Registration
- Subject registration
- Exam registration

not chosen any course for the semester yet, but you intend to register with an “Active” status, the program will ask you to make sure whether you really want to continue the registration process. If you choose the option “no” at this stage, this means that registration will not be completed, and before you do so, you can take up your courses. If you choose “OK”, you can continue registration. Naturally, you are free to take up courses afterwards.)

its elective subjects separated from the curricula. If you do not find any subject in this list, this only means that at your institution these elective subjects are also integrated into the curricula. In this case, you should choose the option “Subject list of the chosen curriculum” at this question. By ticking “Show only those subjects that will be launched” you can make sure that only those subjects appear in the displayed subject list which will be launched in the semester selected. You can

THE DEPARTMENTS OF SEMMELWEIS UNIVERSITY

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display the subject list filtered according to the conditions set by clicking on the „List subjects” button.

2. Display, search and ordering options in the subject list: On the top of the list you can set the number of subjects to be displayed on one page. If the list is longer than one page, you can use the two-way arrows on the top of the list or the drop-down menu to turn pages. By clicking on the printer icon, you can print the page displayed. When you find the subject required, click on any detail and all details of the selected subject will be displayed in a pop-up window.
3. Subject details / Current courses tab: Here you can see the courses launched in the given semester for the selected subject. You can now choose the subject and its course or courses. You can choose the courses by marking the checkbox on the right of the course list, then confirm your choice by clicking on „Save” at the bottom of the page. You have to choose more than one course for the same subject if more than one course type (e.g. theoretical and practical) are announced. In this case, you need to choose one course for each course type. This is not true for exam courses which must be chosen independently in all cases, which means that you cannot choose an exam course and another course type for the same subject at the same time. Course registration will only be successful if:
 - **you have fulfilled the requirements for subject and course registration,**
 - none of the courses selected is booked out (in the students/limit column the number of students is under the limit),
 - **you have selected one course for each course type (e.g. theoretical, practical),**
 - **it is preliminary or final subject and course registration period,**
 - you have not completed the subject so far.For more information on a given course, click on any detail of the given course in the list to display the course information in a new pop-up window.
4. Deregistering subjects: If for any reason you would like to drop a chosen subject, you can do so under „Registered subjects” in the „Subjects” menu. On this page you can see the subjects you have chosen in the current registration period; you can change courses or deregister subjects here. If in any subject line you click on „Deregister subject”, the system will first ask whether you really want to drop the given subject and if you answer yes, the subject will be dropped and deleted from the list of registered subjects. Naturally, this means that your registration for the courses of the deregistered subjects is also deleted and you will be informed of this. (Subject deregistration is possible during the preliminary or final subject or course registration period.)
5. Changing courses: If you want to change the course(s) you have chosen in a given subject you can do this by clicking on any detail of the given subject to display the pop-up window „Subject details”. Here on the „Current courses” tab in the last column of the list you have to select the course(s) required and unmark the course(s) to be dropped, then confirm the change

by clicking on the „Save” button. The system will report on the change or the reasons for potential errors.

Exam registration

You can find „Exam registration” in the „Exams” menu. On this page you can register for exams or cancel your registration. In the exam list, exams which you have already registered for will appear in blue. To cancel an exam registration, go to the „Selected exams” menu.

1. List exams: On entering the page for the first time all future exam dates announced in the current semester will appear, but you can filter the list. If you only want to see the exam dates of a given subject, select the subject from the „Subjects” roll-down menu, then click on the button „List exams”.
2. Exam registration: To register for an exam, click on „Register” in the line of the given date. The program will report on the success or failure of exam registration.
3. Cancelling exam registration: If you register for an exam by mistake or you simply change your mind and want to cancel your registration, click on „Cancel” next to the given exam. (Normally this can be done prior to the exam within the cancellation deadline.)
4. Payment of retake exam fee: By clicking on „Payment” under „Finances”, you will be taken to the page where the list of settled and payable items is displayed. Here you can also fulfill your financial obligations. On the „Payment” tab, click on the „Transcribe item” button and on the appearing „Transcribe item” window, enter the payment title (retake exam), then select the subject for which you would like to transcribe the exam fee from the roll-down list. Finally, click on the „Create item” button. You can take over the invoice of the item created in the Dean’s Office. To list current items, select the current semester using the „Semester” roll-down menu under „Filters” on the 1.) „List items” tab. (Items you have displayed are marked as „Own item” in the „Status” column.) To view the details of a given item, click on „Details” in the line of the item concerned.

Message management

During term time, students may receive messages on various topics. This menu can be found on the left-hand side of the page. Here you can see the messages sent to the student by the Dean’s Office clerk in charge of his/her year or the instructor of a chosen course. You can view the text of the message on a new window by clicking on the required topic in the list of messages.

The NEPTUN system assists students and university employees in the accurate and effective performance of administrative tasks related to their studies. **In order to ensure faultless operation, it is indispensable that authority rules are complied with and that accurate data is provided. Therefore, please note that data changes or wrong data must be corrected within 8 days using „Modify data”.**

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Assistant lecturer:	Dr. Ádám Berki, Dr. Lóránt Dabasi, Dr. Anna Gaál, Dr. Iván Lambertus, Dr. Fritz Pablo, Dr. Marcell Palotai, Dr. Hanga Pál, Dr. Andrea Papp, Dr. Krisztina Vén
Residents:	

Department of Neurosurgery

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Teaching staff leader:	Prof. Dr. Péter Banczerowski M.D., Ph.D.
Professor Emeritus:	Prof. Dr. István Nyáry M.D., Ph.D.
Associate professor:	Dr. Erőss Loránd , M.D., Ph.D., Dr. Sándor Nardai M.D., Ph.D.
Research fellow:	Dr. Tamás Mezei M.D., Ph.D.
Assistant research fellow:	Dr. Zoltán Nagy M.D.

Background The Department of Neurosurgery was established in 1977 and is operated by the Center of Neurosurgery and Neurointervention, which is a stand-alone neurosurgical hospital. It has 156 beds in its wards, which includes the only paediatric neurosurgical department in Hungary. The Center is the third largest neurosurgical service-provider in Europe.

Profile The Department of Neurosurgery is involved in virtually the entire spectrum of neurosurgical practice. All other specialities needed for modern neurosurgery (e.g. neuroradiology, neuroophthalmology, neurootology, electrophysiology, neuropathology and neurology) are also present, and are organised in a multidisciplinary structure. The biggest neuro-intensive care department, with separate units for paediatric cases, is maintained and operated by the Department.

Education Lectures are given on neurosurgery to medical undergraduates in Hungarian and English. Postgraduate resident training is also provided, in addition to further training courses.

Health Care Annually, around 3500 major operations are performed in five theatres, including endovascular interventions, stereotactic surgery, endoscopic and laser surgery, neuro-implantation, in addition to the so-called classical micro-neurosurgical operations. The outpatient turnover is 50,000. The Department has the highest case mix index in Hungary, indicating the most complicated cases, which makes a unique background for both undergraduate and postgraduate teaching.

Research Multidisciplinary organisations with a high patient turnover are ideal for basic and clinical research. Cerebral vascular malformations, tumours of the base of the skull, pituitary adenomas, functional neurosurgery and interventions, neurooncology, spine surgery as well as intra- and post-operative patient monitoring are the major fields of interest for the Department's staff members.

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Professor Emeritus:	Prof. Dr. György Bender
Full professor:	Prof. Dr. Miklós Szendrői
Associate professor:	Dr. Anikó Faluhelyi, Dr. József Lakatos, Dr. Ferenc Mády,
Assistant professor:	Dr. Imre Antal, Dr. István Böröcz, Dr. László Sólyom, Dr. Sándor Kiss
Assistant lecturer:	Dr. Zoltán Bejek, Dr. Tamás Terebessy, Dr. Géza Kordás, Dr. Gergely Holnapy (tutor)

Department of Psychiatry and Psychotherapy

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☎: 210-0330

Head of the Department:

Full professor:

Professor Emeritus:

Associate professor:

Assistant professor:

Assistant lecturer:

Clinical senior specialist:

Clinical specialist:

Clinical doctor:

Residents:

Psychologist:

External teachers with contract
in the English program:

Prof. Dr. János Réthelyi M.D., Ph.D.

Prof. Dr., Gábor Faludi, Prof. Dr. Dóra Perczel-Forintos

Prof. Dr. László Tringer, Prof. Dr. István Bitter

Dr. Brigitta Baran, Dr. Pál Czobor, Dr. Lajos Simon, Dr. Judit Tolna,

Dr. Zsolt Unoka (tutor for the fourth year),

Dr. Zoltán Hidas (tutor for dentistry students)

Dr. Gábor Csukly, Dr. Xénia Gonda, Dr. Éva Jekkel, Dr. Beatrix Mersich,

Dr. Erika Szily (tutor for the sixth year), Dr. Bálint Szuromi

Dr. Judit Benkovits, Dr. Kinga Farkas, Dr. Máté Fullajtár, Dr. Ádám Menus,

Dr. Attila Pulay, Dr. Imola Seres (tutor for the fifth year), Dr. László Tombor

Dr. Éva Csibri (part time), Dr. Andrea Sárosi

Dr. Csilla Bolyós (part time), Dr. Brigitta Blancz, Dr. Péter Döme, Dr. Luca Egerváry,

Dr. Mónika Eleméry, Dr. György Freschl, Dr. Judit Lazáry, Dr. Krisztina Seregi

Dr. Livia Balogh

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Dr. Szilvia Somogyi, Dr. Ádám Ferenc Szabó, Dr. Andrea Szegő, Dr. Péter Szocsics,

Dr. Katalin Szócs, Dr. Dominika Tóth, Dr. István Vályi-Nagy, Dr. Réka Zsigmond

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Associate professor:

Assistant professor:

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Prof. Dr. Lilla Tamási

Prof. Dr. János Tamás Varga

Prof. Dr. György Losonczy

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Dr. Noémi Eszes, Dr. Edit Hidvégi, Dr. Péter Horváth, Dr. Zsuzsanna Kovács, Dr. Zsófia Lázár,

Dr. Zoltán Süttő, Dr. Krisztina Vincze

Dr. Kristóf Karlócai, Dr. Tamás Komáromi, Dr. Gabriella Zsámboki

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Dr. Dániel Hammer, Dr. Jalsovszky Péter Leó, Dr. Alexandra Nagy, Dr. Judit Kiss, Dr. Dóra Oroszi,

Dr. Erik Palmer, Dr. Lőrinc Polivka, Dr. Zsófia Tassó, Dr. Nóra Tóth, Dr. Rita Varga,

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Assistant lecturer:	Dr. Domokos Csukás
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Associate professor:	Dr. Gábor Viktor Szabó
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Master lecturer:	Dr. Zsuzsa Nagy Dr. Zoltán Oláh

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Associate professor:

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Assistant lecturer:

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Szilvia Kristóf

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Head of the Department:

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Assistant lecturer:

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Dr. Antal Hamvas, Dr. József Pánovics,
Dr. Attila Keszthelyi

Dr. Sándor Lovász, Dr. Miklós Szűcs, Dr. Krisztina Szabó, Dr. Lajos Joós

Dr. Stelios Mavrogenis, Dr. András Ruzs, Dr. Attila Majoros, Dr. Péter Riesz,
Dr. Erzsébet Péntes, Dr. Gergely Bánfi

Dr. András Horváth (tutor)

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Head of the Department:

Tutor:

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Department of Military-, Disaster- and Order Enforcement Medicine

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Deputy head of Department:

Academic advisor:

Clinical specialist:

Executive of educational affairs:

Departmental secretariat:

International affairs:

Prof. Dr. János Gál

Dr. Gábor Orosz, Dr. István Mártai

Dr. László Svéd

Dr. Ádám Péter

Mrs. Beáta Flóra Németh

Mrs. Melinda Könyves

Balázs Nándor Marczin

The department was founded on July 1st, 1970 (EüM 43/1969) – first under the name of Department of Military Medicine (as part of the Institution of Medical Training), then as the Institution of Military Medicine, and later as the Institution of Military and Disaster-Medicine. From 2001 it was named ÁOK (Faculty of Medicine) Department of Military and Disaster Medicine, Semmelweis University. The name has undergone further changes since July 1st, 2004 as university reorganization affected and integrated a number of sub-divisions (the former Department of Oxyology and the Department Group of Emergency Care Training) into this department. Since March 27th, 2014, by legislation of the senate (40/2014), the present name of the institution is the **Department of Military-, Disaster- and Order Enforcement Medicine**. It is currently located at the Medical Centre, Hungarian Defence Forces complex, where the functionality of the institution is provided by a series of separate contracts of cooperation.

PROFESSIONAL PROFILE

- Coordination, education and science-related questions regarding military and disaster medicine
- Maintaining an established and widely expanding network of local and international cooperation in the fields of military, disaster, and order enforcement medicine
- Continuing the long-running collaboration between the NATO Centre of Excellence for Military Medicine and Semmelweis University
- Contract-governed scientific collaboration between departments of the National University of Public Services and Semmelweis University
- The observing and analysing of disasters either occurring in the present or that are historically documented throughout the World - and application of the findings under Hungarian circumstances
- Establishing training programmes related to the department's field and organising such courses for the doctors and professionals, both civilian and military-employed.
- Providing the graduate education course "The Medical Fundamentals of Disaster Resolution" in Hungarian, English and German languages
- The education of trainee specialists at both theoretical and technical levels, coordination of these projects
- Preparation of candidates for the Military-, Disaster and Order Enforcement exam
- Hosting Qualification Examinations and organising the related preparation course

National Ambulance Service

1055 Budapest, Markó utca 22

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Director-General:

Dr. Gábor Csató MD

Course Director:

Dr. Gábor Göbl M.D

Lecturer

Dr. László Gorove M.D

Faculty of Dentistry

Department of Prosthodontics

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Head of the Department:

Associate professor:

Assistant professor:

Assistant lecturer:

Clinical specialist:

Prof. Dr. Péter Hermann D.M.D., M.Sc., Ph.D.

Dr. Péter Kivovics, Dr. András Kóbor, Dr. Melinda Madléna,
Dr. Tibor Károly Fábián, Dr. Zsuzsa Szántó, Dr. Judit Borbély (tutor 1st year)

Dr. János Gerle, Dr. László Kádár, Dr. Endre Somogyi,
Dr. Katalin Károlyházy (tutor 5th year)

Dr. Péter Faluhelyi, Dr. Marianna Jáhn, Dr. Katalin Kalocsai, Dr. Mercédesz Linninger,
Dr. Krisztina Mikulás, Dr. Zsuzsanna Tóth, Dr. Pál Sajgó, Dr. Katalin Nemes,
Dr. Dénes Palaszkó (tutor 2nd year, 3rd year 2nd semester), Dr. Ildikó Bercze (tutor),
Dr. Alexandra Czigola

Dr. Péter Schmidt, Dr. János König (tutor)

Independent Section of Radiology

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Head of the Department:

Prof. Dr. Csaba Dobó Nagy D. M. D.

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Head (assigned) of the Department:

Professor Emerita:

Associate professor:

Assistant professor:

Assistant lecturer:

Prof. Dr. med. habil. Noémi Katinka Rózsa MSc, PhD

Prof. Dr. Ildikó Tarján

Dr. Miklós Kaán, Dr. Gergely Balaton

Dr. Anita Beck, Dr. Dorottya Bányai

Dr. Bálint Nemes, Dr. Réka Bagdy-Bálint, Dr. Lili Judit Ács,

Dr. Lili Heckenast, Dr. Gergely Miklós Kaán, Dr. Laura Mária Lipták, Dr. Zsuzsanna Stefánia
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Assistant professor:

Assistant lecturer:

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Prof. Dr. Árpád Fazekas

Dr. Anna Herczegh, Dr. Beáta Kerémi, Prof. Dr. Zsolt Lohinai, Dr. Zsuzsanna Tóth

Dr. Réka Fazekas, Dr. Barbara Mikecs, Dr. Eszter Molnár, Dr. Enikő Szabó

Dr. Péter Komora, Dr. Ákos Mikolicz, Dr. Botond Simon, Dr. Eszter Szalay

Dr. Krisztina Árendás, Dr. Mónika Balázs, Dr. Zsófia Bata, Dr. Sarolta Bonczföldi-Pozsgay,
Dr. Dániel József Borbola, Dr. Dániel Cifrák, Dr. Roland Róbert Daubner, Dr. Andrea Demeter,
Dr. Éva Feilné Simon, Dr. Ádám Fekete, Dr. Adél Galvács, Dr. Eszter Hulmány, Dr. Bernadett
Katona, Dr. Komoráné Dr. Bernadett Gánti, Dr. Mária Kónya, Dr. Alexandra Kovács,
Dr. Katinka Lékó-Kesjár, Dr. Péter Márton, Dr. Eszter Mártonné Dr. Danka,
Dr. Dóra Mensch-Kovács, Dr. Ákos Mikolicz, Dr. Róbert Nagy Mátyás, Dr. Tamás László Nagy,
Dr. Vivien Názár, Dr. Fruzsina Anna Németh, Dr. Réka Pap-Németh, Dr. Petra Irén Papp,
Dr. Dalma Pellei, Dr. Melinda Zsanett Polyák, Dr. Arvin Shahbazi Irani, Dr. Boglárka Szántai,
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Professor Emeritus:	Prof. Dr. Tivadar Zelles
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1st year

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BASIC MODULE

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First year in the 2025/2026 academic year

1st Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
OBLIGATORY COURSES										
Cell Science	AOKGEN666_1A	1		2				3	–	examination
History of Medicine and Semmelweis University	AOKNEI1144_1A	2		0				2	–	practical examination
Macroscopic Anatomy and Embryology I	AOKANT1089_1A	2		6				8	–	examination
Medical Biophysics I	AOKFIZ1090_1A	1		3				4	–	examination
Medical Chemistry	AOKMBT829_1A	3		3				6	–	examination
Medical Communication	AOKMAG1091_1A		10		18			3	–	examination
Medical Hungarian I	AOKNYE906_1A	0		4				2	–	practical mark
Medical Terminology	AOKNYE1125_1A	0			28			2	–	practical examination
Physical Education (PE) I	AOKTSI1093_1A	0		1				1	–	practical mark
OBLIGATORY ELECTIVE COURSES										
Basics of Medical Chemistry	AOVMBT797_1A	2		0				3	–	practical mark
Mathematical and Physical Basis of Medical Biophysics	AOVFIZ1097_1A	1		1				2	–	practical mark

2nd Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
OBLIGATORY COURSES										
First Aid	AOKSGO1092_1A	1		1				2	–	practical mark
Introduction to Patient Care	AOKCSA.....1A	0.5		1.5				2	–	practical mark
Macroscopic Anatomy and Embryology II	AOKANT1089_2A	4		6				10	Macroscopic Anatomy and Embryology I	comprehensive examination
Medical Biochemistry I	AOKBMT1099_1A	2		2				4	Medical Chemistry	examination
Medical Biophysics II	AOKFIZ1090_2A	1		2.5				3	Medical Biophysics I	comprehensive examination
Medical Hungarian II.	AOKNYE906_2A	0		4				2	Medical Hungarian I	practical mark
Microscopic Anatomy and Embryology I.	AOKANT854_1A	1		4				5	Cell Science	examination
Physical Education (PE) II	AOKTSI1093_2A	0		1				1	–	practical mark
Summer Practice - Nursing	AOKNSG1127_1A	0		1 month				3	–	practical examination
OBLIGATORY ELECTIVE COURSES										
Medical Informatics	AOVDEI1126_1A	0		1		2		2	–	practical examination

LIST OF TEXTBOOKS *(The list may change!)*

- 1 McMinn and Abrahams' Clinical Atlas of Human Anatomy with STUDENT CONSULT Online Access, 7th Edition By Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973 Publication Date: 22/03/2013
- 2 Sobotta Atlas of Human Anatomy (Package), 15th English ed. Musculoskeletal system, internal organs, head, neck, neuro-anatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 Publication Date: 25/06/2013
- 3 Gray's Anatomy for students with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchell Elsevier; 03/04/2014; ISBN 9780702051319
- 4 C.Rosse-P.Gaddum-Rosse: Hollinshead's Textbook of Anatomy. Lippincott-Raven. 4th ed. 1997. ISBN 0-397-51256-2
- 5 Stevens & Lowe's Human Histology, Elsevier, 4th ed. 2015 ISBN 978-0-723435020
- 6 Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O'Dowd and P Woodford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473
- 7 Histology: A Text and Atlas: With Correlated Cell and Molecular Biology; 7th Edition by MH Ross and W Pawlina; Wolters Kluwer 2015, ISBN 9781451187427
- 8 Langmann's Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer 2014, ISBN 9781469897806
- 9 Ebbing, D.D-Grammon, S.D: General Chemistry. 9th ed. 2009. Houghton Mifflin Co. Boston. ISBN 10:0-618-85478-6 / 13:978-0-618-85478-7
- 10 Harper's Illustrated Biochemistry, 30th edition, Lange, ISBN-10: 0071825347
- 11 Seminar manuals: published on homepage: semmelweis.hu/biokemia/
- 12 Tóth: Concise Inorganic Chemistry for Medical Students. Bp. Semmelweis Kiadó
- 13 Laboratory Manual; Medical Chemistry and Biochemistry. Bp. Semmelweis Kiadó
- 14 Bauer-Csermely-Hrabák: Principles of Organic Chemistry (ed. A. Hrabák) Bp. Semmelweis Kiadó
- 15 Hrabák: Selected Collection of Chemical Calculations and Biochemical Exercises. Bp. Semmelweis Kiadó
- 16 Garzó-Müllner-Sasvári: Bioorganic compounds. Bp. Semmelweis Kiadó
- 17 Damjanovich – Fidy – Szöllösi (eds) Medical Biophysics, Medicine, Budapest, 2009. ISBN 978-963-226-127-0
- 18 Miklós Kellermayer: Medical Biophysics Practices. Semmelweis Publishers, Budapest, 2015. ISBN 978-963-331-349-7.
- 19 Borda Szandra-Hetesy Bálint: Magyar orvosi szaknyelv I-II. Students can download the book in pdf format from the moodle interface.
- 20 Zimonyi-Bakó A. Medical Terminology. (available on Moodle in pdf)
- 19 Borda Szandra-Hetesy Bálint: Magyar orvosi szaknyelv I-II. Students can download the book in pdf format from the moodle interface.
- 21 Zimonyi-Bakó A. Medical Terminology. (available on Moodle in pdf)
- 22 Alberts et al.: Essential Cell Biology. Garland Science/ Taylor & Francis Group Publ. 2013. (4th edition, ISBN: 9780815344544)
- 23 Anne-Marie Barry, Chris Yuill: Understanding the Sociology of Health: An Introduction. Sage, London, 2016.
- 24 János Pilling: Medical Communication in Practice. Medicina, Budapest, 2020.

Recommended textbooks:

- 1 Gray's Anatomy. The Anatomical Basis of Clinical Practice; 41st edition by S.Standring: 2015 ISBN : 9780702052309
- 2 RMH McMinn: Last's Anatomy, Regional and Applied. Churchill Livingstone, Edinburgh 1990. ISBN 0-443-03484-4
- 3 A.L. Kierszenbaum Histology and Cell Biology: An Introduction to Pathology 3rd Edition, Paperback with STUDENT CONSULT Online Access and E-Book ISBN: 9780323085885 Copyright: 2012
- 4 Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 9780071780339
- 5 W.Kahle-H.Leonhardt-W.Platzer: Color Atlas and Textbook of Human Anatomy (in 3 volumes) 3rd revised ed. Thieme Inc. New York, 1986.
- 6 Human Anatomy, Color Atlas and Textbook, 6th Edition by J Gosling, P Harris, J Humpherson, I Whitmore and P Willan; Elsevier, 2016, ISBN 9780723438274
- 7 Stryer: Biochemistry. 4th ed. 1995. ISBN 0-7167-2009-4
- 8 Zumdahl: Chemical Principles. 3rd ed. 1998. Houghton-Mifflin Co. Boston. ISBN 0-395-83995-5
- 9 First Aid Manual: The Authorised Manual of St. John Ambulance, St. Andrew's Ambulance Association and the British Red Cross by the British Red Cross Society published on 21/03/2011 by Dorling Kindersley Publishers Ltd ISBN 9781405362146
- 10 Cooper-Hausman: The Cell: A Molecular Approach, 5th Edition, Sinauer Associates, 2006, ISBN 0-87893-300-X
- 11 Graham Scambler: Sociology as Applied to Medicine. 6th edition. 2008, Saunders Elsevier, London

Institute of Genetics, Cell- and Immunobiology

Address: NET Building, H-1089 Budapest, Nagyvárad tér 4.

Course director: Prof. Dr. *Edit Buzás MD, DSc*

Course coordinator: Eszter Lajkó PharmD, PhD

Office hours are given on the Institute's website (<http://gsi.semmelweis.hu/index.php/en/education/information>)

Credit: 3

There will be two midterms

Aim of the course:

The Cell Science course is designed for medical students as part of the Basic Module. The course presents the most important aspects of cell morphology and function. It provides a detailed overview of compartmentalization in the eukaryotic cell and highlights the key features of essential cellular functions, including migration, endocytosis, cell-cell communication, division, stem cell differentiation, ageing, and cell death.

The practical sessions introduce students to the microscopic techniques used in the study of cell morphology. The aim of the course is to demonstrate the complexity of the relationship between cell structure and function, as well as to present fundamental methods of in vitro cell culturing and their potential medical applications.

Location of the course:

Selye János Lecture Hall and Lab rooms L13-L16 are located on the first floor of the NET building (1089 Budapest, Nagyvárad tér 4.)

Lecturers: Prof. Dr. Edit Buzás, Dr. András Kristóf Fülöp, Dr. Hargita Hegyesi, Dr. László Kóhidai, Dr. Eszter Lajkó, Dr. Tamás Visnovitz, Prof. Zoltán Wiener

Lectures (1 hours per week):

1. Cell membrane
2. Structure and function of nucleus I.
3. Structure and function of nucleus II.
4. Endoplasmic reticulum
5. Golgi complex, vesicular transport and secretion
6. Endocytosis. Autophagy
7. Structure and function of mitochondria and peroxisomes
8. Cell adhesion and cell junctions
9. Cytoskeleton and Cellular movement
10. Cell communication. Extracellular vesicles.
11. Cell cycle and mitosis
12. Cellular aging and cell death
13. Stem cells and differentiation
14. Tumor cell biology

Practices (2 hours per week):

1. The light microscope
2. The general cell structure. Light microscopic microtechnique
3. The electron microscope. Cell membrane
4. The interphase nucleus. Cyto(histo)chemistry
5. Immunohistochemistry. Fluorescence microscopy
6. Endoplasmic reticulum
7. Golgi complex and secretion
8. Endocytosis and lysosomes, Enzyme histochemistry
9. Cell and tissue culture
10. Cell surface differentiation, enzyme-histochemistry
11. Store and supply of energy. Mitochondria. Peroxisome.
12. Mitosis
13. Cell death (necrosis and apoptosis)
14. Consultation

The order of topics may vary

Course requirements: The requirement for obtaining the end-of-semester signature is the fulfilment of at least 75% attendance and participation in practical sessions (maximum three absences are permitted, [TVSZ §29 (2)]).

Midterms: During the semester, there will be two midterms (Moodle tests). (The dates and topics will be announced at the beginning of the semester). Students who achieve 75% of the points on the midterms will be offered a grade of "Good" (4), and those who achieve 85% will be offered a grade of "Excellent" (5).

Completing the Moodle tests is not mandatory; missed midterms can only be made up during the same week in another group, with prior approval from the practical instructor and the course administrator. Based on the cumulative performance during the semester, students may receive an offered final examination grade.

Exam: There is a written colloquium in Cell Science at the end of the semester, in accordance with the rules of the current Study and Examination Regulations. The exam is considered passed if the student achieves at least 50% of the total score on the test. The examination grade will be calculated from the sum of the examination scores if the students obtain at least 50% of the scores.

The written exam is a Moodle test. You will have to study from the presentations and doc files on the homepage and from the Essential Cell Biology book. There will be questions from both lectures and practical material. Figures are just as important as text. The exam test may include short essay questions, simple multiple-choice questions, concept matching, LM and EM images, diagrams, or table-based tasks. Students who achieve 75% of the points on the midterms will be offered a grade of "Good" (4), and those who achieve 85% will be offered a grade of "Excellent" (5).

Core text: Alberts et al. Essential Cell Biology (4th edition) Garland Science ISBN-13: 978-0815344544 ISBN-10: 0815344546

Lecture and practice presentations and additional texts are available on the homepage: <http://gsi.semmelweis.hu/index.php/en/> <http://gsi.semmelweis.hu> (The username and password are on course data-sheet of the Neptun)

Institute of Preventive Medicine and Public Health

Lecturer: **Dr. Fazekas-Pongor Vince**

The history of medical science is considered as a part of the general history of civilization. The study of the history of medicine helps us to describe and understand how people in different times and cultures experienced and dealt with these fundamentals of human existence. This knowledge can inform debate about the present and the future and help to bring medicine and science to a wide audience.

Detailed course description:

1. Introduction. What is Medicine? Methods and sources of Medical History. The birth of paleomedicine (bones teeth, mummies). Prehistoric medicine. Far East. (Vince Fazekas-Pongor)
2. Far East Medicine. Chinese civilization, Japan, India. (Vince Fazekas-Pongor)
3. Medicine of ancient civilizations, rivers valley's culture: Mesopotamia, Egypt, and the medicine knowledge. Medicine - in the Bible time - Heritage of the empirical knowledge. Practitioners. Theories of diseases. (Vince Fazekas-Pongor)
4. Greco-Roman Medicine. Homeric medicine. Asclepius, Hippocrates. Corpus Hippocraticum – the concept and doctrine of his theories about the nature and diseases (the four humors). The Oath. Hygiene and health education. Post-Hippocratic schools – the golden heritage in the school of Alexandria. The roman physicians, diseases. Advance of public health. Water supply and sanitation, climate, soil and health, diseases, endemics. The workers' health, provision of medical care. (Celsus, Galenus) (Vince Fazekas-Pongor)
5. Medieval medicine. Byzantine Healers, Arabian Hakims, Monks, Crusaders and medieval „doctors.“ The Arabian medicine: chemistry, pharmacy, hospitals. Razes, Avicenna, Abulcasis. The medieval Monasteries (Monte Cassino). The growth of European cities, sanitary problems of urban life. The first religious medical school in Salerno. Medieval Universities, medical humanists, and Christian caritas. (Vince Fazekas-Pongor)
6. Medicine in the Renaissance. The Arts and Humanism. The new mentality of medicine: Paracelsus. The revolution of anatomy: Vesalius and his contemporaries. The first step toward specialization. Botany and mineralogy. The printing of books' role in medicine. Foundation of the administration of Public Health. Epidemic diseases: communicable and non-communicable diseases. Theories, therapies, medical care, hospital. Quarantine. (Vince Fazekas-Pongor)
7. Experimenters, Teachers and Theoreticians in the Sixteenth and Seventeenth Centuries. Body as machine -old schools: iatrochemical, iatrophysical theories. New schools: animism, tonus, vitalism, stimulation, homeopathy. The circulation of the blood. Harvey's methodology Malpighi. Microscopy. Birth of modern clinical medicine: Sydenham. Boerhaave and his pupils. (Vince Fazekas-Pongor)
8. Industrialism in the Eighteenth Century. Clinical medicine-schools of clinical (French, English, German, and Habsburg). The first Vienna School: van Swieten. surgery (Hunter, Valsalva), pathology (Morgagni, Bichat). Public health and hygiene. Occupational health, prison reform, general health (death rate, statistics), Ramazzini, Frank. Smallpox. Infant mortality. Nursing, dispensaries and hospitals, and development of obstetrics. Sanitary conditions – filthy towns. (Vince Fazekas-Pongor)
9. Clinical medicine in the second half of the nineteenth Century. Bacteriology, a new science in medicine. Revolution, concepts and theories under the microscope. New discoveries Pasteur, Koch. (Vince Fazekas-Pongor)
10. Social revolution, industrialism, public health. National and international movements and health reforms, and medical care. Period of great epidemics. International health organizations. The Red Cross. (Vince Fazekas-Pongor)
11. Development of surgery and gynaecology. The man-midwife (Smellie, Hunter), History of anaesthesia. General and local possibilities. Wells, Morton, Simpson, Jackson). Asepsis and antisepsis. Early efforts to develop aseptic techniques. Semmelweis, Lister. Progress in surgery, Billroth. Cholecystostomy, appendectomies. (Vince Fazekas-Pongor)
12. Emergence of specialism. Logical outgrowth of locality pathology, new instruments. Initially the medical professions: Paediatrics, Psychotherapy, Ophthalmology, Otology, Rhinology and Laryngologist, Dentistry, Neurology and Psychiatry, Dermatology and Venerology. (Vince Fazekas-Pongor)
13. From the black death to the AIDS. The history of epidemics. The theories and therapies. Tropical medicine. The development of epidemics, bacteriology and immunology. The new medicaments. Ehrlich and chemotherapy, sulphonamides, antibiotics. Virology. Salk and Sabin. New diseases and screenings methods.
14. Consultation (Vince Fazekas-Pongor)

Textbook:

Chrestomathy on the History of Medicine. Ed. Dr. Forrai J., Dr. Ballér P., Budapest, 1992. SOTE

MACROSCOPIC ANATOMY AND EMBRYOLOGY I.

Department of Anatomy, Histology & Embryology

Head of Department: **Dr. Alpár Alán**

Course Director: Dr. Andrea D. Székely

Credit value: 8

Number of lessons per week: 7 lectures: 1 practical course: 6 seminars: 0

Subject type: obligatory course

Name of the course leader: Dr Alpár Alán (full professor)

Objectives of the subject, its place in the medical curriculum:

Demonstration of the macroscopical composition of the human body specifically to provide the future clinicians/medical doctors with a valid body of information with relevance to clinically significant morphological structures. General Embryology describes the intrauterine development of a human embryo/fetus and introduces the development of the locomotor system. Teaching is done in the form of lectures and dissection classes.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Department of Anatomy, Histology and Embryology
Budapest 1094, Tűzoltó utca 58.

Successful completion of the subject results in the acquisition of the following competencies:

Understanding the macroscopical composition of the human body together with the position and topographical relation of organs. Clear understanding of structure and function. Ability to perform basic preparatory tasks during dissection. Identification of general directions/landmarks on the cadaver together with the recognition of significant organs/body parts. Acquiring knowledge of surface features and/or sectional anatomy forming basis for clinical diagnostics (palpation, auscultation, etc.) and the use of radiological imaging methods. Clear understanding of the beginning of human development (general embryology) together with the development of the musculoskeletal system.

Course prerequisites:

None (subject is offered in the 1st semester)

Number of students required for the course (minimum, maximum) and method of selecting students):

obligatory for all registered students, on the basis of registration via the NEPTUN system

How to apply for the course:

Via the NEPTUN system.

Detailed curriculum:

List of lectures

Week 1	1. General introduction, terminology. General arthrology and myology 2. Diagnostic aspects of the locomotor system
Week 2	3. Joints and movements of the shoulder and shoulder girdle 4. Clinical anatomy of the shoulder and the shoulder girdle
Week 3	5. Joints and movements of the elbow and the hand 6. Clinical anatomy of the elbow and hand
Week 4	7. Pelvis. Joints and movements of the hip 8. Clinical anatomy of the hip joint
Week 5	9. Joints and movements of the knee 10. Clinical anatomy of the knee
Week 6	11. Joints and movements of the foot 12. Clinical anatomy of the foot
Week 7	13. Components and movements of the vertebral column 14. Composition of thorax, diaphragm
Week 8	15. Composition of the abdominal wall. Hernia canals. Inguinal and femoral canals 16. General composition of the skull.
Week 9	17. Cranial cavities (orbit, nasal cavity, pterygopalatine fossa) 18. TMJ, muscles of mastication, muscles of facial expression. Neck muscles and fasciae.
Week 10	19. General introduction to embryology. Intrauterine development. Gametes. 20. Fertilization, cleavage, preimplantation development of the embryo.
Week 11	21. Implantation, structure of the placenta, placental circulation. Fetal membranes, yolk sac. Bilaminar embryo. 22. Gastrulation, formation and derivatives of germinal layers. Differentiation of mesoderm.
Week 12	23. Neurulation, neural crest. 24. Development of somites, early development of the cardiovascular system.
Week 13	25. Folding of the embryo. Body axes, cranio-caudal and dorsoventral differentiation. 26. Development of the musculoskeletal system – derivatives of pharyngeal arches, development of the limbs.
Week 14	27. Development of the skull 28. Placenta, umbilical cord, embryologic and fetal periods, parturition

Topics for the dissection classes

1-6 weeks:	Bones, joints and muscles of the limbs. Dissection of the limbs.
7-9. weeks:	Cadaver dissection. Dissection of the superficial layers of the trunk, inspection of the structure of the body wall on prosected specimens (torso).
8-12. weeks:	Inspection of the bony skull together with head and neck prosections
13-14. weeks:	Embryology consultations, revision

Other subjects concerning the border issues of the given subject (both obligatory and optional courses). Possible overlaps of themes: Microscopic Anatomy and Embryology I - II.

Special study work required to successfully complete the course:

All students are required to *demonstrate their knowledge and motivated practical work* by the completion and demonstration of a dissected specimen or region once during the two semesters of the Academic year.

Requirements for participation in classes and the possibility to make up for absences:

Active participation in practical lessons is obligatory. Students should attend at least 75% of the scheduled hours, absences therefore are limited in **25%**. Attendance will be recorded in the dissection room classes.

Methods to assess knowledge acquisition during term time:

During the semester, both practical and theoretical knowledge will regularly be evaluated. Attendance is obligatory at the two mid-term tests (held on weeks 7 and 12). Anatomy mid-terms are oral exams. Midterm 1 – week 7 – Anatomy of the upper and lower limbs (bones, joints, muscles, blood supply and innervation)
Midterm 2 – week 12 – Anatomy of the axial skeletal structures (bones, joints, muscles, blood supply, innervation of the head, neck, trunk)
Valid marks, earned at the official midterm, cannot be upgraded or corrected on the retake midterms which are solely offered to those being absent.

Topic list for the semifinal examination:

Macroscopic Anatomy I.

Musculoskeletal Anatomy

- General osteology, classification of bones
- Continuous connections of bones. Classification of joints; components, movements and mechanisms
- General myology
- Structure of the vertebral column, the gross anatomy of the muscles acting upon it
- Movements and muscles of the head&neck (atlantooccipital and atlantoaxial joints)
- Joints of the shoulder girdle, the gross anatomy of the muscles acting upon them
- Shoulder joint, the gross anatomy of the muscles acting upon it
- Axillary fossa, quadrangular and triangular spaces
- Muscle compartments and cross section of the arm
- Elbow joint, the gross anatomy of the muscles acting upon it. Cubital fossa
- Muscles and cross section of the forearm
- Structure and movements of the radiocarpal joint, gross anatomy of the muscles acting upon it
- Osteofibrous spaces and muscle compartments of the hand, tendinous sheaths
- Carpometacarpal, metacarpophalangeal and interphalangeal joints of the thumb and fingers, the gross anatomy of the muscles concerned with the movements
- Osteofibrous structure of the thoracic cage (bones, joints, ligaments, movements)
- Thoracic muscles
- Diaphragm
- Muscles and spaces of the abdominal wall, rectus sheath
- Composition of the pelvis (bones, ligaments and membranes)
- Muscles of the buttock, the posterior abdominal wall and the pelvis (external and internal muscles of the hip)
- Inguinal canal, femoral canal
- Subinguinal hiatus, vascular and muscular compartments; adductor canal, femoral canal
- Hip joint and the gross anatomy of the muscles concerned with the movements
- Osteofibrous compartments, muscles and cross section of the thigh

The time and topics of midterm tests will be announced in the departmental homepage at the beginning of the semester (<http://sem-melweis.hu/anatomia>).

Requirements for signature:

Active participation in at least 75% of dissection room sessions, including the midterm tests (irrespective of the result) is obligatory for every student.

Type of examination:

Semifinal (written and oral) examination, topics: subject matter of the semester.

Semifinal examinations consist of written (theoretical) and oral (practical) parts. Examiners are delegated by the Course Director with the consent of the Head of Department.

Requirements of the examination:

During the semifinal examination the knowledge of students will be tested. The examination starts with a written pretest (e-learning module “Moodle”) to be followed by an oral test in Macroscopic Anatomy (identification of structures on true anatomical specimens) including relevant theoretical questions from the subject matter of the semester.

- Knee joint and the gross anatomy of the muscles concerned with the movements. Popliteal fossa
- Osteofibrous compartments, muscles and the cross section of the leg
- Ankle joint together with the gross anatomy of the muscles acting upon it
- Subtalar and talocalcaneonavicular joints, the muscles acting upon them
- Osteofibrous compartments and structure of the foot, arches of the foot
- Bones, spaces and connections of the skull, external and internal skull bases
- Neurocranium, components and cavities (anterior, middle and posterior cranial fossae)
- Viscerocranium, components and cavities (walls and connections of the nasal cavity, orbit, oral cavity, pterygopalatine and infratemporal fossae)
- Temporomandibular joint and the gross anatomy of the muscles of mastication
- Superficial muscles of the neck, muscle triangles
- Deep muscles of the neck and the laminae of the cervical fascia
- Muscles of facial expression

Further topics with relevance to the musculoskeletal system

- Lymphatic drainage of the thoracic wall including the mamma
- Dorsal branches of the spinal nerves, intercostal nerves
- Cervical plexus, brachial plexus, lumbar plexus, sacral plexus.
- Innervation of limbs
- Innervation of the trunk
- Cutaneous innervation
- Axillary artery and branches. Arteries and veins of the arm, forearm, and hand
- Arteries and veins of the lower limb
- Lymph nodes and lymphatic drainage of the upper and lower limbs

General Embryology and development of the musculoskeletal system

- Spermatogenesis, spermiogenesis
- Oogenesis
- Fertilization, cleavage of the zygote
- Blastocyst formation; the bilaminar embryonic disc
- Implantation
- Formation of body axes, parts of the early embryo (yolk sac, amnion, chorion, body stalk)
- Gastrulation

- Formation of the intraembryonic mesoderm; the notochord
- Neurulation (neural tube and neural crest)
- Derivatives of ectoderm, endoderm and mesoderm
- Folding of the embryo
- The structure and function of the placenta
- Development of the fetal membranes (chorion and amnion), umbilical cord
- Twin formation
- Membranous and cartilaginous neurocranium and viscerocranium
- Development of the limbs and vertebral column
- Development of the muscular system

Method and type of evaluation:

The first part of the semifinal examination is a written test (e-learning module "moodle") composed of simple or multiple choice questions. Passing rate: 60%

The second part of the examination is an oral/practical test in Macroscopic Anatomy (identification of structures on true anatomical specimens) including relevant theoretical questions from the subject matter of the semester.

Students are given separate marks for each part of the examination. Upon the termination of the examination the Chairman of the Examination Committee composes the final mark from the partial marks earned in the written and practical parts.

Evaluation of the written test: passing rate 60% - 2, 70% -3, 80% - 4, 90% - 5.

In case the result of the test falls between 50%-59,999%, the mark is fail (1), but the students may continue with the oral examination – i.e., having a "discretionary fail".

Students scoring below 50% have an unsuccessful examination (i.e., fail the examination) therefore they may not continue with the oral part.

Further unsuccessful examination parts result in the failure of the semifinal examination. When failing at the practical part, the written test will not have to be repeated in case the result was a 4 or a 5 only.

Exemption from the oral test could be earned from the results of the two midterm tests. A mark 4 (good) can be earned if the midterm average is 4,00 (4+4 or 3+5); while a mark 5 (excellent) will be earned if the average of the midterm marks is at least 4,50 (4+5 or 5+5). These students may be exempted from the oral part of the semifinal examination and thus will have to sit only for the written (moodle test) part.

Exemptions are solely based on the result of the marks earned from the official (first) midterms, but not from the retakes.

How to register for the examination?

Via the NEPTUN system.

Possibilities for exam retake:

According the Study and Examination Policy

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Recommended textbooks

1. Sobotta Atlas of Human Anatomy, 15th English ed. Musculoskeletal system, internal organs, head, neck, neuroanatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 2013
2. Gray's Anatomy for students with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchell, Elsevier; 2014; ISBN 9780702051319
3. THIEME Atlas of Anatomy, General Anatomy and Musculoskeletal System, 2014 by Schuenke, ISBN: 9781604069228
4. THIEME Atlas of Anatomy, Head, Neck and Neuroanatomy, 2016 by Schuenke, ISBN: 9781626231207
5. THIEME Atlas of Anatomy, Internal Organs, 2016 by Schuenke, ISBN: 9781626231665
6. McMinn and Abrahams' Clinical Atlas of Human Anatomy with STUDENT CONSULT Online Access , 7th Edition By Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973 , 2013
7. Netter: Atlas of Human Anatomy, Including Student Consult Interactive Ancillaries and Guides, 6th Edition, 2014.
8. Human Anatomy, Color Atlas and Textbook, 6th Edition by J Gosling, P Harris, J Humpherson, I Whitmore and P Willan; ISBN 9780723438274 Elsevier, 2016.
9. Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.
10. Gray's Anatomy. The Anatomical Basis of Clinical Practice; 41st edition by S. Standring; 2015 ISBN : 9780702052309
11. Netter's Clinical Anatomy with Online Access, 3rd Edition, by J. Hansen, 2014, **eBook ISBN: 9781455770632 eBook ISBN: 9780323312899 014**
12. Anatomy, A Photographic Atlas, 8th Edition by Rohen, Yokochi; Wolters Kluwer, 2016, ISBN: 978-1-4963-0870-2
13. Bräuer: Sobotta Flashcards (Muscles; Bones, Ligaments, and Joints) URBFI, 2013.
14. RMH McMinn: Last's Anatomy, Regional and Applied. Churchill Livingstone, Edinburgh 1990. ISBN 0-443-03484-4
15. Regional Anatomy, by T Tömböl, Medicina 2008, ISBN 963 242 186 8
16. Sectional Anatomy – Workbook, by A. Nemeskéri; István Apáthy's Foundation, 2001.
17. Neuroanatomy An Illustrated Colour Text, 4th Edition by Crossman & Neary Publication Date: 13/04/2010 ISBN-13: 9780702030864
18. *The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384*

Further study aids:

To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology (<http://semmelweis.hu/anatomia>) or from Knowledgebase on the Library homepage: (https://lib.semmelweis.hu/knowledge_base).

MACROSCOPIC ANATOMY AND EMBRYOLOGY II.

Department of Anatomy, Histology & Embryology

Head of Department: *Dr. Alán Alpár*

Course Director: *Dr. Andrea D. Székely*

Credit value: 10

Number of lessons per week: 9 lecture: 3 practical course: 6 seminar: 0

Type of the course: obligatory course

Objectives of the subject, its place in the medical curriculum:

Demonstration of the macroscopical composition of the human body specifically to provide the future clinicians/medical doctors with a valid body of information with relevance to clinically significant morphological structures. Development of internal organs – this part describes the intrauterine differentiation and growth of internal organs with relevance to the general medical curriculum. Teaching is done in the form of lectures and dissection classes.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Department of Anatomy, Histology and Embryology
Budapest 1094, Tűzoltó utca 58.

Successful completion of the subject results in the acquisition of the following competencies:

Understanding the macroscopical composition of the human body together with the position and topographical relation of organs. Clear understanding of structure and function. Ability to perform basic preparatory tasks during dissection. Identification of general directions/landmarks on the cadaver together with the recognition of significant organs/body parts. Acquiring knowledge of surface features and/or sectional anatomy forming basis for clinical diagnostics (palpation, auscultation, etc.) and the use of radiological imaging methods. Understanding of human development in order to draw parallels with macroscopical anatomy.

Course prerequisites:

Macroscopic Anatomy and Embryology I.

Number of students required for the course (minimum, maximum) and method of selecting students:

Obligatory for all registered students, on the basis of registration via the NEPTUN system

How to apply for the course:

Via the NEPTUN system.

Detailed curriculum:

List of lectures

Week 1	1. Nasal cavity, paranasal sinuses 2. Morphology and development of teeth 3. Oral cavity, tongue, palate, salivary glands, faucial isthmus 4. Clinical anatomy of the facial cranium
Week 2	5. Pharynx, esophagus 6. Larynx 7. Development of the face, malformations 8. Clinical anatomy of the cervical viscera and lymph nodes
Week 3	9. Development of the pharyngeal arches, development of the foregut 10. Thoracic cavity, mediastinum. Chambers of the heart, external features. Structure of heart wall, valves, fibrous skeleton. Pericardium. 11. Cardiac vessels and nerves, conducting system. Surface projection. Auscultation points. 12. Clinical anatomy of the thorax 1.
Week 4	13. Development of the heart 14. Development of arteries and veins 15. Morphology of trachea and the lung. Pleura 16. Clinical anatomy of the thorax 2.
Week 5	17. Development of the respiratory system. 18. Stomach and small intestines (duodenum, jejunum, ileum) 19. Liver, gall bladder, pancreas, spleen. 20. Clinical anatomy of the abdominal cavity 1.
Week 6	21. Large intestine, rectum 22. Development of the midgut and hindgut 23. Peritoneal relations of abdominal organs. Development of the peritoneum, separation of body cavities 24. Clinical anatomy of the abdominal cavity 2. Retroperitoneum
Week 7	25. Morphology of the kidney, capsules of the kidney, ureter, urinary bladder. 26. Morphology and coats of the testicle 27. Morphology of the epididymis, spermatic cord, seminal vesicle and prostate 28. Morphology of penis and male urethra. Male perineum

Week 8	29. Ovary, Fallopian tube and uterus 30. Vagina, female perineum, external genital organs 31. Clinical anatomy of the male urogenital tract 32. Clinical anatomy of the female urogenital tract
Week 9	33. Development of the urinary system 34. Development of genital organs 35. Topographical divisions of the central nervous system, developmental units 36. Meninges, epidural and subarachnoidal spaces, ventricles, choroidal plexus, CSF
Week 10	37. Lobes of the cerebral cortex, topographical subdivisions, structure and function of the medial, lateral and basal cortical fields 38. Topography and components of the basal ganglia and the diencephalon (thalamus, hypothalamus), the 3rd ventricle. 39. Topography and components of the brainstem (midbrain, pons, medulla oblongata), the 4th ventricle. 40. Arterious, venous and lymphatic circulation of the brain
Week 11	41. Cranial nerve nuclei 42. Trigeminal nerve (CN 5/1), CN 3, CN 4, CN 6 43. Trigeminal nerve (CN 5/2, 5/3), 44. Facial nerve (CN 7)
Week 12	45. Glossopharyngeal nerve (CN 9), hypoglossal nerve (CN 12) 46. Accessory nerve (CN 11), vagus nerve (CN 10) 47. Clinical anatomy of the glossopharyngeal, vagus, accessory and hypoglossal nerves 48. General composition of cranial nerves (summary). Consultational lecture (Q&A)
Week 13	49. Spinal cord, spinal ganglia, spinal segment. Spinal nerves, nerve plexuses 50. Intracranial topography, orbit 51. The autonomic nervous system. Sympathetic nervous systems 52. The autonomic nervous system. Parasympathetic nervous systems
Week 14	53. Lymphatic system. Regional lymphatic drainage of organ, lymph nodes. 54. Topographical relations of the thoracic cavity 55. Topographical relations of the abdominal cavity 56. Topographical relations of the pelvis

Topics of dissection classes

1-2. weeks:	Dissection of the head and neck organs.
3-6. weeks:	Opening of the thoracic and abdominal cavities, dissection of thoracic and abdominal organs
7-9. weeks:	Dissection of the retroperitoneal region and perineum together with organs of the lesser pelvis.
10-12. weeks:	Dissection/ inspection of the brain and spinal cord. Intracranial topography.
13-14. weeks:	Cranial nerve branches. Cross sections of the trunk. Revision

Other subjects concerning the border issues of the given subject (both obligatory and optional courses). Possible overlaps of themes:

Microscopic Anatomy and Embryology I - II.

Special study work required to successfully complete the course:

All students are required to *demonstrate their knowledge and motivated practical work* by the completion and demonstration of a dissected specimen or region once during the two semesters of the Academic year.

Requirements for participation in classes and the possibility to make up for absences:

During the semester, both practical and theoretical knowledge will regularly be evaluated. Attendance is obligatory at the two mid-term tests (held on weeks 7 and 13). Anatomy mid-terms are oral exams.

Midterm 1 – week 7 – Anatomy of the internal organs of the head, neck, thorax and abdomen (together with their development, topography, blood supply and innervation)

Midterm 2 – week 13 – Anatomy of the retroperitoneum and the pelvis (urinary system, external and internal genital organs, pelvic floor, perineum (together with their development, topography, blood supply and innervation)

Students absent from the mid-term test should reattend at one of the two further occasions (week 8 or 13, week 14, respectively) or their semester will not be accepted.

Valid marks, earned at the official midterm, cannot be upgraded or corrected on the retake midterms which are solely offered to those being absent.

The time and topics of midterm tests will be announced in the departmental homepage at the beginning of the semester (<http://semmelweis.hu/anatomia>).

Requirements for signature:

Active participation in at least 75% of dissection room sessions, including the midterm tests (irrespective of the result) is obligatory for every student. Missed practical classes cannot be made up for.

Type of examination:

Final (written and oral) examination, topics: subject matter of the subjects Macroscopic Anatomy and Embryology I-II. Final examinations consist of written (theoretical) and oral (practical) parts. Examiners are delegated by the Course Director with the consent of the Head of Department.

Requirements of the examination:

During the final examination the knowledge of students will be tested. The examination starts with a written pretest (e-learning module "Moodle") to be followed by an oral test in Macroscopic Anatomy (identification of structures on true anatomical specimens) including relevant theoretical questions from the subject matter of the semester.

Topic list for the semifinal examination:

Macroscopic Anatomy I.

(see there)

Macroscopic Anatomy II.

Internal organs of the head & neck region (morphology and development)

- Oral cavity (divisions, boundaries)
- Floor of mouth, sulcus lateralis linguae
- Macroscopy of the tongue
- Types and morphology of teeth, blood supply and innervation
- Tooth development
- Salivary glands together with topography
- Faucial isthmus, palate. Tonsils
- Pharynx and parapharyngeal spaces
- Blood supply and innervation of pharynx
- Pharyngeal muscles
- Nose, nasal cavity (boundaries, nasal meatus, vessels)
- Paranasal sinuses (connections, vessels)
- Larynx (shape, position, muscles, vessels, nerves)
- Skeleton and joints of larynx together with the fibroelastic membranes, mucous membrane
- Common and external carotid arteries and their branches. Maxillary artery and its branches
- Venous drainage of face and neck
- Lymph nodes and lymphatic vessels of the head&neck
- Development of the face, including the developemnt of the oral and nasal cavities
- Development and differentiation of the foregut
- Derivatives of the branchial arches
- Derivatives of the branchial pouches and grooves
- Development of the teeth and tongue

Circulatory system (morphology and development)

- Shape, external features of heart
- Chambers of heart
- Endocardium, ostia, valves of heart
- Skeleton of heart, anuli fibrosi
- Structure of heart wall
- Pulse generating and conducting system of heart
- Pericardium
- Position and surface projections of heart
- Percussion and auscultation (area of cardiac dullness, heart sounds)
- Radiology of heart
- Early circulation (formation of vessels, basis vascular systems of the embryo/fetus)
- Heart development
- Pulmonary circulation
- Ascending aorta, arch of aorta and its branches
- Subclavian artery and its branches
- Thoracic aorta and its branches
- Abdominal aorta and its branches
- Development of arteries (aorta, branchial arterious arches, umbilical arteries)
- Celiac trunk and its branches
- Superior mesenteric artery and its branches
- Inferior mesenteric artery and its branches
- External and internal iliac arteries and their branches
- Internal pudendal artery and its branches
- Superior vena cava and its tributaries
- Inferior vena cava and its tributaries
- Azygos and hemiazygos veins and their tributaries
- Portal vein and its tributaries, portocaval anastomoses
- Development of veins (inferior v. cava, portal v., superior v. cava, azygos and hemiazygos veins)
- Fetal circulations
- Lymphatic drainage of the abdominal and pelvic organs
- Thoracic duct, right lymphatic trunk

Morphology and development of the thoracic, abdominal and pelvic organs

- Trachea and bronchial tree
- Lung (shape, parts, surfaces, hilum)
- Lung (position, topography, vessels, nerves)
- Surface projection of pleura and lung
- Pleura, pleural cavity
- Mediastinum (divisions and content)
- Development of the lower airways including the lung
- Description and topography of the esophagus
- Stomach (shape, position, parts, blood supply and innervation). Peritoneal relations
- Duodenum (shape, position, divisions, vessels)
- Jejunum-ileum (shape, position, vessels)
- Large intestine (shape, position, vessels)
- Rectum, anal canal (shape, position, vessels)
- Liver (shape, position, peritoneal relations, vessels)
- Gall bladder and biliary passages (anatomy)
- Pancreas (shape, position, vessels)
- Peritoneum, greater and lesser omentum, mesentery, omental bursa
- Formation and differentiation of the midgut
- Formation and differentiation of the hindgut
- Development of liver and pancreas
- Development of the peritoneum
- Formation of body cavities, development of the diaphragm
- Kidney (shape, position, hilum, sinus, capsules, vascular architecture)
- Renal pelvis and calyces. Ureter
- Urinary bladder (shape, position, muscles, vessels)
- Female urethra
- Male urethra, bulbourethral gland
- Development of kidneys
- Development of urinary passages
- Testis (shape, position, vessels). Scrotum, coats of testis
- Epididymis, vas (ductus) deferens, spermatic cord
- Seminal vesicle, prostate
- Penis (shape, position, mechanism of erection, vessels, nerves)
- Pelvic floor, male perineum (connective tissue spaces)
- Hernia canals (inguinal and femoral)
- Ovary (shape, position, vessels)
- Uterine tube (shape, position, vessels)
- Uterus (shape, parts, position, supporting structures, vessels) Broad ligament
- Vagina, female perineum (connective tissue spaces)
- External female genital organs (mons pubis, labia, vestibule of vagina, greater vestibular gland, vessels)
- Development of gonads, formation and migration of primordial germ cells
- Development of male genital system
- Development of female genital system
- Development of the external genital organs

Macroscopy of the nervous system

- Intracranial topography Dura mater, dural sinuses
- Arachnoid mater, pia mater, cisterns, CSF circulation
- Description and meninges of the spinal cord
- Brain stem (medulla oblongata, pons, midbrain)
- Cerebellum
- Diencephalon (parts, blood supply). Thalamus, hypothalamus
- Lateral ventricles, III. ventricle, IV. ventricle
- Hemispheres
- Internal carotid artery (course, parts and branches)
- Vertebral artery (course and branches)
- Circle of Willis
- Veins of the brain
- Cranial nerve nuclei, macroscopy of cranial nerves together with the brain, dural and skull exits
- Branches of cranial nerves (CN 3, CN 4, CN 5, CN 6, CN 7, CN 9, CN 10, CN 11, CN 12)
- General composition of the autonomic nervous system
- Sympathetic nervous system (cranial, cervical, thoracic and lumbar parts)
- Sympathetic trunk
- Parasympathetic system (cranial and sacral parts)
- Topography of the orbit. Extraocular muscles. Eye movements.
- Eyelids, conjunctiva, fasciae of the orbit, lacrimal apparatus0

Method and type of evaluation:

Final examinations are composed of written theoretical and oral practical parts.

Students are given separate marks for each part of the examination. Upon the termination of the examination the Chairman of the Examination Committee composes the final mark from the partial marks earned in the written and practical parts.

Evaluation of the written test: passing rate 60% - 2, 70% -3, 80% - 4, 90% - 5.

In case the result of the test falls below 60%, the mark is fail (1), but the students may continue with the oral examination.

Further unsuccessful examination parts result in the failure of the semifinal examination. When failing at the practical part, the written test will not have to be repeated in case the result was a 4 or a 5 only.

Exemptions from the written test may be earned from the result of the annual competition. All students with an average of 4,0 from the two midterms are invited to participate in a written (moodle) competition from the topics of the 2 semesters of the subject held on Week 13.

Students achieving good marks (4 or 5, i.e., at least 80%) at the test may be exempted from the written part of the final examination and thus will have to sit only for the oral/dissection part.

Bonus dissection mark – Students may earn a bonus dissection mark (4 or 5 only) from the average of the two oral tests (only the official, first, midterm dates matter). A mark 4 (good) can be earned if the midterm average is 4,00 (4+4 or 3+5); while a mark 5 (excellent) will be earned if the average of the midterm marks is at least 4,50 (4+5 or 5+5). This bonus mark will be added to the marks of the practical part of the final examination in case it positively influences the final mark.

How to register for the examination?

Via the NEPTUN system.

Possibilities for exam retake:

According the Study and Examination Policy

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:**Recommended textbooks**

1. Sobotta Atlas of Human Anatomy, 15th English ed. Musculoskeletal system, internal organs, head, neck, neuroanatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 2013
2. Gray's Anatomy for students with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchel, Elsevier; 2014; ISBN 9780702051319

3. THIEME Atlas of Anatomy, General Anatomy and Musculoskeletal System, 2014 by Schuenke, ISBN: 9781604069228
4. THIEME Atlas of Anatomy, Head, Neck and Neuroanatomy, 2016 by Schuenke, ISBN: 9781626231207
5. THIEME Atlas of Anatomy, Internal Organs, 2016 by Schuenke, ISBN: 9781626231665
6. McMinn and Abrahams' Clinical Atlas of Human Anatomy with STUDENT CONSULT Online Access, 7th Edition By Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973, 2013
7. Netter: Atlas of Human Anatomy, Including Student Consult Interactive Ancillaries and Guides, 6th Edition, 2014.
8. Human Anatomy, Color Atlas and Textbook, 6th Edition by J Gosling, P Harris, J Humpherson, I Whitmore and P Willan; ISBN 9780723438274 Elsevier, 2016.
9. Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.
10. Langmann's Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
11. Gray's Anatomy. The Anatomical Basis of Clinical Practice; 41st edition by S. Standring: 2015 ISBN : 9780702052309
12. Netter's Clinical Anatomy with Online Access, 3rd Edition, by J. Hansen, 2014, **eBook ISBN: 9781455770632**
eBook ISBN: 9780323312899 014
13. Anatomy, A Photographic Atlas, 8th Edition by Rohen, Yokochi; Wolters Kluwer, 2016, ISBN: 978-1-4963-0870-2
14. Bräuer: Sobotta Flashcards (Muscles; Bones, Ligaments, and Joints) URBFI, 2013.
15. RMH McMinn: Last's Anatomy, Regional and Applied. Churchill Livingstone, Edinburgh 1990. ISBN 0-443-03484-4
16. Regional Anatomy, by T Tömböl, Medicina 2008, ISBN 963 242 186 8
17. Sectional Anatomy – Workbook, by A. Nemeskéri; István Apáthy's Foundation, 2001.
18. Neuroanatomy An Illustrated Colour Text, 4th Edition by Crossman & Neary Publication Date: 13/04/2010 ISBN-13: 97807020308
19. The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384

Further study aids:

To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology (<http://semmelweis.hu/anatomia>) or from Knowledgebase on the Library homepage: (https://lib.semmelweis.hu/knowledge_base).

MEDICAL BIOPHYSICS I.

Tutor: *Dr. Dániel Sándor Veres*

First Semester

Week	Lecture (1 hour per week)	Laboratory (3 hours per week)
1	Radiations (basic concepts)	Data analysis
2	Properties of electromagnetic radiations; wave and corpuscular nature	Resonance
3	Attenuation of radiation	Emission spectroscopy. Light sources
4	Luminescence and its applications	Spectrophotometry
5	Lasers and their medical applications	Optical lenses; light microscope
6	Thermal radiation, thermography. Biological effects of light	Detection of nuclear radiations
7	Production and spectrum of X-radiation Cyclotron; Linear accelerator;	Amplifier
8	Attenuation of X-radiation, interactions	Special light microscopes
9	Atomic structure; Radioactive decay law Gamma-radiation and its detection	Optics of the eye
10	Radiotherapy, radiosurgery; Isotope diagnostics	Polarimeter
11	SPECT, PET Beta-radiation, beta-decay	The attenuation of gamma-radiation
12	Alpha-radiation, alpha-decay Interaction with matter	Dosimetry
13	Dosimetry	Concentration determination with refractometer
14	Radiation protection; estimation of risk	Repetition

MEDICAL BIOPHYSICS II.

Second Semester

Week	Lecture (1 hour per week)	Laboratory (2,5 hours per week)
1	Bonds and their significance in macromolecular structure; Boltzmann distribution, examples	Coulter counter
2	Liquid crystals, membranes	Determination of skin-impedance
3	Electronic properties of condensed materials (solids, macromolecules)	X-ray diagnostics
4	Ultrasound properties, generation of ultrasound	Gamma energy determination
5	Ultrasonography, Doppler methods	Pulse generators (e.g. pacemaker, defibrillator)
6	Methods for structure examination	Ultrasound
7	Basic concepts of Thermodynamics, First law	Audiometry
8	General description of transport phenomena, Onsager`s equation, examples	Isotope diagnostics
9	Diffusion; transport across membrane	Densitography (CT)
10	Resting potential and its local changes	Flow of fluids.
11	Action potential, properties, interpretation	Electrocardiography
12	General characteristics of sensory function, hearing, vision	Diffusion
13	Biophysics of muscle function	Sensory function
14	Motor proteins	Repetition

Institute of Biochemistry and Molecular Biology
Department of Molecular Biology
 EOK Building, H-1094 Budapest, Tűzoltó u. 37-47.

Lecturer of the course: Miklós Csala MD, DSc
csala.miklos@semmelweis.hu

Course coordinator: Gergely Keszler MD, PhD
keszler.gergely@semmelweis.hu

Credit: 6

Number of lessons per week: lectures: 3; practicals: 3

The principal aim of the course is to prepare students for the understanding of the subjects of Biochemistry, Molecular cell biology, Physiology and Pharmacology. This requires a firm knowledge of the foundations of general, organic and inorganic chemistry.

Lectures:

General chemistry

1. Atomic structure; the periodic table of elements
2. Chemical bonds, hybrid states
3. Secondary bonds and interactions
4. Chemical equilibria
5. Acid-base theories, pH
6. pH of strong or weak acids and bases
7. The theory of buffers
8. Buffers of physiological importance, cation and anion hydrolysis, pH of salt solutions
9. Solubility of salts and bases, the solubility product
10. Laws of dilute solutions. Specific and equivalent conductivity
11. Thermodynamics 1 – Enthalpy
12. Thermodynamics 2 – Entropy
13. Thermodynamics 3 – Direction of reactions
14. Electrochemistry 1
15. Electrochemistry 2
16. Electrochemistry 3
17. Reaction kinetics
18. Complex compounds, reactive oxygen species

Organic chemistry

1. Principles of organic chemistry
2. Nomenclature of organic compounds, constitution of organic compounds
3. Configuration and conformation of organic compounds
4. Saturated and unsaturated hydrocarbons
5. Reactions of alkyl halides and aromatic compounds
6. Classification and reactions of hydroxyl compounds
7. Classification and reactions of oxo compounds
8. Structure, function and reactions of organic acids
9. Nitrogen-containing organic compounds
10. Sulphur or phosphorus-containing organic compounds

Practicals:

1. Introduction, acid-base titration 1 (titration of strong acids) (**4×45 min**)
2. Concentration, pH, problems (**2×45 min**)
3. Acid-base titration 2 (titration of weak acids). Relationship between conductivity and dissociation (**4×45 min**)
4. Salts (**2×45 min**)
5. Titration curves, consultation (buffers) (**4×45 min**)
6. Physiological buffer systems (**2×45 min**)
7. Electrochemistry, consultation (**4×45 min**)
8. Thermochemistry, thermodynamics (**2×45 min**)
9. Permanganometry (**4×45 min**)
10. Electrochemistry (**2×45 min**)
11. Determination of the ionization constant of phenol red by photometry (**4×45 min**)
12. Structure of organic compounds (**2×45 min**)
13. Complexometry. Precipitation titration (**4×45 min**)
14. Isomers, molecule models (**2×45 min**)

Lectures and practical lessons

Two lectures are held every week; practical lab lessons (duration: 4×45 min) and seminars (2×45 min) are held in alternating weeks. For detailed schedules see the Moodle website of the subject.

Prerequisites for acknowledging the semester

Attendance of at least 75% of the practical lessons is obligatory. Students not attending (i) more than 2 labs or (ii) more than 5 seminars or (iii) more than 1 lab and 3 seminars are not going to be allowed to sit for the semifinal exam. Missed practicals and seminars can only be made up in the same week with another group; certificate of participation issued by the host teacher needs to be presented by the student to his/her own teacher.

However, only one missed class can be made up during the semester.

Midterm examination

An optional written midterm test (30 min) is held in week 13 about the laboratory experiments performed during the semester. Performance at the laboratory work during the whole semester is also taken into account at the evaluation.

Examination and grading system

The oral and written exam is based on the topic list announced in the beginning of the semester, and it takes place before a two-member committee (examiner and co-examiner). The exam can be passed if all these topics are sufficiently answered. Students pick 3 questions (general chemistry, organic chemistry, practice) and a calculation problem to be solved in writing. Students, who perform well in at the practical midterm and in the labs during the semester, get exempted from picking the practical question. The bonus is valid during the whole exam period (in case of an unsuccessful exam).

Exemption from attending the course

Students who learned general, and organic chemistry at university levels prior to the commencement of their studies at Semmelweis University might be exempted from attending the Medical Chemistry course. Students are kindly asked to present their official documents (academic transcripts and a detailed syllabus on the courses they have completed) to the tutor (Gergely Keszler).

Recommended textbooks

Ebbing-Gammon: General Chemistry, latest edition

Hrabák-Csermely-Bauer: Principles of Organic Chemistry (2nd edition, 2007, editor: A. Hrabák)

Hrabák: Selected Collection of Chemical Calculations and Biochemical Exercises (latest edition)

E-learning system (Moodle) (<https://itc.semmelweis.hu/moodle>)

Topic list

1. General chemistry
2. The periodic table of the elements, quantum numbers
3. The covalent bond, the molecular geometry of inorganic molecules (e.g. carbon monoxide, carbon dioxide, ammonia). Ionization energy, electron affinity, electronegativity. The ionic bond, hydroxylapatite and fluoroapatite
4. The structures of polyatomic ions, the complexes
5. The secondary bonds and interactions between molecules
6. Laws of dilute solutions: vapor pressure, freezing point depression, boiling point elevation
7. The phenomenon of osmosis, its biological significance, isotonic, hypotonic and hypertonic solutions
8. Chemical equilibria, the equilibrium constant and the degree of dissociation, their correlation. The Le Châtelier principle (example: formation, properties, salts, practical use of hypochlorous acid.)
9. Gas mixtures: partial pressure, volume %. The composition of the air. Dissolution of gases in liquids, Henry's law, the decompression sickness
10. The structure and dissociation of water. Acid-base theories. The pH and pOH concept, calculation of the pH of strong acids or bases, and their titration curves. Acid-base indicators
11. The dissociation of weak acids and bases, the concept of specific and equivalent conductivity, their correlations with the dissociation. Titration curves of weak acids
12. Types of salts and their reactions with water. pH of salt solutions
13. The buffers: principle, mechanism of action, calculation of the pH. The titration curves of polyprotic acids (phosphoric acid)
14. Buffers of physiological importance
15. The solution equilibria of solid substances, the solubility product
16. The first law of thermodynamics. Heat of reaction, combustion heat, heat of formation. Hess' law
17. The second law of thermodynamics. The direction of the chemical reactions, Gibbs free energy
18. Oxidation, reduction, oxidation number, standard reduction potential

19. The galvanic cells: arrangement, reactions, calculation of the electromotive force
20. Types of electrodes, redox systems of biological importance
21. The concentration cells, the principle of measuring the pH
22. Reaction rate, order and molecularity, factors influencing the reaction rate

II. Organic chemistry

1. The electronic structure of the carbon atom, its hybrid states, the spatial structures of organic compounds
2. The concept of isomerism, types of structural isomerism, nomenclature of organic compounds
3. Geometric isomerism in unsaturated and cyclic compounds
4. Stereoisomerism, chiral compounds, optical activity, D-L and R-S nomenclature
5. Conformations of organic compounds, examples with open chain and cyclic molecules
6. Reaction types and mechanism in organic chemistry
7. Properties and reactions of alkanes
8. Properties and reactions of alkenes
9. Characteristics, reactions and biological roles of aromatic compounds
10. Alcohols, enols, phenols
11. Oxo compounds: aldehydes and ketones. Their chemical reactions, the mechanism of the nucleophilic addition. Oxo-enol tautomerism
12. Properties and reactions of compounds containing a carboxyl group
13. Substituted carboxylic acids (Halogenated, oxo-, hydroxy-, aromatic; mono-, di- and tricarboxylic acids)
14. Organic compounds containing sulfur or phosphorus
15. Nitrogen-containing organic compounds: classification and properties of amines
16. Carboamides, amides of the carbonic acid, imines

III. Laboratory

1. Principle of concentration determination by volume measurement: titrations
2. Titration of strong acids and bases
3. Titration of weak acids and bases
4. Conductivity measurement, determination of weak acid dissociation
5. Titration of gastric juice
6. Titration curves of mono- and polyprotic acids
7. Titration based on redox reaction: permanganometry
8. Complexometry: determination of copper concentration
9. Electrochemical measurements: the Daniell cell, concentration cell, redox and non-polarizable electrodes
10. Principle of spectrophotometry, areas of application: determination of the K_d value of the phenol red indicator
11. Precipitation titration

MEDICAL COMMUNICATION

Institute of Behavioural Sciences

Name of the course director: Dr. Adrienne Stauder, Ph.D., habil

Name of the course leader: Dr. János Pilling

Credit value: 3 credits

Total number of hours: 28 lectures: 14 practices: 14 seminars: 0

Subject type: obligatory course

Objectives of the subject, its place in the medical curriculum:

Proper communication is an essential element of effective healing. Good communication helps to form a trusting relationship between the physician and the patient, it allows the doctor to gather effectively the information that underpins the diagnosis, and it improves the patient's cooperation and adherence with treatments. The aim of education is partly to teach communication techniques that can make the daily tasks of doctors more effective: listening to, interviewing, informing and promoting cooperation of the patients. The subjects of education are also elements of the everyday doctor-patient relationship, which have recently come to the fore, such as e.g shared decision making, suggestive effects of medical communication, communication aspects of patient safety.

In addition to describing the general regularities of medical communication, the course also presents the specialties of communication in various areas of the health care. Thus, we deal with the peculiarities of communication with children or the elderly, discussion about sexual topics and the cultural competence of the doctor. In our education, we place great emphasis on the difficult issues of the doctor-patient relationship, so we deal with the communication of bad news and the prevention and management of aggression.

The main goal of the course is to teach special communication knowledge to medical students that can help them create proper doctor-patient relationship and improve their effectiveness in medical practice.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

SU NET and EOK buildings

Successful completion of the subject results in the acquisition of the following competencies:

Upon successful completion of the subject, the students will be able to

- effectively gather information to make a diagnosis by using appropriate questioning techniques;
- use communication techniques that facilitate the understanding and remembering during patient information;
- know and apply specific communication techniques to express their attention and empathy;

- use several communication techniques to improve the patient's therapeutic cooperation;
- inform the patient about the possible risks of the treatments in accordance with the legal regulation, in an objective, yet non-alarming way;
- can activate the patient in order to become a partner in his own treatment as much as possible, and empower the patient himself to contribute as much as possible to his own recovery or improvement of his condition;
- have effective methods to facilitate lifestyle change;
- be aware of the suggestive effects that doctor's communication can have; be able to use communication methods that put the positive effects of the doctor's words at the service of cooperation and healing;
- be able to communicate in a way that suits the individual characteristics of the patient (age, different social and cultural backgrounds, different levels of health understanding, possible mental disorders or disabilities);
- be able to communicate on intimate issues without embarrassment;
- know and be able to use communication methods to manage tensions and conflicts;
- breaking bad news in a compassionate way (eg news of incurable disease, news of death, news of congenital malformation);
- can effectively use modern technology for the purposes of medical communication;
- know and be able to use communication tools that increase patient safety.

Course prerequisites:

There are no prerequisites.

Number of students required for the course (minimum, maximum) and method of selecting students:

The completion of the course is obligatory for all students. Course is taught only in the first semester of the academic year, all students can register for the course. The recommended maximum number of students for practice is 15 students per group.

How to apply for the course:

Through the Neptun system.

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments! Always attach a CV for guest lecturers!)

LECTURES: Week 1-7

Week 1:	Introduction. Communication difficulties and possible solutions in the everyday medical practice. (Dr. János Kollár)
Week 2.	Promoting behavior change. The development of the patient-physician collaboration. (Dr. Adrienne Stauder)
Week 3.	Breaking bad news. Disclosing medical errors. (Dr. János Kollár)
Week 4.	Suggestive communication in medical practice. (Dr. János Kollár)
Week 5.	Communication about functional complaints. (Dr. Adrienne Stauder)
Practice: 6x3 hours Weeks 1-6 or 8-13 (exact times, venues and teachers to be announced in the Neptun and on our website:) https://semmelweis.hu/magtud/en/education/faculty-of-medicine/medical-communication/seminars-and-course-schedule/)	
Week 1 / 8.	Practice 1. Communication in everyday life and in the medical practice. The active listening. Communication aspects in empathy.
Week 2 / 9.	Practice 2. Patient information, patient education. Communicating with different age groups (eg. children, elderly). Communicating with patients with low health literacy.
Week 3 / 10.	Practice 3. Promoting lifestyle change: motivational interview, shared decision-making.
Week 4 / 11.	Practice 4. Communicating bad news (practice). Suggestive communication techniques. Communicating about complementary and alternative therapies.
Week 5 / 12.	Practice 5. Communication with tense, hostile patients, strategies to prevent violence. Assertive communication.
Week 6 / 13.	Practice 6. The cultural competence of the doctor. Communicating about intimate issues. Communicating about mental health problems.
Week 7 / 14.	no practice

All planned lecturers: Dr. Kollár János, Dr. Stauder Adrienne Dr. Tóth Mónika Ditta, are employees of Semmelweis University

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

- The Sociology of Healthcare and Medicine (possible overlap: the impact of modern technology on medical communication)
- Medical Psychology, Psychiatry (possible overlap: relationship and communication with people with mental disorders.)
- Bioethics (possible overlap: medical communication deals with the implementation in everyday practice of principles described in bioethics.)

Special study work required to successfully complete the course:
(E.g. field exercises, medical case analysis, test preparation, etc.)
no special study work required

Requirements for participation in classes and the possibility to make up for absences:

The participation at minimum 75% of the practice seminars is the prerequisite of the signature.

It is possible to make up for ONE absence by participating in another seminar group the same week (only once in a semester, upon agreement with both teachers!)

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)
There is no assessment during the term time.

Requirements for signature:

The participation at minimum 75% of the practice seminars is the prerequisite of the signature.

Requirements of the examination:

(In case of a theoretical examination, please provide the topic list; in case of a practical exam, specify the topics and the method of the exam)

Exam topics list A:

1. The significance of medical communication. Misconceptions and facts about medical communication.
2. Doctor-patient consultation.
3. Promoting lifestyle change: the 5A and 5R methods; the transtheoretical model of behavior change.
4. Promoting lifestyle change: motivational interviewing.
5. Communication options for developing health literacy.
6. Communicating risks of treatments.

7. Shared decision making.
8. Suggestive communication in medical practice.
9. Communication with children.
10. Communication with older people. Communication with elderly having age-related mental disorders.
11. Cultural competence of the physician.

Exam topics list „B”

12. Communication about functional symptoms
13. Communication with patients using complementary and alternative treatments.
14. Communicating about intimate issues.
15. Communication with tense, hostile people.
16. Communication with depressed patients. Recognizing the risk of suicide.
17. Communication with patients having anxiety symptoms or addictions.
18. Breaking bad news.
19. Communication aspects of patient safety.
20. Communication with people living with disabilities.
21. Communication with the victims of abuse.
22. E-health: use of technological tools in health communication.

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)

Final mark is based on an oral exam. Two topics – one from A list and one from B list should be reported on, at least at satisfactory (2) level. The average of the marks given for each topic gives the final mark.

How to register for the examination:

Through the Neptun system.

Possibilities for exam retake:

Through the Neptun system

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

The oral exam is based on the course text book and the lecture handouts posted in Moodle.

Course text book:

Pilling, János: Medical Communication in practice. Medicina, Budapest, 2020.

MEDICAL HUNGARIAN I.

Responsible organisational unit:

Institute of Languages for Specific Purposes

Programme director:

Katalin Fogarasi PhD, habil., director, habilitated associate professor

4 lessons per week, 2 credits,

Assessment: 2 oral tests (on weeks 7 and 14)

The aim of the subject:

The role of this subject is to help students acquire the Hungarian language skills that enable them to take anamnesis, ask the patient about medical history and present complaints and to develop strategies that help understanding Hungarian patients in their clinical practice.

Students learn how to communicate with the patient during the examination of the thoracic organs, circulation, abdomen, locomotor and nervous systems. Furthermore, they get familiarised with basic medical documentation (e.g., patient's chart). They develop the vocabulary necessary in their clinical practice, such as the names of symptoms and conditions.

This is the first semester of a 4-semester medical language course. The aim of the course is to enable students to take anamnesis, to be informed about past illnesses and present complaints, and to have appropriate strategies for understanding the patient in clinical practice. Students will get familiar with the instructions used in the examination of patients, be able to examine patients independently, and be able to give relevant instructions (examination of the thoracic organs, circulation, abdomen, musculoskeletal system, nervous system - based on the medical chart). Students will get familiar with the forms of medical documentation (fever chart, chart, etc...). Students will be able to understand the symptoms of diseases – according to the list proposed by the clinics – in Hungarian and ask the patients relevant questions about their illness.

Course content of practical lessons:

weeks	curriculum
1	Introduction, the alphabet, formal greetings.
2	Introduction. What would you like to drink?
3	What languages do you speak? Where are you from?
4	General personal information.
5	Numbers.
6	Time and date.
7	Oral test
8	The human body; body parts
9	Present complaints
10	At the pharmacy
11	Location of the pain. Where does it hurt?
12	Timing of the pain. When does it hurt?
13	At the clinic. Basics of history taking in Hungarian
14	Oral test

Course material provided by the Department of Languages for Specific Purposes

Borda Szandra-Hetesy Bálint: Magyar orvosi szaknyelv 1. Students can download the book in pdf format from the moodle interface.

MEDICAL HUNGARIAN II.

Responsible organisational unit:

Institute of Languages for Specific Purposes

Programme director:

Katalin Fogarasi PhD, habil., director, habilitated associate professor

4 lessons per week, 2 credits,

Assessment: 2 oral tests (on weeks 7 and 14)

The aim of the subject:

This is the second semester of a 4-semester medical language course. The aim of the course is to enable students to take anamnesis, to be informed about past illnesses and present complaints, and to have appropriate strategies for understanding the patient in clinical practice. Students will get familiar with the instructions used in the examination of patients, be able to examine patients independently, and be able to give relevant instructions (examination of the thoracic organs, circulation, abdomen, musculoskeletal system, nervous system - based on the medical chart). Students will get familiar with the forms of medical documentation (fever chart, chart, etc...). Students will be able to understand the symptoms of diseases – according to the list proposed by the clinics – in Hungarian and ask the patients relevant questions about their illness.

Course content of practical lessons:

weeks	curriculum Hungarian language competences related to the following topics
1	Structure of the anamnesis. Why were you hospitalized?
2	Complaints and present symptoms. How do you feel? (abdominal pain, diarrhea, stool)
3	Complaints and past symptoms (dizziness, shortness of breath, swollen legs, cough)
4	Internal organs
5	Known diseases (diabetes, hypertension, asthma, allergies)
6	Known diseases (heart, lung, liver, biliary, kidney and thyroid problems)
7	Oral test
8	Medications (what, when, how much)
9	Medications and past surgeries. Allergies, intolerance, surgical complications
10	Past surgeries (what kind, when), transfusion
11	Smoking, alcohol, present occupation
12	Smoking, alcohol, past occupation
13	Revision, practice
14	Oral test

Course material provided by the Department of Languages for Specific Purposes

Borda Szandra-Hetesy Bálint: Magyar orvosi szaknyelv 2. Students can download the book in pdf format from the moodle interface.

MEDICAL TERMINOLOGY

Responsible organisational unit:

Institute of Languages for Specific Purposes

Programme director:

Katalin Fogarasi PhD, habil., director, habilitated associate professor

90 minutes/week

Assessment: Midterm test, practical exam, moodle homeworks

Role of subject in fulfilling the aim of training:

Medical Terminology is a course designed for medical students to ease their everyday studies by providing them with linguistic and terminological knowledge. The material is closely built on the terminology of Anatomy and the clinical terminology of the Musculoskeletal system. Students get familiarized with the most sufficient grammatical rules governing medical terminology and become able to decode anatomical names and formulate both Latin and Greek diagnostic phrases.

Syllabus

- 1 Latin nouns in Anatomy
- 2 The dictionary form of Latin nouns
- 3 Latin possessive phrases in Anatomy
- 4 The plural form of Latin nouns
- 5 The dictionary form of Latin adjectives and their agreement to nouns
- 6 The dictionary form of Latin adjectives and their agreement to nouns
- 7 test 1
- 8 Anatomical adjectives from nouns
- 9 Anatomical adjectives from nouns
- 10 Muscle names
- 11 Muscle names
- 12 Diagnostic terminology - musculoskeletal disorders
- 13 Diagnostic terminology - musculoskeletal disorders
- 14 test 2

Course material, recommended text book(s), professional literature and supplementary reading(s)

Bakó, Alexandra. Medical Terminology, manuscript. 2022 (available on the moodle course of the subject in pdf)

PHYSICAL EDUCATION I.

Physical Education and Sportcenter

Type of Subject: Obligatory

Credit: 0 1

Name of the Lecturer: *Várszegi Kornélia*

His/her workplace, phone number: 1107 Budapest, Zágrábi utca 14.
+36-1/264-1408

Position: director

Objectives of the subject, its place in the medical curriculum:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behaviour.

Detailed curriculum:

1st Week:	General information	Health and Safety, Fire and Environmental protection. The mid-year adoption requirements, the construction of the classes and the presentation of the university recreational and sports opportunities for extra – curricular activities. Heart rate measurements, Ruffier test and evaluation of the results.
2nd Week:	Athletic	Exercises to improve stamina. Preferably outdoors, on grass ground running, with the aim of developing good running and breathing techniques.
3rd Week:	Flying disc	Introduction the basic of frisbee rules and practicing the basic technical elements in pairs and game situation.
4th Week:	Tennis	Introducing the basis technical elements of tennis (forehand and backhand shot), improving hand-eye coordination.
5th Week:	Agility ladder	Introducing different running, skipping techniques using agility ladder.
6th Week:	Football	Introducing the basic technical elements of football. Single exercises and exercises in pairs to improve the ball skill development.
7th Week:	Badminton	Introducing the basic technical and tactical elements of badminton. Introducing the basic rules and game.
8th Week:	Circuit training	Bodyweight exercises and exercises with basic equipment to learn the correct functional movement pattern.
9th Week:	Ball skill developing exercises	Compare the results with the previous test to bring the importance of the health of the cardiovascular system to the attention.
10th Week:	Meta	Introducing the game and the basic rules. Aim to improve the ball skill development, improve reaction time, speed and explosiveness.
11th Week:	Obstacle course	To complete a built-up obstacle course using different creeping-climbing, hovering, pulling, skipping, throwing techniques for general skill development.
12th Week:	Core training	Postural correction exercises using the own bodyweight especially to strengthen the core muscles to prevent the health of the vertebrae.
13th Week:	Skipping rope	Endurance and coordination developing exercises at different levels using skipping rope.
14th Week:	Dumbbell exercises	Strengthening exercises with dumbbells.

P.E. Teachers:

Doharné Buczkó Anikó, Farkas Dominika, Kalmus Dániel, Lehel Zsolt, Sótornyiné Hrehuss Nóra, Várszegi Kornélia, Weisz Miklós

Requirements for participation in classes and the possibility to make up for absences:

The number of active participations for physical education classes is 10, regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Testnevelési és Sportközpont (Gymnasium) 1107 Budapest Zágrábi utca 14.

Gabányi László Sportcsarnok 1116 Budapest, Hauszmann Alajos utca 5.

Successful completion of the subject results in the acquisition of the following competencies:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

Number of students required for the course (minimum, maximum) and method of selecting students:

According to the Neptun admission system (20 – 60 students)

How to apply for the course:

via Neptun system

Methods to assess knowledge acquisition during term time:

There is no mandatory control during the term.

Requirements for signature:

Active participation in practice classes 10 times under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, or
2. does sports regularly and submits a certificate of association and federation in the Neptun system during the exemption period at the beginning of the semester.

PHYSICAL EDUCATION II.

Type of Subject: Obligatory

Credit: 1

Name of the Lecturer: *Várszegi Kornélia*

His/her workplace, phone number: 1107 Budapest, Zágrábi utca 14.

Position: director

Objectives of the subject, its place in the medical curriculum:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behaviour

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Testnevelési és Sportközpont (Gymnasium) 1107 Budapest Zágrábi utca 14.

Gabányi László Sportcsarnok 1116 Budapest, Hauszmann Alajos utca 5.

Successful completion of the subject results in the acquisition of the following competencies:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

Number of students required for the course (minimum, maximum) and method of selecting students:

According to the Neptun admission system (20 – 60 students)

How to apply for the course:

via Neptun system

Detailed curriculum:

1st Week:	General information	Accident, fire and environmental knowledge. Requirement for acceptance of the semester system, the structure of the classes and the presentation of the university recreational sports opportunities for extra-curricular activities.
2nd Week:	Basketball	Dribbling, passing and shooting drills in order to improve fine motor skills.
3rd Week:	Bench exercises	Using the dimensions of the sport bench by running, skipping, jumping, lifting etc. exercises.
4th Week:	Rubber band exercises	Strength and coordination training by taking advantage of the elastic features of the object.
5th Week:	Floorball	Introducing the sport to the Students by exposing the major rules, proper technique of stick handling. Passing and shooting drills.
6th Week:	„Double-trouble”	Strength and stretch training in pairs by applying different starting positions. Functional movements executed in pairs.
7th Week:	Volleyball	Introducing the fundamental elements of the game (serves, hits, digs etc.) Exposing the major rules and techniques.
8th Week:	Frisbee	Taking the next step into the game by applying tactical elements in match situations. Passing and catching drills in different moving forms.
9th Week:	Practical exercise and ball skill developing exercises	Sport games on the side (Dodge-ball, King of the court etc.) completing a practical exercise
10th Week:	Circuit training	General strengthening drills at each stations. Applying different intensity level, regarding the various conditions of the Students.
11th Week:	Tennis	Involving the new strokes into the learning process: form of serves, the volleys, the smash etc.
12th Week:	Badminton	Introducing the new technical and tactical elements of the game (drop shots, lobs, smash etc.) Exposing the rules of doubles.
13th Week:	Core exercises	Relative (own body) weight exercises applying different equipment (hand weights, rubber band etc.) with the aim of postural correction, by strengthening the core muscles in order to avoid spinal deformations.
14th Week:	Box exercises	Applying the sport box by jumping, lifting, slaloming, carrying (etc) it.By this enhance the level of strength and stamina.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./week sport training (competitive sport, for qualified only): cheerleader, men's football, handball, basketball, volleyball)

P.E. Teachers:

Doharné Buczkó Anikó, Farkas Dominika, Kalmus Dániel, Lehel Zsolt, Sótönyiné Hrehuss Nóra, Várszegi Kornélia, Weisz Miklós

Requirements for participation in classes and the possibility to make up for absences:

The number of active participations for physical education classes is 10 (for trainings 15 times!), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days, after registration in the Neptun system. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic

attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes

Methods to assess knowledge acquisition during term time:

There is no mandatory control during the term.

Requirements for signature:

Active participation in practice classes 10 times under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, or
2. does sports regularly and submits a certificate of association and federation in the Neptun system in the exemption period preceding the semester.

BASICS OF MEDICAL CHEMISTRY

Department of Medical Chemistry, Molecularbiology and Pathobiochemistry

Lecturer: **Prof. Dr. Miklós Csala**

Lectures: obligatory

Credit: 1

Topics:

- 1: Basics of atomic and molecular structure, periodic table, bondings.
- 2: Chemical equations, stoichiometry, reaction types. Acids, bases, salts. Solutions. Concentrations.
- 3: Laws of diluted solutions. Electrolytes, ionization of electrolytes. Conductivity. Acid-base theories.
- 4: Chemical equilibria. Le Chatelier principle, law of mass action. Equilibria in aqueous solutions, principle of pH. Buffers. Carbon dioxide/hydrocarbonate buffer.
- 5: Consultation: preparation for the 1st midterm. Focused on calculations: ionization, pH, buffer, solubility product.
- 6: Chemical thermodynamics. Principles of enthalpy, entropy, free enthalpy. Hess' law. Basics of reaction kinetics. Activation energy and catalysis.

- 7: Electrochemistry. Oxidation and reduction, redox systems in the living cells.
- 8: A short summary of inorganic chemistry. Metals and non-metals. Complexes.
- 9: Calculations in electrochemistry and thermochemistry.
- 10: Basics of organic chemistry, hybrid states of carbon, organic reaction types. Isomerism, structural isomerism. IUPAC nomenclature.
- 11: Stereochemistry. Geometric and chiral isomerism, nomenclature. Prochirality.
- 12: The most important groups of organic compounds. Aliphatic and aromatic skeletons, their reactions. Repetitions of their structures. Consultation before the 2nd midterm – focused on organic chemistry.
- 13: The most important groups of organic compounds according to their functional groups, their reactions. Repetitions of their structures.
- 14: Closing test. 30 multiple choice questions and 10 structures

Exam: closing test. 30 multiple choice questions and 10 structures

Note: Material of the lectures is available on the website of the Department.

Max. 3 absences are allowed.

MATHEMATICAL AND PHYSICAL BASES OF MEDICAL BIOPHYSICS (obligatory elective course)

First Semester

Tutor: **Dr. Dániel Sándor Veres**

Altogether 16 sessions (combined lecture and practice) in the first 8 weeks

Closing test of the course: on the ninth week [with a re and re-retake options at ~ 11th and 13th weeks]

Credit 2

Topics of lectures:

1. Mathematics, necessary for the understanding of biophysical laws I.
2. Mathematics, necessary for the understanding of biophysical laws II.
3. Physical quantities and units. Kinematics – physics of motion I.
4. Physical quantities and units. Kinematics – physics of motion II.
5. Statics – changes of shape, forces, mechanical stress, pressure I.
6. Statics – changes of shape, forces, mechanical stress, pressure II.
7. Dynamics – work, energy I.
8. Dynamics – work, energy II.
9. Fluid mechanics, Oscillations I.
10. Fluid mechanics, Oscillations II.
11. Waves, Thermodynamics I.
12. Waves, Thermodynamics II.
13. Electricity – charges in rest and in motion I.
14. Electricity – charges in rest and in motion II.
15. Magnetism, magnetic induction I.
16. Magnetism, magnetic induction II.

Tutor: **Dr. Kuti Nikoletta, Dr. Gulyás Csilla**

Topics

1. System of the emergency medicine. Chain of emergency
 - Goal of first aid and levels.
 - Safety on the scene
 - Emergency call
 - Extrication, Moving the patient.
 - Critical state, recognition.
 - Quick look ad simple assessment, the ABCDE approach
2. The unconscious patient
 - Secure the airway
 - Chain of survival
 - Cardiac arrest recognition.
 - CPR - resuscitation
3. Critical illness or critical situations – complains and symptoms (red flags) and immediate measures
 - Chest pain
 - SONB, Dyspnoe
 - Syncope
 - Shock
 - Allergy
 - AMS – seizures – stroke- hypoglycemia,
 - Injuries, Bleeding control, Fixations, Covers. Burns. Frostbites.
 - Hypo/hyperthermia.
 - Intoxications
 - Major incidents

Practices

- Stabil – recovery position, basic airway skills,
- BLS – basic life support
- BLS-AED – use of AED
- VKV – Fixations for fractures, Burns and frost injuries, Bleeding control, Practical exam

Due to our short time for practices, the topics listed above will be discussed in more detail during the lectures.

Note: Participation at 75% of practices is necessary. Compensation of absences is possible in subsequent practices.

Development in learning skills will be controlled all the time during the practices in the semester.

Mode of certifying absences: oral – referring to practices.

Requirements: The student should be able to recognize emergencies, and call for help start with BLS + AED provide airway management in unconscious patients provide first aid for patients complaining for chest-pain, shortness of breath, signs for hypoglycaemia and having suffered from fainting, shock condition, convulsion, injuries.

The performance of the above mentioned requirements at the last practice will be evaluated with “accepted” or “not accepted”.

INTRODUCTION TO PATIENT CARE

Name of the host institution (and any contributing institutions):
Host - **Department of Family Medicine;**
Contributing departments: Dpt. of Pediatrics, Dpt. of Neurology, Dpt. of Psychiatry, Dpt. of Internal Medicine and Oncology, Dpt. of Internal Medicine and Hematology, Dpt. of Cardiology, Dpt. of Surgery, Gastroenterology and Transplantation, Dpt. of Gynecology and Obstetrics and Dpt. of Anesthesiology and Intensive Therapy - SIM Center

Name of the subject: **Bevezetés a betegellátásba**
in English: **Introduction to Patient Care**
in German: **Berufsfelderkundung**

Credit value: 2
Semester: 2nd semester (as defined in the curriculum)

Total number of classes per week:
2/ 6weeks, 3/another 6 weeks
lectures: 2 lessons for 6 weeks
practical lessons: 3 lessons for 6 weeks
seminars: 0

Type of subject: obligatory

Academic year: 2024/2025

Language of instruction, for optional or elective subjects:
Course coordinator: Prof. Peter Torzsa M.D. Ph.D.
Place of work, phone number: H- 1085 Budapest, Stáhly u. 7-9. Phone: +36-1-355-8530
Position: Professor, Head of Department

Date and number of habilitation: 2020.07.21, 11/2020
Course description, contact: semmelweis.hu/csot/en/english-program/english-program-first-year/

PRACTICALS

7th week:	internal medicine, surgery, pediatrics, psychiatry, obstetrics and gynecology, family medicine, cardiology, neurology according to the attendance sheet
8th week:	internal medicine, surgery, pediatrics, psychiatry, obstetrics and gynecology, family medicine, cardiology, neurology according to the attendance sheet
9th week:	internal medicine, surgery, pediatrics, psychiatry, obstetrics and gynecology, family medicine, cardiology, neurology according to the attendance sheet
10th week:	internal medicine, surgery, pediatrics, psychiatry, obstetrics and gynecology, family medicine, cardiology, neurology according to the attendance sheet
11th week:	internal medicine, surgery, pediatrics, psychiatry, obstetrics and gynecology, family medicine, cardiology, neurology according to the attendance sheet
12th week:	internal medicine, surgery, pediatrics, psychiatry, obstetrics and gynecology, family medicine, cardiology, neurology according to the attendance sheet
13th week:	makeup/replacement classes if needed
During the semester until the 14th week: Skills Lab opportunity: an Introduction to Patient Care – Nursing skills in cooperation with Department/Clinic of Anaesthesiology and Intensive Care, SIM Centre – details, application on MOODLE	
14th week:	Essay upload on MOODLE.

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:
completed attendance sheet and/or individual certificates from the tutors. It's obligatory for the student to attend 75 percent of the training sessions, but if needed students can join another training group for a makeup class to be able to meet this requirement. Please contact the Department (Tutor) in this case by email.

Form of assessment in the study period: essay

Number and type of assignments for individual work and the deadline for submission:
1 essay until the end of semester

Requirements to obtain the teacher's signature: attending at least 75% of the practicals (5 out of 6 total), so completed attendance sheet and/or individual certifications uploaded to MOODLE.

Type of assessment: essay (practical mark)

Examination requirements:
Essay, typed, 1600 characters as the minimum length WITHOUT spaces, e.g. Times New Roman font, font size 12, single spacing.
Topic: A report of students' experiences of lectures and practices about medical profession e.g. with short case reports, impressions, personal situations. Which specialty of the medical profession was attractive for you, why?
Deadline for upload to MOODLE is the end of 14th week.

Method and type of grading:
Grade 1: Deadline was missed, number of characters < 1600,
Grade 2: no personal example or practical experience at all (just theoretical or technical reports)
Grade 3: too general drafting without any personal opinion
Grade 4: minor formal mistakes with personal point of view
Grade 5: precise writing with personal examples

Objectives of the course and its place in the medical curriculum:
An overview of medical profession. Formation of the consciousness of profession, personal careers. The attitude of the medical doctor. Communication with colleagues and the members of the medical staff. An overview of different levels of health care. The organization and the functional activity of clinical departments and the general practitioner's office. Characteristics of the clinical work. Overview of the scientific activity of the clinical departments.

Place of instruction (address of lecture hall or seminar room etc.):
Lectures are in the Basic Medical Science Center. The practicals are held all around the University's different departments and contracted GPs' surgeries in Budapest.

Competencies acquired through the completion of the course:
Basics of medical interviewing, making a rapport with patients.

- Exploring anamnesis and basic communication techniques
- Approach to the physical examination, basic skills
- Introduction to nursing skills: e.g. hand disinfection and blood taking – Skills LAB

Student headcount conditions for starting the course (minimum, maximum) and method of student selection:
max. 16 students/study group

Detailed course description:

LECTURES
1st semester week: family medicine lecture
2nd week: cardiology lecture
3rd week: obstetrics and gynecology lecture
4th week: surgery lecture
5th week: pediatrics lecture
6th week: psychiatry lecture

List of course books, textbooks, study aids and literature facilitating the acquisition of knowledge to complete the course and included in the assessment, precisely indicating which requirement each item is related to (e.g., topic by topic) as well as a list of important technical and other applicable study aids:
lecture slides on MOODLE and the Department's homepage: semmelweis.hu/csot/en/english-program/english-program-first-year/

Second Semester

Thematic:

- An overview of medical profession.
- Formation of the consciousness of profession, personal careers.
- The attitude of the medical doctor. Communication with colleagues and the members of the medical staff.
- An overview of different levels of health care.
- The organization, function activity of the clinical department and general medicine praxis.
- Characteristics of the clinical work.
- Overview of the scientific activity of the clinical department. Raising interest on joining to it.

MEDICAL BIOCHEMISTRY I.

Department of Medical Biochemistry

Credits: 5

Total number of hours: 70; lectures (hours): 42; practices (hours): 28

Type of the course: obligatory

Academic year: 2023/2024

Name of Head of the Department: Professor László Csanády M.D. Ph.D. [D.Sc.](#)

Contact details: H-1094 Budapest, Tűzoltó u. 37-47. **tel:** +36-1-459-1500#60010 e-mail: csanady.laszlo@med.semmelweis-univ.hu

Position: Temporary Head of Department

Date of Habilitation: 2013 Its number: 341

Objectives of the subject, its place in the medical curriculum:

The aim of this course is to examine biologically important molecules - namely amino acids, carbohydrates, lipids and nucleotides - identify their contributions to metabolic processes emphasized from a medical point of view, examine the structure and function of proteins, and address mechanisms of catalysis performed by enzymes. Furthermore, three basic biochemistry modules are outlined: The enzymology module, encompassing general principles of enzyme kinetics and how enzymes influence efficiency and controllability of chemical processes in biological systems, as well as how they affect structure and regulation of metabolic pathways; the bioenergetics module, addressing the relationships between mass-energy conversions in the human body emphasizing nutritional aspects, also elaborating on thermodynamic aspects of metabolism; and the 'first' intermediary metabolism module, presenting the salient features of carbohydrate and lipid metabolism which are essential for understanding physiological and pathological processes of the human body. During practices, students apply the theoretical knowledge acquired at lectures as part of case-oriented discussions in an effort to interpret - from a molecular point of view - medically relevant conditions.

Location of the course (lecture hall, practice room, etc.):

Premises located in the Basic Medical Sciences building (laboratory rooms located on the first floor and lecture halls located on the ground floor).

Upon the successful completion of the curriculum, the student should be able to:

Identify biochemical structures, know and understand the reactions in which medically important molecules participate; know and understand inter-organ biochemical processes; know and understand integrated metabolic functions of the human body. Overall, such knowledge is essential for understanding physiological and pathological processes and, consequently, for making sound medical decisions.

Prerequisite (s) for admission to the course:

Medical Chemistry

Number of students required for the course (minimum, maximum) and method of selecting students:

Not applicable for obligatory subjects

How to apply for the course:

Application is through the Neptun online system

Detailed curriculum:

Lectures: weekly 2×70 min (3 hours)

Lecturers: Prof. Csanády László (CSL), Prof. Kolev Kraszimir (KK), Dr. Christos Chinopoulos (CC), *Dr. Komorowicz Erzsébet* (KE), Dr. Kardon Tamás (KT), Dr. Törőcsik Beáta (TB), Prof. Tretter László (TL)

Practices (P): 2 hours every week

Week	Lectures	Practices (P): 2 hours every week
1	The chemical structure of the amino acids that make up proteins. Formation of peptide bonds and their spatial structure. Primary structure of proteins. (CSL) Hierarchical structure of proteins, secondary and tertiary structure. Process of unfolding of proteins, protein denaturation. (CSL)	Structural and chemical characteristics of amino acids from the point of view of physiological functions (pH and temperature dependent properties).
2	Quaternary structure and posttranslational modifications of proteins. Structure of collagen. Structural basis of protein-nucleic acid interactions. (CSL) Structure-function relationships of haemoglobin and myoglobin. (CSL)	Current protein diagnostic and structural analysis methods and their medical applications.
3	A description of the general properties of enzymes. The chemical nature of enzymes. Thermodynamics of catalysis. The role of activation energy. Isoenzymes. The role of coenzymes and vitamins. Mechanism of action of serine proteases. (KK) Kinetic models of enzyme function. Michaelis-Menten kinetics. Initial reaction rate criteria. Michaelis constant (Km) and its significance. Inhibition of enzyme reactions, kinetics of inhibition. The importance of inhibition types in drug design. (KK)	Interpreting protein structure-related pathological conditions in light of atomic resolution protein structures
4	Allosteric and cooperativity. Levels of regulation of enzyme reactions: regulation by compartmentalization, regulation of gene expression, regulation by reversible modification of catalytic activity of enzymes. Regulation by proteolytic activity. (KK) Structure and kinetics of metabolic pathways. Principles of metabolic control. Strategies for identifying drug target enzymes. (KK)	Determination of enzyme kinetic parameters, regulation of enzyme activity
5	Thermodynamics of biochemical processes. Reversible and irreversible reactions. Compounds with high group transfer potential. The central role of ATP in cellular energy metabolism. Reducing equivalents. (TL) Substrate level phosphorylation as a possible mechanism for ATP synthesis. Reactions and regulation of the citrate cycle. Acetyl-CoA sources of the citrate cycle. Pyruvate dehydrogenase complex. (TL)	Identification of metabolic pathways.
6	Mechanism of ATP synthesis in mitochondria: oxidative phosphorylation. The so-called terminal oxidation, also known as respiratory chain redox reactions, and the enzyme complexes that catalyse these reactions. (CC) Transfer of energy released during exergonic redox reactions to the synthesis of ATP. Function of ATP synthase, reversibility. Respiratory control, P/O ratio. Mechanisms inhibiting oxidative phosphorylation. Physiological role of uncoupling. (CC)	The structure of carbohydrates. Carbohydrate components in the diet. Dietary fibers and additives.
7	Carbohydrates in food, their digestion, absorption of carbohydrates in the intestinal tract. Membrane transporters in general. Glucose transporters, their tissue localization, regulation. (TB) The process and regulation of glycolysis. (TB)	Experimental determination of P/O ratio (practice)
8	Metabolism and molecular pathology of fructose, galactose and lactose. Glycogen degradation and synthesis. (TB) Gluconeogenesis. Anaplerotic reactions. Energetics of gluconeogenesis, its significance in starvation. Cori cycle. Regulation of gluconeogenesis. Effect of glucagon. (TB)	Lactic acidosis
9	Regulation of blood glucose I. Glycogen mobilisation in liver and muscle. Phosphorylation cascade. Enzymes regulated by glucagon. Lactose synthesis (TB) Regulation of blood glucose II. Hyperglycaemia. Insulin secretion, its receptor and its effects on the organs (TB)	Structures and bioenergetic functions of the main lipids in the body and in foodstuffs
10	The biochemistry of diabetes. Type 1 and type 2 diabetes (TB) Dietary lipids, their digestion, absorption, metabolism of kilomicros. Essential fatty acids (TL)	Measurement of blood glucose levels according to the oral glucose tolerance test. Non-enzymatic glycation of haemoglobin.
11	Mobilisation of fatty acids in adipose tissue and its regulation. Transport in the circulation. Free fatty acids, VLDL, IDL (TL) Oxidation of fatty acids and its regulation. Production and utilisation of ketone bodies (TL)	Role of insulin in metabolism and signal transduction
12	Synthesis and regulation of fatty acids. Saturated and unsaturated fatty acids. Synthesis and regulation of triglycerides and phospholipids (TL) Characterisation and grouping of biotransformation reactions: phase I reactions - microsomal cytochrome P450 isoenzymes, phase II reactions - glucuronidation, conjugation with glutathione. Regulation of biotransformation processes (KT)	The role of lipoprotein lipase in determining the metabolic profile of organs. Lipoprotein lipase deficiency.
13	Cholesterol metabolism, cholesterol transport in the circulation (KK) Synthesis, metabolism and role of bile acids in the digestion of fats. Cholesterol deposition and uptake in cells (KK)	Determination of cholesterol and triglycerides (medical implications of plasma cholesterol levels)
14	Steroid hormone synthesis in the adrenal cortex. Biochemical background of adrenocortical stratification. Synthesis of mineralocorticoids, prereceptor specificity. Types of steroid receptors and signal transduction, classical and non-genomic mechanisms of action. (KE) Synthesis of glucocorticoids, cortisol effects, regulation of cortisol synthesis. Synthesis of sex hormones. Progesterone and estradiol synthesis in the placenta. Testosterone synthesis in the testis, formation and significance of dihydrotestosterone. (KE)	Membrane-forming lipids; precursors of signalling molecules.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes: none

Special study work required to successfully complete the course: None.

Requirements for participation in classes and the possibility to make up for absences:

Practices and seminars are mandatory. It is not possible to make up for missed practices/seminars. In case of absences amounting to more than 3 occasions, the semester is not acknowledged. Arriving to a practice/seminar with a delay of more than 10 minutes is considered an absence.

Methods to assess knowledge acquisition during term time:

Practice/seminar participation performance will be evaluated by the tutor: as such, maximum 10 points per semester can be obtained that may count towards the examination grade, see under "Grading system".

Midterms: A midterm will take place in the 6th and another in the 11th week, during the practice/seminar (allocated time per midterm: 30 minutes). Each midterm will consist of multiple choice questions (MCQs) from which max 30 points can be obtained (15 points per midterm).

It is not obligatory to pass a midterm in order to be allowed to sit for the exam.

The midterm points will be added as "points" to the score of the semi-final exam, as detailed in "Grading system". In case of justified absence from the midterm (certificates to be sent to biochem.teaching.secretary@gmail.com), retake opportunity is provided in the last week of the semester during the practice/seminar allocated time.

Lectures: At the end of each lecture, there will be a Kahoot on the topic of the lecture, consisting of 5 questions. Maximum 1 point can be earned per lecture, as outlined by the lecturer. Through the Kahoots, students may obtain points that will be added to the points earned at the exam, as detailed in "Grading system".

Competition: The competition consists of two rounds: a written and an oral one. The written part is held on the last week and consists of 70 multiple-choice questions (MCQs) and will last 40 minutes. Only students who cumulatively amass 21 or more points from the midterms may participate in the competition. Points obtained from midterms, or practice/seminar performance, do not count toward the score of the competition. Students who score at least 90% of the best result achieved by any student in the course will be invited for the oral exam; this short oral exam will take place on the last day of the last week (after 2 pm, exact time and place will be announced in the last week). On the basis of the written and oral part exemption from the semifinal exam may be granted with a grade of 5 (top 5 % scorers) or 4 (top 5.1-10% scorers).

Requirements for signature: No credit will be given for absences exceeding 6 hours (3 occasions).

Type of examination: semi-final; Form: written and oral test based on material of the official textbooks, lectures and practices/seminars published at the department's Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>). See under "Grading system" for further details.

Requirements of the examination:

The material covered in the exam is the material of the lectures and practices/seminars in the topic, with the corresponding textbook chapters as announced in the detailed syllabus posted in the department's Moodle e-learning system.

Method and type of evaluation:

Grading system: The grade of the final exam is based on the points obtained at the written MCQ semi-final exam, the two midterms, the practice points, and the oral exam following the written MCQ exam as detailed below.

Grading of the written part:

- Block1: 30 MCQ (30 min) on proteins and enzymes (threshold to pass 12 points)
- Block2: 30 MCQ (30 min) on bioenergetics and carbohydrate metabolism (threshold to pass 12 points)
- Block3: 30 MCQ (30 min) on biotransformation and lipid metabolism (threshold to pass 12 points)

Subtotal threshold: the sum of scores from Block1, Block2, and Block3 should be at least 45 points Total grade of the written part: if the subtotal threshold is achieved, the points of the midterms (max. 30 points) and practices (max. 10 points) are added and the grade is determined as follows:

Fail (1): if the score in any block is less than 12,
OR the subtotal is less than 45,
OR the total is less than 60
Pass (2): 60 - 74 points

Satisfactory (3): 75 – 89 points
Good (4): 90 – 109 points
Excellent (5): 110 – 130 points

Oral part

Only students who pass the written part proceed to the oral part held on the same day. The examiner chooses 5 MCQ that have been correctly answered by the student in the written part, and the student should interpret them. If the student has achieved amass 15 or more points from the two midterms, they need to answer only 3 oral questions.

Final grade

The final grade is based on the total written grade weighted by a factor determined by the examiner based on the student's performance in the oral part. In case of failure students must retake both the written and oral parts.

In the case of retakes, students must retake both the written and oral parts.

How to register for the examination?: The exam dates are announced on the 12th week of the semester. At least two exam dates per week will be provided. Applications are made in the Neptun system in accordance with the University Study and Exam Rules.

Possibilities for exam retake: An exam can be retaken according to the general rules of the university. In case of a retake to bettering the mark, the most recent result will be registered, not the highest mark.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Harper's Biochemistry (30th edition, or later)
Online material published at the department's Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>).

MICROSCOPIC ANATOMY AND EMBRYOLOGY I.

Department of Anatomy, Histology & Embryology

Head of Department: *Dr. Alán Alpár*

Course Director: *Dr. Andrea D. Székely*

Credit value: 5

Number of lessons per week: 5 lectures: 1 practical course: 4 seminars: 0

Type of the course: **obligatory course**

Name of the course leader Dr Alpár Alán (full professor)

Objectives of the subject, its place in the medical curriculum:

Demonstration of the fine structure of cells and tissues composing the organs of the human body specifically to provide the future clinicians/ medical doctors with a valid body of information describing the microscopical elements of clinically significant morphological structures (including cell biology, general histology and the histology of organs).

Teaching is done in the form of lectures and histology laboratory classes

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Department of Anatomy, Histology and Embryology

Budapest 1094, Tűzoltó utca 58.

Successful completion of the subject results in the acquisition of the following competencies:

Understanding the microscopical composition of the human body together with the understanding of human development in order to draw parallels with macroscopical anatomy. Clear understanding of histological structure and function. Ability to identify basic structural elements within the tissue specimen. Identification of general directions/landmarks within digitized tissue slides.

Course prerequisites:

Cell science

Number of students required for the course (minimum, maximum) and method of selecting students):

Obligatory for all registered students, on the basis of registration via the NEPTUN system

How to apply for the course:

Via the NEPTUN system.

Detailed curriculum:

List of lectures

1. week:	Epithelial tissues, cell contacts, intercellular connections Glandular epithelium
2. week:	Connective tissue cells and fibres. Extracellular matrix
3. week:	Supporting tissues (cartilage, bone)
4. week:	Ossification, bone remodelling. Blood, erythropoiesis, leukopoiesis
5. week:	Muscle tissues
6. week:	Histology of lymphatic organs. Cellular components of lymphatic tissue. Thymus, tonsils, MALT. Structure and circulation of lymph nodes and spleen
7. week:	Histology of the tongue and teeth. Histology of the esophagus
8. week:	Histology of the stomach. Microscopical anatomy of the small and large intestines
9. week:	Histology of the liver and pancreas
10. week:	Histology of the airways
11. week:	Microscopical anatomy of urinary organs
12. week:	Histology of the male genital systems
13. week:	Histology of the female genital system I.
14. week:	Histology of the female genital system II. Placenta, mammary gland

Histology laboratories

1. week:	Introduction, epithelial tissues
2. week:	Connective tissue cells and fibres
3. week:	Blood, Cartilage, bone
4. week:	Bone formation. Nerve tissue
5. week:	Smooth, skeletal and cardiac muscle types. Histology of vessels
6. week:	Lymph nodes, tonsils, thymus, spleen
7. week:	Lip, tongue, lingual papillae Tooth bud
8. week:	Esophagus, stomach. Duodenum, jejunum, ileum, colon
9. week:	Liver, gall bladder, pancreas
10. week:	Larynx, trachea, lung
11. week:	Urinary system
12. week:	Male genital system
13. week:	Female genital system
14. week:	Placenta, revision

Other subjects concerning the border issues of the given subject (both obligatory and optional courses). Possible overlaps of themes:

Macroscopic Anatomy and Embryology I - II.
Cell sciences, cell biology
Certain chapters of Biochemistry and/or Physiology

Special study work required to successfully complete the course:
none

Requirements for participation in classes and the possibility to make up for absences:

Active participation in histology laboratory classes is obligatory for every student. Students should attend at least 75% of the scheduled hours to gain a signature proving the validity of the semester. Absences are therefore limited in **25%**. Attendance will be recorded in the histology laboratory classes.

Methods to assess knowledge acquisition during term time:
The knowledge of students will be checked in written (electronic) midterm tests.

Midterm 1 – week 5 (basic tissues)
Midterm 2 – week 11 (histology of internal organs)
Attendance is obligatory at the two midterm tests. Students absent from the tests should reattend at one of the offered retakes (week 7 or 13 and week 12 and 13, respectively). Histology midterms are written examinations organised as e-learning type (Moodle) examination composed of images and theory questions, where a valid SeKa account (including user name&password) is required.

Requirements for signature:
Active participation in at least 75% of histology laboratory sessions, including the midterm tests is obligatory for every student. One of the midterm tests will have to be at least a pass. Two retake possibilities are offered to attempt a successful test (weeks 13-14).

Type of examination:
Semifinal (written and oral) examination, topics: subject matter of the semester (Microscopic Anatomy and Embryology I.).
1. Written pretest (e-learning module – 40 simple and multiple choice theory questions, passing rate: 60%)
2. Microscopic Anatomy - identification of structures on digitized tissue slides - including relevant theoretical questions from the subject matter of the semester
Examiners are delegated by the Course Director with the consent of the Head of Department

Requirements of the examination:
During the semifinal examination the knowledge of students will be tested. Semifinal examinations are composed of written (theoretical) and oral (practical) parts with the latter being conducted with the use of digitized histological tissue slides.

Topic list for the semifinal examination:

Microscopic Anatomy and Embryology I.

General Histology

- Concept of basic tissues
- Definition and classification of epithelial tissue
- Simple epithelia
- Stratified epithelia
- Membrane specializations of epithelia
- Glandular epithelia
- Pigment epithelium, sensory neuroepithelium
- Cells of connective tissue
- Ground substance and fibres of connective tissue
- Types of connective tissue
- Blood and the corpuscular elements of blood
- Histology of the bone marrow, maturation of erythrocytes and platelets
- Differentiation of granulocytes, lymphocytes and monocytes
- Histology of cartilage
- Histology of the bone tissue
- Intramembranous ossification
- Endochondral ossification
- Growth and remodeling of bone
- Smooth muscle and myoepithelial cells
- Skeletal muscle tissue
- Cardiac muscle tissue
- Nervous tissue

Histology of organs

- Histological structure of arteries and arterioles
- Composition of capillaries and veins
- Lymphatic tissues in general, cellular components
- Histological structure of lymph nodes
- Spleen (fine structure and circulation)
- Thymus

- Tonsils, MALT
- Wall structure of hollow organs
- Histology of the lip, tongue and teeth
- Structure of the esophagus
- Histology of the airways (epiglottis, larynx, trachea, lung)
- Histology of the stomach
- Structure of the small and large intestines
- Histology of the liver and biliary passages including the gall bladder
- Histology of the pancreas
- Histology of the kidney and the urinary passages (ureter, urinary bladder)
- Histology of the testicles together with the epididymis
- Histology of the prostate, seminal vesicle, spermatic cord
- Histology of the penis
- Histology of the ovary, uterine tube; corpus luteum
- Histology of the uterus
- Histology of the vagina
- Placenta, umbilical cord

Method and type of evaluation:
Semifinal examinations are composed of written theoretical and oral practical parts. The written theoretical examination is done using an e-learning module (40 questions, passing rate: 60%) while the practical examination is conducted with the help of digitized histological tissue slides.
Evaluation of the written test: passing rate 60% – 2, 70% – 3, 80% – 4, 90% – 5.
In case the result of the test falls between 50%-59,999%, the mark is fail (1), but the students may continue with the oral examination – i.e., having a “discretionary fail”.
Students scoring below 50% have an unsuccessful examination (i.e., fail the examination) therefore they may not continue with the oral part.
Students are given separate marks for each part of the examination. Unsuccessful partial examinations result in the failure of the semifinal examination. When failing at the practical part, the written test will not have to be repeated in case the result was a 4 or a 5 only. Upon the termination of the examination the Head of the Examination Committee composes the final mark from the partial marks earned in the written and practical parts.
Students may earn an exemption from the written part of the semifinal examination with a 4 or a 5 calculated from the average of the two written tests. A mark 4 (good) can be earned if the midterm average is 4,00; while a mark 5 (excellent) will be earned if the average of the midterm marks is at least 4,50. These students will have to sit only for the second, oral, part of the semifinal examination.

How to register for the examination?
Via the NEPTUN system

Possibilities for exam retake:
According the Study and Examination Policy
Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

List of textbooks

1. Langmann's Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
2. Histology: A Text and Atlas: With Correlated Cell and Molecular Biology; 7th Edition by MH Ross and W Pawlina ; Wolters Kluwer 2015, ISBN 9781451187427
3. Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O'Dowd and P Woodford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473
4. Stevens & Lowe's Human Histology , Elsevier, 4th ed ISBN 978-0-723435020, 2015.
5. Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.
6. The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384
7. Histology Manual 1-3. by A. Nemeskéri and K. Kocsis: István Apáthy's Foundation, 2019.
8. A. L. Kierszenbaum Histology and Cell Biology: An Introduction to Pathology, 4th Edition, Paperback with STUDENT CONSULT Online Access and E-Book ISBN: 9780323085885; 2015
9. Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033

Further study aids:
To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology (<http://semmelweis.hu/anatomia>) or from Knowledgebase on the Library homepage: (https://lib.semmelweis.hu/knowledge_base/).

SUMMER PRACTICE - NURSING

Credit point: 2

Total hours: 160 practice

Type of course: obligatory

Aim of the course, its position in the medical curriculum:

Introduction of the structure of the clinic/hospital and the operating of the given ward. Learning the process of patient care and nursing through practical training. Learning basic skills of everyday nursing tasks, which will be used during further medical practice and after completion of the medical training.

Acquired competences after successfully completing the course:

- Ability to assess basic nursing needs of the patient.
- Ability to detect, observe, and document patient's vital signs (pulse, blood pressure, respiration, temperature).
- Ability to administer subcutaneous and intramuscular injection, collect blood, place venous cannula under supervision, recognise minor complications.
- Knowledge of basic skills of resuscitation.

Student enrolment requirements (minimum, maximum), method of student selection:

Number of attending students as given by the practical site. Valid Occupational Medical Examination certificate, certificate of occupational, fire, and environment protection training.

How to apply for course:

After applying on the NEPTUN site, contact clinical head nurse of the practical site/in case of a hospital contact hospital nursing board, regarding the beginning of the practice.

Detailed syllabus:

- 1st week: Introduction to the operating of the ward. Observing nursing activities, assessment and documentation of nursing needs, and patient's environment. Actively taking part in everyday nursing care of patients with the support of nurses. Observing and acquiring communication skills with patients. Observing laboratory and other examination procedures, as well as preparation of patient for surgery/examination. Learning the use of personal protective equipment, as well as hygienic and antiseptic hand washing. Learning basic skills, protocol, and ward devices for resuscitation.
- 2nd week: Independent nursing care patient admission, measurement of weight, height, blood pressure, pulse, temperature, respiration, blood glucose, assessment of needs, documentation. Development of patient's environment. Assistance with performance of ECG. Observe administration of medication, blood collection, administration of injection, placement of venous cannula, infusion and transfusion therapy, assistance in preparation, recognition of minor local complications. Administration of subcutaneous and intramuscular injection under supervision of nurse.
- 3rd week: Blood collection, administering injection, placement of venous cannula under supervision of nurse. Continuous practice of knowledge acquired during the first two weeks.
- 4th week: Continuous practice of knowledge acquired during the first three weeks.

Requirements for participation in classes and opportunities to make up for absences:

Two classes may be missed, further absences cannot be made up.

The criteria for end-of-term signatures:

Regular attendance of the practical. According to the Studies and Exams Code, the criteria for obtaining signature is at least 75% participation in the practical.

Type of exam:

practical

Exam requirements:

Student chooses one task from the list of given tasks, and performs the given task in practice. In connection with the task the student assesses the patient's nursing care needs, and detects, observes, and documents vital signs (pulse, blood pressure, temperature, respiration).

Method and type of class marks:

Criteria for obtaining a signature is regular attendance of the practical, for the performance of the chosen item a mark is given: passed with excellence (5) – passed (3) – not passed (1) .

How to apply for the exam:

The practical exam takes place on the last day of the practice.

Opportunity to repeat the exam:

The practical exam can be repeated two times.

The list of printed, electronic and online notes, textbooks, study aids and literature to be used to learn the curriculum (in case of online sources, html address):

Recommended literature:

Bokor, Nándor: Általános ápolástan és gondozástan (Medicina 2013.)
Oláh, András (ed). Az ápolástudomány tankönyve http://eta.bibl.uszeged.hu/906/1/0061_apolastudomany_magyar.pdf

EXAMINATION ITEMS

1. Describe and demonstrate the process of hygienic hand disinfection.
2. Describe the daily routine of the ward, and the content of the nursing documentation.
3. After the patient left, tidy up the bed and its environment.
4. Describe possibilities of positioning patient in bed. Perform positioning taking patient's comfort and safety needs into consideration.
5. Prepare for and perform tidying up patient's bed, and bathe patient. Describe patient's hygiene, comfort and safety needs, and inform patient about the nursing procedure.
6. Prepare for a non-independent patient's need to defecate, and perform the necessary nursing procedure. Describe aspects of observation regarding the quality and quantity of the exudates.
7. Describe possible nutrition and fluid intake needs of the patient. Describe nursing tasks of enteral nutrition and sufficient hydration of the patient. Demonstrate leading a fluid chart.
8. Describe disinfection methods of the instruments and devices of the ward; explain asepsis and antisepsis.
9. A new patient is admitted to the ward. Assign patient to a hospital room, take nursing history, and fill out patient admission chart.
10. Measure weight, height, temperature, and respiratory rate of newly admitted patient, and indicate these values on patient's chart and nursing documentation.
11. Prepare for and perform blood pressure measurement. Take the pulse. Indicate these values on patient's chart and nursing documentation.
12. Describe nursing tasks for monitoring of bodily discharges. Indicate quality and quantity of discharges on patient's chart and nursing documentation.
13. Prepare subcutaneous injection for administration. Describe procedure and possible complications of administration. Perform administration under supervision of nurse, fill out necessary documentation.
14. Prepare intramuscular injection for administration. Describe procedure and possible complications of administration. Perform administration under supervision of nurse, fill out necessary documentation.
15. Prepare blood pressure measurement and perform procedure under supervision of nurse. Describe possible complications of taking blood pressure.
16. Prepare for placing permanent venous cannula. Describe means of fixing venous cannula, observation points, and

- possible complications. Perform placement of cannula under supervision of nurse, fill out necessary documentation.
17. Prepare for placing and intravenous drip administered for patient. Set up the infusion. Perform documentation regarding the infusion therapy.
 18. Prepare for blood group determination and transfusion. Describe nursing tasks.
 19. Prepare for and perform bedside blood glucose measurement. Explain what the device indicates in case of high or low blood glucose levels. Indicate these values on patient's chart and nursing documentation.
 20. Prepare for placement of permanent catheter. Describe procedure and possible complications of placement. Document procedure.
 21. Prepare 12 channel ECG with standard and chest leads for patient. Describe procedure of placement of ECG electrodes.
 22. Describe options and methods of decubitus risk assessment. Perform and document decubitus risk assessment. Describe prevention methods.
 23. Prepare for changing protective dressing and wound treatment. Describe procedure of changing dressing and wound treatment. Examine condition of the wound. Document procedure.
 24. During medical rounds an elastic bandage was ordered for the patient's lower limb. Apply elastic bandage and document procedure.
 25. Describe nursing tasks regarding medication (distributing and administering medication). Perform identification of patient, administration of medication, and necessary documentation.
 26. Describe possibilities and procedures of special medication administration forms (drip, inhalant, rectal, vaginal).
 27. Describe personal protective equipment used at ward, and their application. Possible methods for prevention of nosocomial infections.
 28. Describe general and specialist diagnostic methods of the ward, and the preparations necessary for the examinations.
 29. A patient in shock is admitted to the ward during night shift. Describe symptoms of circulatory and respiratory failure, and their recognition. Prepare for initiation of basic resuscitation, and describe procedure.

Name of the educational organizational unit: SE EKK

Type of the subject: 1 practice / week

credit value: 1

Name of the lecturer of the subject:

Dr. Miklós Szócska

Teachers:

Dr. Tamás Iváncsy (PhD, lecturer)

Dr. Ádám Zoltán Tamus (PhD, associate professor)

Tamás Tóth (PhD, senior lecturer)

Zoltán Sándor (PhD, senior lecturer)

Zoltán Tóth (PhD, senior lecturer)

Administrator: Ms Júlia Nagy

Term: spring

The exercise of the subject in the in the realization of the aim of the education:

To introduce the students to the medical application of informatics, the characteristics of modern, integrated information systems with respect to quantitative aspects and to decision demands of the modern sciences. The medical informatics leans on methods of mathematics, statistics and computer sciences and it also includes from the different engineering, management and informatics procedures.

Select the desired course in Neptun when registering to the subject! Changing topics/groups is possible only according to the rules of the registration in Neptun! You must attend the course you have selected in Neptun!

OPTIONAL courses:

I. SCIENTIFIC COMMUNICATION COURSE

The course gives an introduction to the paper based and oral publications and presentations. The students have to find a medical problem (a topic) to work out during the course.

1. Creation and retrieval of medical knowledge. Finding and studying scientific publications via the electronic library of the university.
2. Structure of a scientific publication. The importance and meaning of the sections of the paper. Structure of an oral presentation.
3. Scientific publication in practice: finding and evaluating information and creating paper and presentation on the selected topic.

II. DATABASES COURSE

The course gives an introduction to structuring and retrieving data using databases. The students perform practical examples of data management and query using a current software solution.

1. Introduction to database theory and data modelling principles (the application, logical and physical models, basic concepts and objects).
2. Data handling in practice: planning a relational database, managing tables and fields
3. Information retrieval from databases: the role and structure of queries, performing basic queries
4. Data management via user interfaces – basic concepts and principles

III. BIOMEDICAL SIGNAL PROCESSING COURSE

The students learn about the basics of biomedical signals, their acquisition, digital storage and processing. They perform practical analysis of selected signal examples.

1. Introduction to biomedical signal processing, objectives of signal analysis, Components of human-instrument system
2. Examples of biomedical signals (electrical and mechanical signals), and transducers.
3. The basics of signal processing, the digitalizing (sampling, Shannon-theory, quantization).
4. Analysis of a phonocardiogram (heart sound, calculation of the pulse, murmurs). Spectral analysis.
5. Analysis of ECG signal. Basics of removing noise and artefacts.

IV. PRESENTATION TOOLS

The course provides an overview of visual representation of medical

information for various audience. The students learn the use of several related tools, and work up a selected topic.

1. Introduction to presentation techniques: How to make a good presentation? – technical and non-technical skills, best practices
2. Types of medical information, online information sources
3. Visual representation of information: word cloud, infographic etc.
4. Online tools for creating and sharing presentations

Requirements of participation of the lessons and the possibility of substitution of the absence:

According to rules of the Studies and Exam Code. Attendance on at least 3 of the 4 practices is mandatory.

The mode of the certificate in case of absence from the lessons:

According to rules of the Studies and Exam Code. No certificate accepted.

The requirements of signature at the end of the term (including also the number and the type of the students' exercises which are solved individual by them)

Attendance on at least 3 of the 4 practices is mandatory

The mode of acquisition of the mark:

Practical exercise

List of lecture notes, course books, study-aids and literature which can be used to acquisition of the syllabus:

The educational materials are available at <http://dei-cloud.semmelweis.hu>

Username and password is announced at the first practice.

TERMINOLOGY OF CLINICAL SPECIALTIES

Responsible organisational unit:

Institute of Languages for Specific Purposes

Programme director:

Katalin Fogarasi PhD, habil., director, habilitated associate professor

90 minutes/week

Assessment: Midterm test, practical exam, moodle homeworks

Role of subject in fulfilling the aim of training:

The aim of the course is to extend students' medical terminology by going through the main fields of medicine and by getting acquainted with the names of conditions, symptoms, and anatomical structures. Students develop a more advanced terminological knowledge not only by learning new Latin phrases or Greek combining forms, but also by improving their skills in interpreting medical terms with the help of etymological notes and word formation rules and conventions. The lessons provide students with opportunities to develop a more conscious use of the anatomical nomenclature and diagnostic language as well as to better understand clinical documents.

Syllabus

- 1 Musculoskeletal disorders and the Locomotor system
- 2 Cardiological diagnoses and the Cardiovascular system
- 3 Pulmonology and the Respiratory system
- 4 Gastroenterology and the Gastrointestinal system
- 5 Nephrology and the Urinary system
- 6 Revision with the help of case studies
- 7 Stomatology and the Oral cavity
- 8 Neurology and the Nervous system
- 9 The sensory organs
- 10 Dermatology and the Integumentary system
- 11 Men's and Women's Health and the Reproductive system
- 12 Revision with the help of case studies
- 13 Revision with the help of case studies
- 14 Sample tests for the practical examination



Faculty of Medicine
2nd year

FACULTY OF MEDICINE

BASIC MODULE

STUDY PROGRAMME

Second year in the 2025/2026 academic year

3rd Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
Introduction to Clinical Medicine	AOKCSA.....1A		12		18			2	Introduction to Patient Care	practical mark
Medical Biochemistry II.	AOKBMT794_2A	3		2				5	Medical Biochemistry I	comprehensive examination
Medical Genetics and Immunology I.	AOKGEN1102_1A	4		0				3	-	examination
Medical Hungarian III.	AOKNYE906_3A	0		4				2	Medical Hungarian II	practical mark
Medical Physiology I.	AOKELT1100_1A	6		5				11	Macroscopic Anatomy and Embryology II, Medical Biophysics II, Medical Biochemistry I	examination
Medical Psychology	AOKMAG1079_1A	1				2.5		4	Medical Communication	examination
Medical Sociology	AOKMAG.....1A		8		20			2	-	examination
Microscopic Anatomy and Embryology II.	AOKANT674_2A	2		2				4	Microscopic Anatomy and Embryology I, Microscopic Anatomy and Embryology II, Cell Science	comprehensive examination
Molecular Cell Biology I.	AOKMBT1101_1A	2.5		2				4	Medical Chemistry, Medical Biochemistry I	examination
Physical Education (PE) III	AOKTSI1093_3A	0		1				1	Physical Education (PE) I *	practical mark

4th Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
Medical Genetics and Immunology II.	AOKGEN1102_2A	0		3,5				4	Molecular Cell Biology I, Medical Biochemistry II, Medical Genetics and Immunology I	comprehensive examination
Medical Hungarian IV.	AOKNYE906_4A	0		4				2	Medical Hungarian III	comprehensive examination
Medical Microbiology I.	AOKMIK1106_1A	2		3				5	Medical Biochemistry II	examination
Medical Physiology II.	AOKELT1100_2A	6		5				11	Medical Physiology I, Microscopic Anatomy and Embryology II	comprehensive examination
Molecular Cell Biology II.	AOKMBT795_2A	3		2				5	Molecular Cell Biology I, Medical Biochemistry II	comprehensive examination

LIST OF TEXTBOOKS (The list may change!)

- 1 Harper's Illustrated Biochemistry, 30th edition, Lange, ISBN-10: 0071825347
- 2 Berne-Levy-Koeppen-Stanton: Physiology, 7th edition, Mosby. ISBN-10: 0323393942
- 3 Lodish: Molecular Cell Biology, 8th edition (2016); ISBN-13: 978-1-4641-8339-3
- 4 Cockerham, William C.: Medical Sociology. Prentice Hall, Upper Saddle River, 2006.
- 5 Marthy A. & Végh Á. Egészségére! Magyar orvosi szaknyelv. Semmelweis Egyetem Egészségtudományi Kar, 2010.
- 6 Immunology seminars (e-book): <http://gsi.semmelweis.hu>
- 7 Abbas, Lichtmann, Pillai, Basic Immunology 6th Edition, Elsevier, 2019
- 8 Medical Genetics and Genomics (e-book)

Recommended textbooks:

Murray, Robert K-Granner, Daryl K-Mayes, Peter A-Rodwell, Victor W: Harper's Illustrated Biochemistry. 26th ed. McGraw-Hill. ISBN 0-07-138901-6 (online version: www.lib.sote.hu)

Introduction to Clinical Medicine

Credit Points: 2

Total number of hours: 30

lectures: 12 (6*2)

practices: 18 (6*3) seminars: -

Type of the course (mandatory/elective): mandatory

Academic year: 2022/2023

Name of the Department: Dr. Péter Torzsa M.D. Ph.D.

Contact details: H- 1085 Budapest, Stáhly u. 7-9. Phone: +36-1-355-8530

Position: Head of Department

Tutor: Dr. Adam Becze – becze.adam@med.semmelweis-univ.hu

Aim of the subject and its place in the curriculum:

- Preventive approach, screening procedures. The importance of disease prevention.
- Holistic patient care, managing complex bio-psycho-social-health problems
- Care of frequent chronic illnesses
- Presenting patients, basic differential diagnostics
- Basic diagnostic tools
- Most frequent diseases in the clinical department and the general practitioner's office. Case reports.
- Referral of patients. The medical consultation.
- Communication with the patient and his/her relatives.

- The role of the family in the treatment of and care for acute and chronic diseases.
- Effective cooperation with patients. Means to improve compliance.
- Team work in medicine.
- Development of professional consciousness.
- Overview of the research activity at the clinical department. Raising interest in participating.

Location of the course (lecture hall, practice room, etc.):

Family practices, clinics

Prerequisite(s) for admission to the subject:

Only for students in the 2nd year, following completion of the Introduction to Patient Care program

Minimum and maximum number of students registering for the course:

Student selection method in case of oversubscription:

Max. 15 students/group

How to register for the course:

Registration for the course in the 'Neptun' system

Detailed topics of the course:

Detailed topic of the subject:

1st week:	internal medicine, public health, dermatology, urology, pulmonology, neurology lectures
2nd week:	internal medicine, public health, dermatology, urology, pulmonology, neurology lectures
3rd week:	internal medicine, public health, dermatology, urology, pulmonology, neurology lectures
4th week:	internal medicine, public health, dermatology, urology, pulmonology, neurology lectures
5th week:	internal medicine, public health, dermatology, urology, pulmonology, neurology lectures
6th week:	internal medicine, public health, dermatology, urology, pulmonology, neurology lectures
7th week:	internal medicine, surgery, paediatrics, psychiatry, obstetrics and gynaecology, family medicine, orthopaedics-traumatology, cardiology, dermatology, urology, pulmonology, neurology, public health practicals according to the attendance sheet
8th week:	internal medicine, surgery, paediatrics, psychiatry, obstetrics and gynaecology, family medicine, orthopaedics-traumatology, cardiology, dermatology, urology, pulmonology, neurology, public health practicals according to the attendance sheet
9th week:	internal medicine, surgery, paediatrics, psychiatry, obstetrics and gynaecology, family medicine, orthopaedics-traumatology, cardiology, dermatology, urology, pulmonology, neurology, public health practicals according to the attendance sheet
10th week:	internal medicine, surgery, paediatrics, psychiatry, obstetrics and gynaecology, family medicine, orthopaedics-traumatology, cardiology, dermatology, urology, pulmonology, neurology, public health practicals according to the attendance sheet
11th week:	internal medicine, surgery, paediatrics, psychiatry, obstetrics and gynaecology, family medicine, orthopaedics-traumatology, cardiology, dermatology, urology, pulmonology, neurology, public health practicals according to the attendance sheet
12th week:	internal medicine, surgery, paediatrics, psychiatry, obstetrics and gynaecology, family medicine, orthopaedics-traumatology, cardiology, dermatology, urology, pulmonology, neurology, public health practicals according to the attendance sheet
13th week:	Homework: Essay
14th: week:	Exam: Essay

Special training activities required: –

Completed attendance sheet

Policy regarding the attendance and making up absences:

It's obligatory for the student to attend 75 percent of the training sessions. Students can join another training group to meet the requirements if they have missed a training session in the original group

Requirement for acknowledging the semester (signature):

It's obligatory for the student to attend at least 75 percent of the training sessions.

Type of the examination:

Essay

Exam requirements:

Case study (essay, typed, 2000 characters without spaces at minimum length, Times New Roman font, font size 12, single spacing) of a specific patient chosen from the practicals' experiences highlighting one or more topics of the Aim of the subject part above seen.

Deadline for handing in the essay is the 14th week

Type and method of grading:

Grading is based on the essay according to the following criteria:

Grade 1: failing to hand in the essay on deadline, the number of characters is under 2000, the case study is not original, but plagiarism

Grade 2: absence of a specific case study of a patient, but the other requirements are met

Grade 3: there is a case study, but too general drafting, without any personal experience

Grade 4: there is a case study with not too significant professional/technical mistake

Grade 5: precise and accurate wording in the medical jargon, personal opinion about the patient's case

How to register for the exam:

Registering for the exam in the 'Neptun' system

Opportunities to retake the exam:

In accordance with the Studies and Exams Code Rules

Literature, i.e. printed, electronic and online notes, textbooks, tutorials (URL for online material):

see on the subject's MOODLE platform

MEDICAL BIOCHEMISTRY II.

Institute of Biochemistry and Molecular Biology, Department of Biochemistry

Credits: 5

Number of lessons per week 70;

lectures 42; practical course/seminar: 28

Type of the course: obligatory

Academic year: 2021/2022

Name of Head of the Department: Professor László Csanády M.D. Ph.D. D.Sc.

Contact details: H-1094 Budapest, Tűzoltó u. 37-47. Phone: +36-1-459-1500#60010 e-mail: csanady.laszlo@med.semmelweis-univ.hu

Position: Head of Department

Date of Habilitation: 2013 Its number: 341

Objectives of the subject, its place in the medical curriculum:

The aim of this course is to provide a comprehensive description of the metabolic processes in the human body, with particular emphasis on the medical aspects of these processes. The main focus of the semester is on intermediate metabolism, i.e. the amino acid and nucleotide metabolism following carbohydrate and lipid metabolism as described in Medical Biochemistry I and the integration of these processes in the individual organs and the human body as a whole. Furthermore, the course aims to develop the skills of medical students to understand the complex physiological processes in the human body at the molecular level. Medical students will learn clinical biochemical methods in case-oriented studies, and in addition, particularly promising and rapidly developing areas („medicine of tomorrow") will be addressed. The medical biochemistry orientation of the course is the molecular basis of diseases that are of major

public health concern (cardiovascular, neurodegenerative, cancer), with particular emphasis on potential molecular targets for therapy.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Premises located in the Basic Medical Sciences building (laboratory rooms located on the first floor and lecture halls located on the ground floor).

Successful completion of the subject results in the acquisition of the following competencies:

The knowledge of the structure, interactions and reactions of biological molecules and the interactions between organs of the higher integrated regulatory functions of the human body, is of paramount importance from a medical point of view and is essential for understanding physiological and pathological processes and, as a consequence, for making informed medical decisions.

Prerequisite (s) for admission to the course: Medical Biochemistry I.

Number of students required for the course (minimum, maximum) and method of selecting students:

Not applicable to obligatory subjects

How to apply for the course: Application is through the Neptun online system.

Detailed curriculum:

Lectures: 2*70 minutes per week (3 hours)

Lecturers: Prof. Csanády László (CSL), Prof. Kolev Krasimir (KK), Dr. Komorowicz Erzsébet (KE), Dr. Törőcsik Beáta (TB), Prof. Tretter László (TL)

Practices (P): 2 hours each week

Week	Lectures	Practices: 2 hours every week
1	Nitrogen balance. Protein digestion. Function and regulation of proteases. Amino acid absorption, amino acid transporters. (KK) Amino acid degradation. Ammonia removal. Reactions and regulation of the ornithine cycle.	Determination of transaminase and creatine kinase activity, medical implications
2	Amino acid degradation: the fate of the carbon skeleton. The role of vitamins in amino acid metabolism. Biosynthesis and degradation of heme. Iron homeostasis (KK)	Elimination of ammonia in the human body.
3	Nucleotide structure/functions. Fate of nucleotides of nutrient origin. Formation and elimination of uric acid, its biological role in the human body. Molecular background of gout (KK). Synthesis and degradation of purine and pyrimidine nucleotides. Effects of cytostatic drugs on nucleotide metabolism. (KK)	Metabolic role and medical significance of vitamin B12 and tetrahydrofolic acid
4	Organ biochemistry. Red blood cell metabolism and enzymopathies. Intermediate metabolism of the kidney. Metabolic properties of the renal cortex and marrow. Renal metabolism in starvation and acidosis. Comparison of gluconeogenesis in kidney and liver. The metabolism of striated muscle and myocardium. Metabolic adaptation to exercise. (TL)	Biochemical-bioenergetic aspects of muscle work.
5	Metabolic characteristics of brain and adipose tissue. Metabolism of intestinal epithelial cells and lymphocytes. (TL) Starvation-fatigue cycle and its regulation, processes in the liver. Inter-organ communication during satiety and starvation. Regulation of biochemical processes in the satiated liver. (TL)	The role of the liver in metabolism. Metabolic rearrangements in liver diseases.
6	Membrane transporters. Na,K-ATPase isoforms. Secondary active transporters. Na ⁺ /H ⁺ exchange transporter (TB) Molecular basis of nerve transmission. Acetylcholine synthesis, receptors, acetylcholinesterase. Properties of synaptic vesicles; key proteins involved in exocytosis of synaptic vesicles (TB)	Metabolic characteristics of rapidly dividing cells and tumours.
7	Synthesis and metabolism of adrenaline and noradrenaline. Transporters in neurons (TB) Adrenergic receptors. Adrenaline and molecular mechanisms of the action of adrenaline and noradrenaline in different organs (TB)	Extracellular matrix: transformations in physiological and pathological states.
8	The synthesis and production of dopamine and serotonin and their metabolism. Molecular properties of transporters and receptors. Biochemical basis of Parkinson's disease. (TB) Synthesis, metabolism, transporters and molecular properties of glutamate and GABA. (TB)	The relationship between metabolism and nervous system function I
9	General characteristics of ion channels. Methods for the study of ion channels. Molecular mechanisms of gating and permeation. Spatial structure of the K ⁺ channel. (CSL) Ion channel families. Voltage dependent, Ca ²⁺ activated, and ATP-sensitive K ⁺ channels. Voltage-dependent Cl ⁻ channels. CFTR Cl-channel. Nicotinic Ach receptor. (CSL)	The relationship between metabolism and nervous system function II
10	General overview of blood clot formation and dissolution. Fibrinogen and fibrin. Regulation of thrombin. Activation of prothrombin. Initiation of coagulation and amplification of the initiation signal. (KK) The coagulation inhibitor system and negative feedback mechanisms. (KK)	Molecular background of congenital thrombophilia. APTT, PTI tests
11	Fibrinolysis. Activation of plasminogen. The plasmin inhibitor system. (KK) Cellular factors in coagulum formation and dissolution. Platelets and von Willebrand factor. (KK)	Molecular background of acquired thrombophilia. Fibrin stabilization and the study of soluble fibrin monomers
12	The role of neutrophil leukocytes and endothelial cells in hemostasis. Hemodynamic and biochemical interactions in hemostasis. (KK) Function and role of pattern recognition receptors (TLR, scavenger receptors) in the vascular wall. Cholesterol-induced pyroptosis and its molecular basis. (KK)	Risk factors associated with cholesterol homeostasis in atherosclerosis (diabetes, hypertriglyceridemia). Biochemical basis of atherosclerosis prevention.
13	The role of gene expression level regulation by dietary components in the regulation of metabolism. (TL). Regulatory, adaptive signals driven by the current metabolic state of the cell and their mechanism of action. Biochemical effects of thyroid hormone and its role in complex metabolic regulation, thermogenesis. (TL).	Molecular basis of weight regulation in physiological and pathological states.
14	Central molecules and drug targets of proliferation, differentiation, survival, angiogenesis, metastasis I (TB) Focal molecules and drug targets of proliferation, differentiation, survival, angiogenesis, metastasis II (TB)	Molecular basis of energy expenditure and its dysregulation in metabolic syndrome

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes: None.

Special study work required to successfully complete the course: None.

Requirements for participation in classes and the possibility to make up for absences:

Practices and seminars are mandatory. It is not possible to make up for missed practices/seminars. In case of absences amounting to more than 3 occasions, the semester is not acknowledged. Arriving to a practice /seminar with a delay of more than 10 minutes is considered an absence

Methods to assess knowledge acquisition during term time:

Practice/seminar participation performance will be evaluated by the tutor: as such, maximum 10 points per semester can be obtained that may count towards the final grade, see under "Grading system".

Midterms: A midterm will take place in the 6th and another in the 11th week, during the practice/seminar (allocated time per midterm: 20 minutes). Each midterm will consist of multiple choice questions (MCQs) from which max 20 points can be obtained (10 points per midterm).

It is not obligatory to pass a midterm in order to be allowed to sit for the final exam. However, the midterm points will be added as "points" to the result of the final exam, as detailed in "Grading system".

Lectures: At the end of each lecture, there will be a Kahoot on the topic of the lecture, consisting of 5 questions. Maximum 1 point can be earned per lecture, as outlined by the lecturer. Through the Kahoots, students may obtain points that will be added to the points earned at the final exam, as detailed in "Grading system".

Competition: The competition is held on the last week and consists of 70 multiple choice questions (MCQs). Only students who amass 14 or more points from the midterms may participate in the competition. Points obtained from midterms, Kahoot quizzes, or practice/seminar performance (see below), do not count in the competition. Winners will be exempted from the final exam.

Requirements for signature: No credit will be given for absences exceeding 6 hours (3 occasions).

Type of examination: final; Form: written and oral test based on material of the official textbooks, lectures and practices/seminars published at the department's Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>). See under "Grading system" for further details.

Requirements of the examination:

The material covered in the exam is the material of the lectures and practices/seminars in the topic, with the corresponding textbook chapters.

Method and type of evaluation:

Grading system: The grade of the final exam is based on the points obtained i) in Kahoot quizzes at the lectures, ii) during the seminars/

practices, iii) at the two midterms, iv) at the written MCQ semifinal exam, and v) in an oral exam following the written MCQ exam. The written MCQ exam and the oral exam will take place on the same day of the examination period.

The grading system is as follows:

- (i) Kahoot: maximum 1 point per lecture.
- (ii) Seminar/practice points: maximum 10 points.

Total points from (i) and (ii) cannot exceed 20 points.

(iii) Two midterms: maximum 20 points.

(iv) Written MCQ exam: This test consists of multiple choice questions (MCQs) from which max 100 points can be obtained (allocated time: 100 minutes).

If the score of the MCQ exam is 49 or below, then the grade of the final exam is 'fail'.

If students reach 50 points on the MCQ exam, the midterm points, practice/seminar performance points and lecture Kahoot points (total max. 40 points) will be added to the MCQ score.

Grade calculation of the written part of the final exam from the total points (MCQ+semester):

95- 140: grade 5 (excellent)

85- 94: grade 4 (good)

70- 84: grade 3 (satisfactory)

55- 69: grade 2 (pass)

Only those students who obtained at least 50 points at the semifinal MCQ test will be invited for an oral exam. During the oral exam, the examiner will pick three questions from those MCQs that were correctly answered by the student. The student will have to elaborate properly on these questions. The final grade will be given based on the written and oral part of the exam.

How to register for the examination?: The exam dates are announced on the 12th week of the semester. At least one exam date per week will be provided. Applications are made in the Neptun system in accordance with the University Study and Exam Rules.

Possibilities for exam retake: An exam can be retaken after two calendar days.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material: Harper's Biochemistry (30th edition, or latest)

Online material published at the department's Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>)

MEDICAL GENETICS AND IMMUNOLOGY I

Institute of Genetics, Cell- and Immunobiology

Course director: Prof. Dr. Edit Buzás

Course coordinator: Dr Hargita Hegyesi

Credit: 3

Number of lessons per week: 3.5

lecture: 2

practical course: 1.5

Academic year: 2025/2026 I. semester

Name of the course leader: Prof. Edit Buzás

Institute of Genetics, Cell- and Immunobiology, +36-1-210-2929 / 56241

Position: Professor and Chairman

Objectives of the subject, its place in the medical curriculum:

Medical Genetics: Introductory course in classical and molecular genetics and functional genomics, as well as basic course for the clinical module. It addresses the types, general laws of human inheritance, characteristics, organization and structure of the human genome, and the most important methods.

A pre-clinical course for medical students that introduces the essentials of the immune system, natural and adaptive immune responses. It discusses the structure of the human immune system: organs, cellular and molecular components involved in the immune response; the development of genetic diversity of antigen receptors, and the role of diversity in an efficient immune response. In related practices, students will be introduced to the basic methods required to test the functionality of the immune system, to the immunological assays and immunologically relevant procedures used in current diagnostics.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Institute of Genetics, Cell- and Immunobiology, H-1089 Budapest, Nagyvárad tér 4. Hungary, NET building lecture rooms, L13-L16

Successful completion of the subject results in the acquisition of the following competencies:

Basics of cytogenetics. Setting up and interpreting pedigrees. Basic knowledge of human genetics and human genomics. Background of monogenic and multifactorial diseases.

Understanding the relationships between immunological processes and the role of the immune system. Theoretical knowledge of basic immunological diagnostic techniques.

Number of students required for the course (minimum, maximum) and method of selecting students:

According to Study and Exam Policy

How to apply for the course:

in Neptun system

Detailed curriculum:

XXXXXXXXXXXXXXXXXXXXX

1. Introduction to human genetics
2. Chromosomal aberrations
3. Genetic variations
4. Epigenetics
5. Autosomal inheritance.
6. Role of sex in inheritance
7. Oncogenetics
8. The role, processes, organs and cells of the immune system
9. Principles of natural immunity
10. The complement system; inflammation and acute phase reaction
11. Antigen, antigen presentation and MHCs
12. Antigen receptors and their formation
13. T lymphocytes and cell-mediated immune response
14. B lymphocytes and humoral immune response

XXXXXXXXXXXXXXXXXXXXX

1. Genetic aspects of cell cycle and atypical mitosis
2. Meiosis and meiotic errors
3. Cytogenetics I.
4. Cytogenetics II.
5. Cytogenetics III.
6. Introduction to pedigree analysis
7. Methods in Genetics
8. The immune system in the laboratory. The importance of immune organs and immune cells, and the possibilities for examining their deviations.
9. Basic concepts related to diagnostic antibody
10. Methods based on antigen-antibody interactions I. Immunose-
rology
11. Methods based on antigen-antibody interactions II: immuno-
assays
12. Methods based on antigen-antibody interactions III Flow
cytometry
13. Laboratory testing of complement
14. An overview of immunological methods used in diagnostics with
examples.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes: Understanding of Genetics and Genomics is based on the knowledge of molecular biology and molecular genetic techniques studied at Medical Biochemistry I-II. Elective subjects taught by our institute (Sex Genetics, Epigenetics, Genomics) elaborate on some of the subchapters of "Genetics and Genomics", with overlaps needed for understanding, focusing on topics not covered in the main subject. Understanding the subject of Clinical Genetics is based on the knowledge of Genetics and Genomics.

Requirements for participation in classes and the possibility to make up for absences:

Attendance of a minimum of 75% of the practices is necessary for the end-term signature. The presence at the seminars (practices) are registered weekly, more than three absences from the seminars invalidate the semester as well. The sessions can be attended in an appropriate mental and health condition.

Practical absence can be remedied during the current training week, in parallel courses, after prior consultation with the practice instructors.

Methods to assess knowledge acquisition during term time:

Two mid-term written tests – one on genetics and one on immunology – will be given during the semester, based on the material covered in the lectures and practical sessions up to that point, on a non-mandatory basis. There will be an opportunity to earn bonus points during the mid-term tests. A make-up opportunity for the midterm will be provided for students who were absent with a valid excuse. The midterm date cannot be postponed, and there is no option for the retake of it.

Requirements for signature:

According to the Study and Exam Policy the students must visit at least 75% of practices.

Type of examination: written (lectures and practices) Moodle test

Requirements of the examination:

1.) Introduction to human genetics and genomics.

Basic genetic terms, e.g.: genome, genetics, genomics, homologous chromosomes, gene, locus, allele, wild type allele, genotype, phenotype, homozygote, heterozygote, hemizygote, dominant, recessive, cytogenetics; Mendel's laws, Model organisms in genetics; DNA: structure, function, amount, organization (chromatin, chromosome). Replication, transcription, mRNA maturation (splicing, alternative splicing), types of RNA-s, features of genetic code. Translation and posttranslational modifications. Human genome:

nuclear and mitochondrial. Structure of eukaryotic gene. Intergenic DNA; Specific sequences of nuclear genome. Repetitive sequences. Human Genome Project, ENCODE Project

2.) Transmission of genetic information from cell to cell in an organism.

Features of mitotic phases. Functional parts of chromosomes (telomere, centromere, kinetochore, sister chromatids). Cytokinesis. Changes of DNA amount and chromosome number during cell cycle. Types, causes and consequences of atypical mitosis.

3.) Transmission of genetic information from generation to generation.

Significance and source of genetic variability. Significance of meiosis. Stages of meiosis: meiosis I. and II. Features of phases of first prophase (leptotene, zygotene, pachytene, diplotene, diakinesis; synapsis, crossing over, chiasma). Random alignment and assortment of homologous chromosomes in meiosis I anaphase. Atypical meiotic process: non-disjunction. Change of DNA amount and chromosome number during meiotic process.

4.) Pedigree analysis

Mendelian or monogenic inheritance, Construction of pedigree: main symbols that are used in pedigrees. Pedigree analysis (characteristics pedigree patterns of monogenic inheritances: AD, AR, XD, XR, Y-linked, mitochondrial). Disease examples for monogenic inheritances (AD, AR, XD, XR, mitochondrial); **Important terms:** gene, genome, locus, allele, multiple allelism, wild type (normal) allele, genotype: homozygote, heterozygote, complex heterozygote, hemizygote, phenotype: dominant, codominant, recessive.

5.) Mendelian Inheritance: autosomal inheritance

Properties and disease examples of autosomal inheritance: AD (osteogenesis imperfecta, achondroplasia, Marfan syndrome, familial hypercholesterolemia, Huntington disease, Polycystic kidney disease). Eco genetic diseases (porphyria, malignant hyperthermia). AR (albinism, phenylketonuria, xeroderma pigmentosum, deafness, cystic fibrosis, sickle cell anemia, thalassemia's). **Important terms:** gene, genome, locus, allele, multiple allelism, wild type (normal) allele, genotype: homozygote, heterozygote, complex heterozygote, hemizygote, phenotype: dominant, codominant, recessive. Genetic heterogeneity (locus heterogeneity, allele heterogeneity), Factors affecting pedigree patterns: reduced penetrance, variable expressivity, pleiotropy, heterogeneity (locus and allele), phenocopy, anticipation, „de novo“, new mutation, Influence of the age, Lethal/sublethal genes, „Modifier genes“, Epistasis; Heterozygote advantage, The influence of the environment,

6.) Role of sex in inheritance

Properties and disease examples of Sex-linked inheritance: XR (hemophilia A and B; Duchenne and Becker muscular dystrophy), XD (hypophosphatemia, incontinentia pigmenti, Fragile X). Y-linked inheritance; Sex influenced inheritance (e.g. boldness). Sex limited inheritance (e.g. precocious puberty). Genomic imprinting, X-chromosome inactivation. Mitochondrial inheritance (homoplasmy, heteroplasmy) Genetics of sex: sex determination, male sex determination. Causes of maldevelopment.

7.) Cytogenetics

Structure and types of eukaryotic chromosome. Karyotyping (chromosome preparation, principle, significance and types of banding techniques, principle and significance of multicolor-FISH, and M-banding); X inactivation. Study of sex chromosomes in interphase. Characteristics of human karyotype. Chromosome territories. Light microscopic slides: 54, 60, 64

a.) Structural chromosome mutations

Structural chromosome aberrations. Types of structural aberrations: deletion (terminal, interstitial), duplication, translocation (reciprocal, Robertsonian), inversion (paracentric, pericentric), ring chromosome, isochromosome. Balanced and unbalanced mutations. Chromosomal translocations in leukemia. Consequence of structural aberrations.

b.) Numerical chromosome mutations

Numerical chromosome aberrations: euploidy, polyploidy, aneuploidy, mixoploidy (mosaicism, chimerism). Possible cause of aneuploidy (non-disjunction in meiosis I and II). Autosomal (Patau, Edwards and Down syndromes) trisomy's. Numerical aberrations of sex chromosomes (Klinefelter, XYY, triplo X, Turner syndromes). Cause and consequence of of polyploidy and mixoploidy (mosaicism and chimerism).

8.) Mutations and polymorphisms

Different meanings of mutation and polymorphism. Significance of mutation. Classification of mutations: by cause (spontaneous, induced, different DNA repair mechanisms, consequence of their failure), by site (in the organism: somatic, germline, in the gene), by function (loss-of-function, gain-of-function, dominant negative, lethal, back), by fitness (neutral, beneficial, harmful), by size (genome, chromosome, gene: insertions, deletions, substitutions). Repetitive insertions, triplet repeat: polyglutamine and polyalanine disorders. inDel mutations: frame shift and in frame mutations. Nucleotide substitutions: transition, transversion, sense (synonymous) missense and nonsense (non-synonymous) mutations. Types, size and significance of genetic polymorphism.

9.) Epigenetics

Meaning of epigenetics. Relationship of genome, epigenome and phenotype. Epigenetic mechanisms: transcriptional (DNA methylation, histone modifications), posttranscriptional (RNAi, miR). X chromosome inactivation, role of XIST. Autoimmunity and X inactivation. Genomic imprinting, evidence of nonequivalence of parental genome. Mechanism of genomic imprinting. Uniparental disomy (UDP). Causes of Prader Willi and Angelman syndromes. Possible role of genomic imprinting. Relationship between genomic imprinting and cancer. Position effect. Epigenetic changes caused by aging and by in vitro fertilization. Transgenerational effects.

10) Oncogenetics

Oncogenetics: oncogenes and tumor suppressor and mutator genes. Activation mechanisms of oncogenes. Tumor suppressor genes, LOH. Immunogenetics: somatic gene rearrangement, role of epigenetics, genetic background of antibody diversity.

11) Introduction to Immunology: The concept of immunity, Components (primary, secondary immune organs, cells, molecules) of the immune system. Principles of the immune response: antigen specificity, sensitivity, memory, clonal selection based operation. Features of innate and adaptive, cell-mediated and humoral, primary and secondary response.

12) The natural immunity: Fc-receptors; PAMP, DAMP, Pattern recognition receptors. Phagocytes and phagocytosis. Role of neutrophils, eosinophils and basophils/mast cells. Types and role of dendritic cells. Inflammasome/inflammasomopathies. Innate lymphoid cells.

13) The complement system: The activation pathways and the regulation of the complement system; Complement receptors; Complement genetics; the biological role of complement activation.

14) Inflammation and the acute phase reaction: The local and systemic inflammation, parainflammation and the acute phase response, The provoking factors and mechanisms, periods; The acute phase plasma proteins and their role.

15) Antigen presentation, MHC: The major histocompatibility complex; The ways of antigen processing and presentation. Special forms of antigen presentation: CD1, cross-presentation, cross-dressing, superantigens.

16) Antigen receptors and their formation: Types and structures of antigen receptors; The immunoglobulin and TCR genes, the sources of antigen receptor diversity; Somatic gene-rearrangement, Expression and production of antigen receptors.

17) T cells and the cell mediated immunity: Differentiation and activation of T cells, types of the T cells, Role of the different T-cell subtypes in immune response, the cell mediated immunity.

18) B cells and the humoral immunity: The activation and differentiation of B cells, types of the B-cells, the humoral immunity.

- Characteristics of the cellular elements of the immune system.
- Diagnostic significance of investigation of immune cells.
- Definition of antigen, epitope, hapten.
- Diagnostic and therapeutic benefits of the characteristics of the adaptive immune response.
- Polyclonal vs. monoclonal antibodies: Definition and production (immunization, hybridoma technique).
- Therapeutic value of antibodies: "Naked" antibodies, immunoconjugates.
- Diagnostic value of antibodies – labeling methods.
- Primary and secondary antibodies.
- Diagnostic parameters of antibodies: sensitivity, specificity.
- Antigen-antibody interaction-based tests in daily clinical practice.
- Antibodies as targets and tools in laboratory practice.
- Antigen-antibody interactions and related basic concepts (antibody classes – specificity – cross-reactivity, affinity – avidity).
- Serum electrophoresis and its densitograms.
- Immune complexes, immunoprecipitation, agglutination: Definitions, turbidimetry, and nephelometry.
- Radial immunodiffusion and immunofixation based on immunoprecipitation.
- Hemagglutination, antibody titer, direct, indirect, and passive agglutination.
- The principle of ELISA: Indirect and sandwich types.
- Lateral flow test.
- Detection methods using radioactively labeled antibodies: RIA, IRMA.
- The role of immunoassays in infection diagnostics.
- Flow cytometry and the principle of cytometer operation.
- Identification of cell populations based on size and granularity, scatter plot.

- Immunophenotyping, fluorescence intensity-based measurements, histogram, dot plot, co-expression measurement.
- Clinical applications of flow cytometry (absolute indications): Diagnosis, disease progression monitoring.
- Measurement of total complement activity (CH50). Changes in CH50 values.
- Complement activation ELISA.
- Diseases of the complement system based on molecular defects.

Method and type of evaluation:

The written exam score must reach the sufficient level (50%) in both genetics and immunology to earn the credits. There will be an opportunity to earn bonus points during the mid-term tests. Students who achieve 85% of the possible bonus points in both genetics and immunology will be offered a grade of excellent, while those who achieve 75% will be offered a grade of good.

How to register for the examination?:

In the Neptun system, according to current university and faculty settings.

Possibilities for exam retake: According to the Study and Exam Policy

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

1. Cs. Szalai (Editor): Medical Genetics and Genomics e-book, 2022
2. Power Point presentations of the lectures and practices; The e-book and presentations available at the homepage: <http://gsi.semmelweis.hu/index.php/en/education/>

MEDICAL GENETICS AND IMMUNOLOGY II

Institute of Genetics, Cell- and Immunobiology

Course Director: Prof. Edit Buzás

Course instructor: Dr. Marianna Csilla Holub, PhD

Credit: 4

Aim of the subject and its place in the curriculum:

Structure of the human genome, and the most important methods and their application in theoretical and clinical medicine, according to the needs of medical students, and evaluates the results (in practice). It presents the forms of genetic and epigenetic variability, their mechanisms and their consequences for human health. Through selected examples, the pathway from gene to disease is analyzed using a systems biology approach.

The course introduces students to the processes of immunological regulation in the healthy human body, including the immunology of pregnancy. It also addresses the course and alterations of immunological processes in various pathological conditions, such as infections, tumors, hypersensitivity reactions, autoimmunity, immunodeficiencies, and during transplantation. In the accompanying practical sessions, students are introduced to immunomodulatory techniques used in therapy, the basics of vaccination, and commonly applied immunotherapeutic procedures illustrated through clinical examples. Diagnostic and therapeutic approaches based on immunological principles for hypersensitivity reactions and autoimmune diseases are also demonstrated through case examples. The immunology module provides essential theoretical foundations for immunopathology lectures in the Pathology course, for Rheumatology lectures in Internal Medicine II, and supports the teaching of all subsequent clinical subjects.

Prerequisite(s) for admission to the subject:

Molecular Cell Biology I, Medical Biochemistry II, Medical Genetics and Immunology I.

Lectures:

1. Introduction to genomics
2. Methods in genomics, Genetic screening
3. Genomic approach of complex inheritance
4. Genetic therapies
5. Genome and environment, Evolution genetics
6. Pharmacogenomics
7. Nutrigenomics
8. Immune response in infections
9. Mucosal immunity
10. Hypersensitivity reactions
11. Immunological tolerance; natural and pathological autoimmunity
12. Immunodeficiencies
13. Antitumor immunity
14. Immunology of transplantation and pregnancy immunity. Summary of immune response

Practices:

1. Genetic background of monogenic disorders I.
2. Genetic background of monogenic disorders II.
3. Genetic background of monogenic disorders III.
4. Complex disorders I.
5. Complex disorders II.
6. Gametogenesis, prenatal genetic testing
7. From genes to bedside
8. Immunological therapies I
9. Immunological therapies II
10. Immunization and vaccination I
11. Immunization and vaccination II
12. Hypersensitivity I: Allergy
13. Hypersensitivity reactions II-IV
14. Testing methods for autoantibodies

Policy regarding the attendance and making up absences:

Practices can only be attended to in an appropriate mental and health condition. During the semester, students may not miss more than three (3) practical sessions. Practical absence can be remedied during the current training week, in parallel courses, after prior consultation with the practice instructors.

Means of assessing the students' progress during the semester:

During the semester, two midterm tests are conducted during the practical sessions via the Moodle system. Genetics and immunology questions are presented separately within the Moodle tests; however, both theoretical and practical questions appear in a mixed format in each test. Participation in the midterms (one in genetics and one in immunology) is not mandatory. Students who achieve at least 85% based on the two midterms may receive a one-grade improvement on their final exam grade, provided the exam is passed successfully.

Type of the examination:

Students who obtain the course signature must take an oral comprehensive written exam (comprehensive examination) at the end of the semester. To pass the exam successfully, students must achieve at least a passing level in both genetics and immunology.

If a student fails to reach the passing level in one of the subjects, they are required to retake the exam only in that specific subject during the retake examination.

Exam requirements:

The topics are based on the textbooks, the e-book, the presentations in the lectures and practices. At the exam, it is not sufficient to repeat memorized topics from the textbook and presentations, but you have to be able to synthesize and integrate your knowledge from different parts of the subject.

Exam topics from the previous semester, supplemented with additional material.

Medical Genetics

Introduction to genomics. Methods in genomics

Genomics, Human Genome, DNA sequencing, Participants in the Human Genome Project, Some results of the HGP, Variations in the human genome, Some novel data about gene expression and genetic variability, Junk DNA in the human genome, Comparative genomics, ENCODE project, Genetic markers, GWAS, Principle of molecular genetic methods: hybridization, restriction enzymes, DNA isolation, Visualization of genomic DNA, separation of DNA fragments by gel electrophoresis, capillary gelelectrophoresis), non-specific staining of DNA (EtBr), Allele-Specific Oligonucleotide (ASO) test, RFLP, , microarray, PCR, PCR- RFLP, Multiplex PCR, MLPA, Significance of real time-PCR. Significance and detection of VNTR. VNTR and

trinucleotide diseases. Significance of polymorphism detection in forensic medicine. DNA fingerprint. Foreign DNA (bacterial, viral) detection. Sequencing in genotyping. NGS, RT (reverse transcriptase)-PCR.

Complex inheritance.

Features of complex inheritance. Environmental factors. Heritability of the complex diseases. Disease example Types of sample collection, prospective and retrospective studies. Selection of populations for genetic studies. Hardy Weinberg equilibrium. Linkage, haplotype, linkage disequilibrium. Founder populations. Association studies, population stratification, population admixture. Risk calculation, odds ratio and relative risk, p-value.

Pharmacogenomics

Pharmacogenetics and pharmacogenomics. Pharmacokinetics, -dynamics, Drug development Adverse drug response, Genomic background of adverse effects, CYP (cytochrome P-450) gene family, Warfarin, Mercaptopurine, Genes influencing pharmacodynamics, Examples of pharmacogenetic studies, Pharmacogenetics of statins, Clopidogrel, Pharmacotherapy of asthma, MODY, Succinylcholine sensitivity, Thiopurine methyltransferase variations, Role of membrane receptors in drug effects.

Nutrigenomics

Genetic variations and food, food and gene expression.

Gene therapy

Gene therapy types (real, gene expression modification) and forms (in vivo, ex vivo). Nucleic acids applied in gene therapy: DNA, RNA. Forms of introduction of nucleic acids into target cells. Vectors applied in gene therapy: adenovirus, adeno associated virus, retrovirus, lentivirus, nonviral integrating vectors. Comparison of viral vectors. Examples of successful gene therapy trial.

Evolution genetics

Gene environmental interactions and the human genome. Natural selection. Role of infections in formation of the genome. Genetic drift, bottleneck effect. Why are some lethal mutations frequent? Examples for effects forming the genome.

Genome and environment

Penetrance of the genetic variants; Interactions between highly and low penetrant variations and the environment; smoking-genome interaction, gene-environmental interactions.

Gametogenesis, prenatal genetic testing

Comparison of spermatogenesis and oogenesis; Genetic aspects of infertility; Genetic aspects of assisted reproduction techniques; CGH; aCGH prenatal genetic testing; Non-invasive prenatal testing

Autosomal Inheritance and Molecular Diagnostics

Monogenic inheritance, Inheritance patterns, Polycystic kidney disease, Achondroplasia, Marfan syndrome, Osteogenesis imperfecta, Huntington disease, Polydactyly, Familial hypercholesterolemia, Cystic fibrosis, Xeroderma pigmentosum, Albinism, Congenital adrenal hyperplasia (CAH), Thalassemia, Sickle cell anemia, Epistasis, Heterogeneity, Penetrance, Expressivity, Lethality, New mutation, Phenocopy, Anticipation, Complementation, Compound heterozygosity,

Genetics – Practical questions/tasks:

Hybridization techniques: microarray methods (oligonucleotide and expression arrays), CGH (comparative genomic hybridization), GWAS, OGM
PCR-based methods: PCR, allele-specific PCR, multiplex PCR, RT-PCR, Q-PCR, MLPA
Significance of nucleic acid sequencing: traditional and NGS (biochemical details not required), interpretation of chromatograms
Interpretation of genetic fingerprints
Interpretation of molecular diagnostic diagrams and analysis of case reports (interpretation of diagnostic examples)

Medical Immunology:

Theoretical topics:

Immune response in infections : Antimicrobial immune response. Escape mechanisms of the pathogens.

Mucosal Immunity: Key components of mucosal immunity, induction and effector phases of the mucosal immune response. Composition and role of Peyer's patches in the immune response,

intraepithelial lymphocytes, and lamina propria lymphocytes. Production and function of mucosal IgA. Development of mucosal immune tolerance. Connections between mucosal immune responses and various diseases.

Hypersensitivity reactions: The Mechanisms and Cellular/Humoral Participants of Type I–IV Hypersensitivity Reactions. Type I Hypersensitivity: Sensitization, anaphylaxis, early and late effector phases, atopy, and the mechanisms underlying the increased prevalence of allergic conditions. Type II Hypersensitivity: Rh incompatibility; stimulatory and inhibitory effects of antibodies directed against receptors. Type III Hypersensitivity: Consequences of immune complex deposition. Type IV Hypersensitivity: Development of hapten-induced contact dermatitis; immunological background of gluten sensitivity.

Immunology of transplantation: Immunological background of transplantation. Organ transplantation and rejection reactions. Immunological background of graft-versus-host (GVH) disease.

Immunological tolerance and autoimmunity: Central and peripheral immune tolerance. Natural and pathological autoimmunity. The concept of the immunological homunculus and immune ignorance.

Immune deficiencies: Primary and acquired immune deficiencies.

Anti-tumor-immunity: Tumor antigens. Anti-tumor immunity. Escape strategies of tumor cells.

Pregnancy immunity: Neonatal immunity. Immunological crosstalk between mother and fetus. The role of the placenta in establishing immune tolerance during pregnancy. Immunological protection of the fetus and the newborn.

Practical topics:

Biological therapies: Definition of targeted molecular therapy and immune modulation. Monoclonal antibodies in the therapy: Adverse effects and types of the monoclonal antibodies, fusion proteins. Monoclonal antibodies in the tumour therapy, checkpoint blockade, induction of ADCC, bispecific antibodies. Antibody therapy in autoimmune diseases. TNF alpha, T- and B cells as therapeutic targets in RA. IVIG, Adjuvant based immunotherapy, CAR-T-cell therapy, DC-therapy, oncolytic virus therapy.

Immunization, vaccination: The aims and practical implementation of immunization. Immunodominant epitope. Optimal dose, adjuvants, route of administration. Oral tolerance. The aim of immune stimulation, active immunization. Passive vaccination.

Hypersensitivity reactions I., II, III., IV.: Mechanisms and diagnosis of type I hypersensitivity reaction. Penetration of antigens, types of IgE mediated responses. Deliberation of histamine and its effects. Allergy tests. Anaphylaxis vs. anaphylactoid reaction; Urticaria vs. angioedema. Food intolerance vs. food allergy. Basics of pharmacotherapy. Desensitization and prevention. Mechanisms and diagnosis of type II, III and IV hypersensitivity reactions. Clinical examples. Diagnostic tests.

Screening methods of autoantibodies: Natural vs. pathological autoantibodies. Autoantigens. Detection of autoantibodies. Example diseases.

Literature, i.e. printed, electronic and online notes, textbooks, tutorials (URL for online material):

1. Cs. Szalai (Editor): Medical Genetics and Genomics e-book, 2022
2. Abbas, Lichtmann, Pillai, Basic Immunology 7th Edition, Elsevier, 2023
3. Practice and lecture ppt-s): <http://gsi.semmelweis.hu>
4. Immunology seminars (e-book): <http://gsi.semmelweis.hu>

MEDICAL HUNGARIAN III.

Responsible organisational unit:
Institute of Languages for Specific Purposes

Programme director:
Katalin Fogarasi PhD, habil., director, habilitated associate professor

4 lessons per week, 2 credits

Assessment: midterm (oral interview) and endterm (oral interview)

Role of subject in fulfilling the aim of training:

The aim of the subject is to enable students to take patient's history, ask about medical history and present complaints. We focus on developing skills and strategies necessary to understand Hungarian patients during their clinical practice. Students learn to give instructions during examination and get familiarised with relevant clinical documents (charts, discharge papers, etc.). Vocabulary building is centred around symptoms of common conditions.

Brief description of subject:

This is the third semester of a 4-semester medical language course. The aim of the course is to enable students to take anamnesis, to be informed about past illnesses and present complaints, and to have appropriate strategies for understanding the patient in clinical practice. Students will get familiar with the instructions used in the examination of patients, be able to examine patients independently, and be able to give relevant instructions (examination of the thoracic organs, circulation, abdomen, musculoskeletal system, nervous system - based on the medical chart). Students will get familiar with the forms of medical documentation (fever chart, chart, etc...). Students will be able to understand the symptoms of diseases – according to the list proposed by the clinics – in Hungarian and ask the patients relevant questions about their illness.

weeks	Topics: Hungarian language competencies in taking medical history in the following topics:
1.	Revision: Present complaints
2.	Family history 1: Is there any disease in the family?
3.	Family history 2: Is there any disease in the family?
4.	Pain 1: Questions about pain
5.	Pain 2: Questions about pain
6.	Respiratory complaints 1
7.	Oral test
8.	Respiratory complaints 2
9.	Cardiovascular complaints 1
10.	Cardiovascular complaints 2
11.	Gastrointestinal problems; urine 1
12.	Gastrointestinal problems; urine 1
13.	Revision
14.	Oral test

Course material, recommended text book(s), professional literature and supplementary reading(s)
Teaching materials and audio recordings of authentic medical documentation, edited by the instructors of the Department of Languages for Specific Purposes.
Borda Szandra-Hetesy Bálint: Magyar orvosi szaknyelv III. Students can download the book in pdf format from the moodle interface.

MEDICAL HUNGARIAN IV.

Responsible organisational unit:
Institute of Languages for Specific Purposes

Programme director:
Katalin Fogarasi PhD, habil., director, habilitated associate professor

4 lessons per week, 2 credits

Assessment: oral test on week 7; mock-comprehensive exam on week 14; comprehensive examination

Role of subject in fulfilling the aim of training:

The aim of the subject is to enable students to take patient's history, ask about medical history and present complaints. We focus on developing skills and strategies necessary to understand Hungarian patients during their clinical practice. Students learn to give instructions during examination and get familiarised with relevant clinical documents (charts, discharge papers, etc.). Vocabulary building is centred around symptoms of common conditions.

Brief description of subject:

This is the fourth semester of a 4-semester medical language course. The aim of the course is to enable students to take anamnesis, to be informed about past illnesses and present complaints, and to have appropriate strategies for understanding the patient in clinical practice. Students will get familiar with the instructions used in the examination of patients, be able to examine patients independently, and be able to give relevant instructions (examination of the thoracic organs, circulation, abdomen, musculoskeletal system, nervous system - based on the medical chart). Students will get familiar with the forms of medical documentation (fever chart, chart, etc...). Students will be able to understand the symptoms of diseases – according to the list proposed by the clinics – in Hungarian and ask the patients relevant questions about their illness.

Brief description of subject:

weeks	<i>Topics: Sentences, instructions used during the medical examination</i> <i>Preparing for the comprehensive exam</i>
1.	Revision: Medical history taking
2.	Examination 1: Informing the patient
3.	Examination 2: Instructions
4.	Examination 3: Further instructions
5.	Diseases, anamnesis 1, listening (revision) 1-2, listening practice for the comprehensive exam 1-2, situations 1.
6.	Diseases, anamnesis 2, listening (revision) 3-4, listening practice for the comprehensive exam 3-4, situations 2.
7.	Revision, oral test
8.	Anamnesis 3,4, listening (revision) 5-6, listening practice for the comprehensive exam 5-6, situations 3.
9.	Anamnesis 5, listening (revision) 7-8, listening practice for the comprehensive exam 7-8, situations 4.
10.	Anamnesis 6, listening practice for the comprehensive exam 9-10, situations 5-6.
11.	Anamnesis 7, listening practice for the comprehensive exam 11-13, situations 7-8.
12.	Anamnesis 8, listening practice for the comprehensive exam 14-16, situations 9.
13.	Anamnesis 9, listening practice for the comprehensive exam 17-18, situations 10.
14.	Revision, mock comprehensive exam

Course material, recommended text book(s), professional literature and supplementary reading(s)

Teaching materials and audio recordings of authentic medical documentation, edited by the instructors of the Department of Languages for Specific Purposes.

Borda Szandra-Hetesy Bálint: Magyar orvosi szaknyelv IV. Students can download the book in pdf format from the moodle interface.

MEDICAL PHYSIOLOGY I.

Department of Physiology

Name of subject: Medical Physiology I.

Type of subject: Obligatory subject

Credit Points: 10

Head of the Department: Dr. Attila Mócsai, Full Professor

Course Director: Dr. Péter Várnai, Full Professor

Tutor: Dr. András Balla

Aim of Medical Physiology course:

The goal of Medical Physiology course is to give the students the understanding of the concepts and principles of medical physiology. The lectures provide the information base while the seminars and practices provide the student with an opportunity to assimilate and integrate the material. Appropriate clinical perspectives are presented throughout the course.

Schedule of the subject:

Lectures:

1. Introduction, body fluids. Functions of cellular membranes, transport across membranes. Transepithelial transports.
2. Signal transduction: receptors, G proteins, second messengers. Cellular calcium metabolism, receptors of growth factors and cytokines. Membrane trafficking and vesicular transport.
3. Ion channels and resting membrane potential. Action potential. Physiology of nerve cells, synaptic transmission in the central nervous system.
4. Neuromuscular junction and physiology of skeletal muscle. Autonomic neurotransmitters and physiology of smooth muscle.
5. Physiology of the blood.
6. Physiology of the heart I.: origin and spread of cardiac excitation. Cardiac cycle. Regulation of cardiac output.
7. Electrocardiography (ECG). Physiology of blood circulation: introduction.
8. Hemodynamics, systemic circulation. Microcirculation.
9. Venous circulation and lymph flow. Local control of circulation. Reflex control of circulation.
10. Circulation of blood in the brain and coronary circulation. Splanchnic circulation, circulation of skin and skeletal muscle.
11. Respiration: pulmonary ventilation. Gas exchange in the lungs. Pulmonary circulation, ventilation-perfusion relationship.
12. Gas transport, hypoxias. Regulation of respiration. Adaptation of cardiovascular and respiratory system.
13. Renal function: renal circulation, glomerular filtration. Tubular functions. Concentration, dilution.
14. Regulation of body fluids and osmotic concentration. Introduction to acid-base balance. Acid-base balance: role of lungs and kidneys.

Practices:

- Blood cell counting, determination of hemoglobin concentration and hematocrit, measurement of erythrocyte sedimentation rate
- Leukocyte differential count on peripheral blood smear
- Typing of Blood Groups, Blood Coagulation Test
- Measurement of transport rate on red blood cells. Hemolysis
- Investigation of cardiac functions in situ

- Blood pressure measurement in humans
- Echocardiography
- Computer simulation: Neuromuscular junction
- Electromyography (EMG), nerve conduction velocity
- Recording and analyzing the human ECG
- Computer simulation: Skeletal and smooth muscle
- Effects of vagal nerve stimulation on cardiac functions
- Respiratory physiology calculations
- Evaluation of acid-base parameters with the Siggaard-Andersen nomogram

Attendance at classes: The lecture hours per week are 5.5; the practice hours per week are 5. The attendance of a minimum of 75% of practices is necessary for the end-term signature.

Absences:

No more than three absences from practices are allowed for any reason; otherwise the semester will not be credited. There are no extra practices.

Requirements for signature:

- 1) The attendance in minimum 75% of practices is necessary for the end-term signature. Students must write a lab report for each practice using the Practical Book. The Practical Book should be signed by the teacher not later than one week after the practice. Participation in the practices is obligatory. No more than three absences from practices are allowed for any reason; otherwise, the semester will not be credited.
- 2) The average of the taken in account weekly tests must be above 50% to obtain the end-term signature. Students who do not meet this requirement need to take a written test covering the material of the semester in the 14th week of the semester during the "Competition exam", and achieving a result of 50% or higher is necessary to obtain the end-term signature.

Requirements of the examination:

Requirements of the semi-final exam: material of the Medical Physiology I.

The semi-final exam is oral exam. The students need to bring ID card and the laboratory report book to participate in the exam. Lists of the theoretical questions can be found in the webpage of the Department of Physiology. The following rules will be enforced during the exams: electronic devices must be kept in the baggage; baggage and coats should be placed next to the wall of the exam place; any form of communication is disallowed; students not complying with these rules will be disqualified immediately.

Registration for the exam:

Registration for the exam must be recorded through the NEPTUN system.

Modification in the registration must be recorded through the NEPTUN system.

List of textbooks:

Textbook: Koeppen-Bruce M- Stanton- Bruce A: Berne & Levy Physiology (7th edition). 2017. ISBN: 9780323393942

Practice book: Practices in Medical Physiology (Edited by: Péter Enyedi and Levente Kiss). 2024. ISBN: 9789633316290

MEDICAL PHYSIOLOGY II.

Type of subject: Obligatory subject

Credit Points: 10

Head of the Department: Dr. Attila Mócsai, Full Professor

Course Director: Dr. Péter Várnai, Full Professor

Tutor: Dr. András Balla

Prerequisite: Medical Physiology I. (subject to change by introducing the new curriculum), Microscopic Anatomy and Embryology II.

Aim of Medical Physiology course:

The goal of Medical Physiology course is to give the students the understanding of the concepts and principles of medical physiology. The lectures provide the information base while the seminars and practices provide the student with an opportunity to assimilate and integrate the material. Appropriate clinical perspectives are presented throughout the course

Schedule of the subject:

Lectures:

1. General principles of regulation in the gastrointestinal tract. Motor functions of the gastrointestinal tract.
2. Secretory functions of the gastrointestinal tract. Digestion and absorption of food.
3. Endocrine regulations. The hypothalamo-adenohypophyseal system; growth hormone, somatomedins.
4. Function of the adrenal cortex. Function of the thyroid gland. Energy balance, quality and quantity requirement of food.
5. Hormonal regulation of intermediary metabolism.
6. Calcium metabolism, bone tissue, growth. Function of the reproductive system: endocrinology of the sexual differentiation and development.
7. Function of the reproductive system: male sexual function; female sexual function; endocrinology of pregnancy, parturition, and lactation.
8. Introduction to neurophysiology. Physiology of nerve & glia cells.
9. Sensory functions.
10. Physiology of hearing and equilibrium.
11. Physiology of vision.
12. Motor functions.
13. Integration of autonomic responses.
14. Electroencephalogram (EEG); sleep phenomena. Learning and memory. Regulation of behavioural mechanisms, motivation; emotion.

Practices:

- Studies on circulatory reactions of a virtual rat
- Circulatory and respiratory reflexes in rabbit (Demonstration, Practice)
- Smooth muscle of rabbit small intestine
- Human pulmonary function tests – Spirometry
- Measurement of cardiac output in rat
- Pulse wave in human
- Oral glucose tolerance test (OGTT)
- Human pulmonary function tests – Body plethysmography
- Electrooculography (EOG) and investigation of the vestibular system
- Spiroergometry
- Human visual physiology
- Investigation of reflexes
- Practice for lab exam. Lab exam

Attendance at classes:

The lecture hours per week are 5.5; the practice hours per week are 4.5. The attendance of a minimum of 75% of practices is necessary for the end-term signature.

Absences:

No more than three absences from practices are allowed for any reason; otherwise the semester will not be credited. There are no extra practices.

Methods to assess knowledge acquisition during term time:

The knowledge of the students is tested in a written form on a weekly base. The written short tests cover the material of lectures of the previous week.

Requirements for signature:

- 1) The attendance in minimum 75% of practices is necessary for the end-term signature. Students must write a lab report for each practice using the Practical Book. The Practical Book should be signed by the teacher not later than one week after the practice. Participation in the practices is obligatory. No more than three absences from practices are allowed for any reason; otherwise, the semester will not be credited.
- 2) The average of the taken in account weekly tests must be above 50% to obtain the end-term signature. Students who do not meet this requirement need to take a written test covering the material of the semester in the 14th week of the semester during the "Competition", and achieving a result of 50% or higher is necessary to obtain the end-term signature.

Final exams

In the examination period the students have to give final exam in the second semester.

Requirements of the examination:

Requirements of the final exam: material of the Medical Physiology I. and Medical Physiology II.

The final exam consists of practical, written and oral parts. The students need to bring student identity card and the laboratory report book to participate in the exam. The practical part (lab exam) takes place in the last week of the second semester. Passing the lab exam is not a prerequisite to participate on the other parts of the final exam. A failed or missed lab exam is taken into account in grading the final exam as fail (1) partial grade (a successful lab exam does not result in any grade). The written and oral part of the final exam is held on the same day. The topics of the final exam can be found in the webpage of the Department of Physiology (<http://semmelweis.hu/elettan/teaching/second-semester>). The following rules will be enforced during the exams: electronic devices must be kept in the baggage; baggage and overcoats should be placed next to the wall of the exam rooms; any form of communication is disallowed; students not complying with these rules will be disqualified immediately

Registration for the exam:

Registration for the exam must be recorded through the NEPTUN system.

Modification in the registration must be recorded through the NEPTUN system.

List of textbooks:

Textbook: Koeppen-Bruce M- Stanton- Bruce A: Berne & Levy Physiology (7th edition). 2017. ISBN: 9780323393942

Practice book: Practices in Medical Physiology (Edited by: Péter Enyedi and Levente Kiss). 2024. ISBN: 9789633316290

MEDICAL PSYCHOLOGY

Institute of Behavioural Sciences

Type of the course: obligatory

credit: 4 credits

Presenter of the course: Dr. Tamás Dömötör Szalai

Course leader: Prof. Dr. György Purebl

Course objectives: The course is designed to give a broad overview of the field of medical psychology, including concepts, theory, and research. A distinct aim of the course is to introduce those low intensity psychological interventions, which can be efficiently used in everyday medical practice.

Learning objectives:

- Develop an understanding of the complex interplay between one's physical well-being and a variety of biological, psychological, and social factors.
- Learn the nature of the stress response and its impact in the etiology and course of many health problems.
- Understand the approach of bio-psycho-social model and become familiar with some frequent psychosomatic diseases.
- Be able to identify various psychological disorders and key personality traits related to health / disease.
- *Competencies gained upon the successful completion of the subject:*
- Developing an understanding of the complex interplay between physical well-being and a variety of biological, psychological, and social factors.
- Learning the nature of the stress response and its impact in the etiology and course of many health problems.
- Understanding the approach of bio-psycho-social model and become familiar with some frequent psychosomatic diseases.
- Being able to identify various psychological disorders and key personality traits related to health/disease.

Course Syllabus:

Lectures:

Week 1.	Introduction to Human Behaviour
Week 2.	Major Schools of Psychology
Week 3.	Conscious States, Sleep, Dreaming and General Anesthesia
Week 4.	People Living with Disabilities
Week 5.	Depression and Suicide – The Role of Online Intervention
Week 6.	Stress and illness; Behavioural Interventions
Week 7.	Human Attachment – Mental Health and Doctor-Patient Relationship

Seminars:

Week 1.	Developmental psychology, attachment theories
Week 2.	Personality theories
Week 3.	Human sexuality and sexual disorders, psychology of reproduction, psychology of birth
Week 4.	Depression and mood disorders.
Week 5.	Anxiety and medical illnesses.
Week 6.	Eating disorders.
Week 7.	Psychosomatic disorders – case studies; somatization and dissociative disorders
Week 8.	Personality disorders.
Week 9.	Sleep disorders
Week 10.	Addiction, substance use
Week 11.	Suicide, cry for help, crisis intervention
Week 12.	Psychology of death, grief, and dying
Week 13.	Behaviour change and psychotherapy. Stress management in medical practice.
Week 14.	Mental health of medical doctors. Prevention and management of burn-out. Bálint-groups.

Participation and making up for absences: Students are expected to attend regularly the course and participation list will be recorded at the end of every lecture and every seminar. To participate on at least 75% of the total number of seminars is a prerequisite for getting the signature needed to absolve the course. The maximum number of absences permitted: three absences from the seminars.

Justification of the absence in the lectures and examinations: Absence should be justified for the seminar leading teacher within three working days.

Checks during the semester (reports, written checks): Every student should prepare presentations on the topics designated by the seminar leader teacher. Active participation is expected.

Requirements for the signature at the end of the semester: Active participation on the practices. The teacher has the right for refusing

to give signature to the students who didn't work on the desired level on the seminars.

Method of the calculation of marks: Grades will be based on student's performances at the final written exam.

Type of the exam: Written final examination taken in the examination period.

Requirements for the exam: Lecture and seminar slides are the obligatory material for the exam, and are available on our website: <https://semmelweis.hu/magtud/en/education/faculty-of-medicine/medicalpsychology/>

Application for the exam: Through the Neptun system.

Changing the application for the exam: Through the Neptun system.

Justification of the absence from the exam: Absence should be justified for the course leading teacher within three working days.

Course and recommended text books:

Required textbook:

5. Behavior & Medicine, 4th Edition, Danny Wedding, Hogrefe & Huber Publishers, Seattle, 2006.

Recommended text books:

6. Kopp M. – Skrabski Á.: Behavioural Sciences Applied in a Changing Society, Corvina, 1996.
7. Fadem B: Behavioural Science., Lippincott Williams & Wilkins, 5th ed., 2008.
8. Sarafino E.P.: Health Psychology. Biopsychosocial interactions. 6th ed., New York, Wiley, 2008.

Additional readings:

The powerpoint slides and prezi presentations used for the lectures and seminars, a short study material as well as a question bank are going to be assigned for reading during the course, and they will be made available on the Moodle surface of the course as well as on our website.

Diploma work topics:

Dr. Piroska Balog:

Chronic stress (marital stress and/or work stress) and cardiovascular vulnerability.
Vital exhaustion and cardiovascular diseases.

Dr. Róbert Bódizs:

The hemispheric lateralization of sleep and wake EEG.
Sleep EEG and personality.
The electrophysiology of sleep and dreaming.

Dr. János Kollár

Music therapy in Parkinson's patients
Music-based supportive therapy in cancer patients
Gamification in medical education
Fears related to the medical profession and coping mechanisms of medical students
Application of virtual reality techniques in the education of medical students.

Dr. György Purebl:

Cognitive therapy for depression.
Cognitive therapy for anxiety disorders.
Relationship between personality disorders and mental diseases.
Insomnia – health consequences, diagnosis and treatment.
The impact of human circadian rhythm on mental and physical health.

Dr. Adrienne Stauder:

Stress related symptoms and psychosocial risk at the work place.
The health consequences of bullying at the workplace.

Dr. Tamás Dömötör Szalai:

The etiology and psychotherapy of eating disorders
Maintaining factors and intervention methods of body image disorder
Attachment and mental health

Dr. Mónika Ditta Tóth (only for Fac.of Gen.Med. students):

Psychological background of suicidal behaviour
Impact of Covid-19 on University students
Depression and burn-out on the workplace

Dr. Péter Ujma:

IQ and the wakeful electroencephalogram
Sibling and twin studies using NLSYLinks
The effects of traits and daily experiences on the sleep electroencephalogram
Determinants of fertility in Hungary

Semester: half class in the first semester and half class in the second semester

Institute of Behavioural Sciences

Type of the course: obligatory

credit: 3

Course leader: Dr. György Purebl

Groups 1-11 in the first semester, groups 11-24 in the second semester

Course objectives:

By the mid to late 20th century, the biomedical model in medicine was replaced by the biopsychosocial model. There are biological, psychological and social factors in the background of illness. This is the approach we take in this course in looking at various aspects of health, illness and medical work. Our aim is to introduce future medical doctors to the social factors they must be familiar with in working with patients. Topics include social stratification and health inequalities, the principles of health care systems, medicalisation and the changing medical profession, illness behaviour, intercultural issues in health care as well as the challenges of digital health.

Course Syllabus:

Lectures	
Week 1	Introduction to medical sociology, basic concepts and principles (Lecture: Bence Döbrösy)
Week 2	Health and illness in society, a historical transformation of mortality and morbidity patterns (Lecture: Edmond Girasek)
Week 3	The challenges of digital health (Lecture: Bence Döbrösy)
week 4	Intercultural healthcare (Lecture: Bence Döbrösy)
Week 5:	Introduction to medical sociology and to the tasks in practicals (practical)
Week 6:	Methods of medical sociology-the case of measuring patient satisfaction (practical)
Week 7:	Help seeking behaviour (practical)
Week 8:	Intercultural differences: cultural dimensions in medicine (practical)
Week 9:	Social inequalities I (practical)
Week 10:	Social inequalities II (practical)
Week 11:	Workshop: Scarce resources in healthcare at the macro level (practical)
Week 12:	Workshop: Scarce resources in healthcare at the micro level – characteristics of the profession (practical)
Week 13:	Health and Society – The health status of the Hungarian population (practical)
week 14:	Summary (practical)

Participation and making up for absences:

No less than 75% of all practices must be attended. One practical absence can be made up by undertaking an extra task set by the practical leader or by participating in the practical with another group.

Justification of the absence in the lectures and examinations:

Medical certificate

Checks during the semester (reports, written checks):

Students will be given topic related tasks during the practices, which they will have to complete in groups. The tasks will involve finding topic related data in class, interpreting it and presenting it to the group, relating the topics discussed in class to the students' own countries and experiences and sharing it with others, reading articles and summarizing them and participating in games and activities. More information will be provided separately. The tasks are graded and contribute towards the final grade. 50% of the final grade is made up of the tasks.

Requirements for the signature at the end of the semester:

Doing 75% of the tasks in practices.

Method of the calculation of marks:

The written examination is 100% of the final grade

30% of the final grade is made up of the tasks done during practices.

Grades:

0-50 points	1
51- 60 points	2
61-74 points	3
75-84 points	4
85 points and over	5

Type of the exam:

Written final exam to be held during the examination period consisting of true or false questions and an essay type case analysis based on lecture materials and the textbook. This is 50% of the final grade.

50% of the final grade is given for the short tasks done in class.

Requirements for the exam:

The material needed to study will be made available on Moodle. In order to undertake the exam successfully, students must know the material made available to them as well as the textbook.

The material covered in the exam:

- Basic sociological concepts (Culture, structure, roles, statuses, social stratification, social institutions, social mobility)
- Health and illness through history, basic epidemiological ideas
- Health inequalities and social inequalities (Age, gender, ethnicity, material conditions)
- Global inequality
- Intercultural factors in healthcare
- Healthcare systems
- Digital health cultural and social aspects
- The doctor-patient relationship
- Illness behaviour
- Health Behaviour
- The medical profession- sociological aspects

Application for the exam: Neptun

Changing the application for the exam:

Neptun

Justification of the absence from the exam:

Medical certificate

Course and recommended textbooks:

Graham Scrambler (ed): Sociology as Applied to Health and Medicine, Palgrave Macmillan 2018 - selected chapters only.

Diploma work topics:

Dr. Zsuzsa Györffy:

Stress, burnout and coping among physicians.
Digital health: opportunities and challenges.

Dr. Bence Döbrösy:

Intercultural healthcare.

Dr. Edmond Girasek:

Application of artificial intelligence in healthcare
Big Data technologies in healthcare
Impact of Digital Health to the healthcare system
Comparison of healthcare systems

MICROSCOPIC ANATOMY AND EMBRYOLOGY II.

Department of Anatomy, Histology & Embryology

Head of Department: Dr. Alán Alpár
Course Director: Dr. Andrea D. Székely

Credit value: 4
Number of lessons per week:
4 lectures: 2 practical course: 2 seminar: 0

Type of the course: obligatory course
Name of the course leader: Dr. Alán Alpár, Professor, Head of Department
Contact details: Semmelweis University, Department of Anatomy, Histology and Embryology, +36 1 459 1500 / 53609

Objectives of the subject, its place in the medical curriculum:
Demonstration of the fine structure of cells and tissues composing the organs of the human body specifically to provide the future clinicians/medical doctors with a valid body of information describing the microscopical elements of clinically significant morphological structures (including cell biology, general histology and the histology of organs).
The part covering the microscopy of the CNS provides the students with a basic knowledge concerning the major roles of the brain together with the spinal cord with special reference to function and structure. The development of the nervous systems together with the detailed morphological/histological/developmental description of organs of special senses as well as the endocrine system will also be discussed. Teaching is done in the form of lectures and histology laboratory classes

Detailed curriculum:

List of lectures

1. week:	1. 2.	Nerve tissue Development of the neural tube, craniocaudal and dorsoventral differentiation. Divisions of the central nervous system
2. week:	3. 4.	Formation and derivatives of the neural crest and placode ectoderm Fine structure of the spinal cord (spinal reflexes, receptors, effectors)
3. week:	5. 6.	Brain tracts, neurotransmitters, neuronal circuits, "connectomics" Central autonomic nervous system. Monoaminergic and cholinergic neurones and pathways. „Ascending Reticular Activating System” (ARAS)
4. week:	7. 8.	Somatosensory system. Spinal and trigeminal sensory pathways. Thalamus, cortical areas. Viscerosensory system. Role of the reticular formation, thalamus, insula and the prefrontal cortices in visceral sensory activities.
5. week:	9. 10.	Neuroanatomy of pain. Referred pain. Cerebral inhibition of pain sensation. Neuroanatomy of movements/locomotion I. Motor cortical areas, planning and programming of movements. Motor pathways
6. week:	11. 12.	Neuroanatomy of movements/locomotion II. The role of cerebellum and basal ganglia in eliciting movements. Gait control mechanism. Visceromotor system. Control of micturition. Spinal motor reflexes.
7. week:	13. 14.	External ear. Middle ear Inner ear. Bony and membranous labyrinth. Development of the organ of hearing.
8. week:	15. 16.	Spiral organ of Corti. Auditory pathway. Neuroanatomy of hearing, understanding and control of speech. Fine structure of the labyrinth, tracts of the vestibular system. Control of balancing and posture together with the movements of the eye and head. Awareness of spatial position
9. week:	17. 18.	Fibrous and vascular coats of the eyeball. Lens, chambers of the eye, vitreous body, accommodation. Lacrimal gland, lacrimal apparatus. Inner coat of the eyeball, retina. Development of the eye.
10. week:	19. 20.	Neuroanatomy of vision. Visual pathway, visual recognition, neuroanatomy of reading and understanding of written/text. Endocrine system I. Hypothalamus, the hypothalamo-hypophysial system, epiphysis
11. week:	21. 22.	Endocrine system II. Thyroid, parathyroid, adrenal glands. Energy metabolism, neuroanatomy of food intake, taste sensation and olfaction. Structure and functional significance of the reward system
12. week:	23. 24.	Limbic system. Amygdala, hippocampus. Circadian rythm, sleep/wake cycle; neuroanatomy of resting state and activation.
13. week:	25. 26.	Behaviour and motivation. Neuroanatomy of emotions, empathy, well-being, aggression, fear, anxiety and depression. Cognitive functions. Neuroanatomy of determination, planning, alertness together with learning&memory, personality, consciousness and creativity.
14. week:	27-28.	Histology revision I-II. (basic tissues, histology of internal organs)

Place where the subject is taught (address of the auditorium, seminar room, etc.):
Semmelweis University, Department of Anatomy, Histology and Embryology
Budapest 1094, Tűzoltó utca 58.

Successful completion of the subject results in the acquisition of the following competencies:
Understanding the microscopical composition of the human body together with the understanding of human development in order to draw parallels with macroscopical anatomy. Clear understanding of histological structure and function. Ability to identify basic structural elements within the tissue specimen. Identification of general directions/landmarks within digitized tissue slides.

Course prerequisites:
Cell science,
Microscopic anatomy and embryology I,
Macroscopic Anatomy and Embryology II.

Number of students required for the course (minimum, maximum) and method of selecting students):
Obligatory for all registered students, on the basis of registration via the NEPTUN system.

How to apply for the course:
Via the NEPTUN system.

Histology laboratories

1. week:	Histology of the peripheral nervous system
2. week:	Microscopy of the CNS – consultation 1
3. week:	Histology of the central nervous system
4. week:	Microscopy of the CNS – consultation 2.
5. week:	Microscopy of the CNS – consultation 3.
6. week:	Midterm test
7. week:	Histology of the organ of hearing
8. week:	Histology of the organ of vision I.
9. week:	Histology of the organ of vision II
10. week:	Skin. Endocrine system 1.
11. week:	Midterm test
12. week:	Endocrine system 2.
13. week:	Histology revision
14. week:	Histology revision

Other subjects concerning the border issues of the given subject (both obligatory and optional courses).

Possible overlaps of themes:

- Macroscopic Anatomy I - II.
- Cell sciences, cell biology
- Certain chapters of Biochemistry. The endocrine and central nervous systems are also discussed in Physiology

Special study work required to successfully complete the course:
none

Requirements for participation in classes and the possibility to make up for absences:

Active participation in histology laboratory classes is obligatory for every student. Students should attend at least 75% of the scheduled hours to gain a signature proving the validity of the semester. Absences are therefore limited in 25%. Attendance will be recorded in the histology laboratory classes

Methods to assess knowledge acquisition during term time:

The knowledge of students will be checked in written (Moodle) tests in the form of 4 weekly tests from the microscopy of the CNS followed by two midterm tests.

Midterm 1 – week 8 – microscopy of the CNS

Midterm 2 - week 13 – histology and development of the endocrine organs together with the organs of special senses.

The midterm test are composed of images and theory questions (20 questions, passing rate:50%) Attendance is obligatory at the two midterm tests. Students absent or having an unsuccessful result from the tests should reattend at one of the offered retakes (week 13 or 14,) or their semester is not accepted.

Requirements for signature:

Active participation in at least 75% of dissection room sessions, including the midterm tests is obligatory for every student. One successful midterm test is required to gain the acceptance of the semester.

Type of examination:

Final (written and oral) examination, topics: subject matter of the two semesters (Microscopic Anatomy and Embryology I-II.). Examiners are delegated by the Course Director with the consent of the Head of Department.

Final examinations consist of written theoretical and oral practical parts.

Requirements of the examination:

Final examinations are composed of written theoretical and oral practical parts. The written theoretical examination is done using an e-learning module while the practical examination is conducted with the help of digitized histological tissue slides.

1. Written pretest (e-learning module) Every student, irrespective of the result of the written test may continue with the oral examination.
2. Microscopic Anatomy - identification of structures on digitized tissue slides - including relevant theoretical questions from the subject matter of the semester
3. One CNS question (exemptions could be earned during the semester in case the result of the 1st midterm is 4 or 5)

Students are given separate marks for each part of the examination. Unsuccessful partial examinations result in the failure of the semifinal examination. When failing at the practical part, the written test will not have to be repeated in case the result was a 4 or a 5 only. Upon the termination of the examination the Head of the Examination Committee composes the final mark from the partial marks earned in the written and practical parts.

Topic list for the final examination:

Microscopic Anatomy and Embryology I.
(see there)

and

Lymphatic organs

- Lymphatic tissues in general, cellular components
- Histological structure of lymph nodes
- Spleen (fine structure and circulation)
- Thymus
- Tonsils, MALT

Microscopic Anatomy and Embryology II.

Lymphatic organs

- Lymphatic tissues in general, cellular components
- Histological structure of lymph nodes
- Spleen (fine structure and circulation)
- Thymus
- Tonsils, MALT

Development of the nervous system and organs of special senses

- Development and primary differentiation of the neural tube
- Development of brain vesicles
- Development of the peripheral nervous system (neural crest, placodes)
- Development of the organ of vision
- Development of the organ of hearing&equilibrium

Neurohistology

- Histology of neurons developing from the neural tube
- Glial cells
- Histology of the neurons and supporting cells developing from the neural crest
- Fine structure of peripheral nerves
- Receptors and effectors
- Interneuronal synapses

Microscopy of the central nervous system

- Fine structure (microscopy) of the spinal cord
- Proprioceptive reflexes
- Nociceptive reflexes
- Autonomic reflexes
- Brain tracts, neurotransmitters, neuronal circuits, "connectomics"
- Central autonomic nervous system. Monoaminergic and cholinergic neurones and pathways.
- „Ascending Reticular Activating System" (ARAS)
- Somatosensory system. Spinal and trigeminal sensory pathways. Thalamus, sensory cortical areas.
- Viscerosensory system. Role of the reticular formation, thalamus, insula and the prefrontal cortices in visceral sensory activities.
- Neuroanatomy of pain. Referred pain. Cerebral inhibition of pain sensation.
- Motor cortical areas, planning and programming of movements. Motor pathways.
- The role of cerebellum and basal ganglia in eliciting movements. Gait control mechanism.
- Visceromotor system. Control of micturition. Spinal motor reflexes.
- Energy metabolism, neuroanatomy of food intake, taste sensation and olfaction. Structure and functional significance of the reward system.
- Limbic system. Amygdala, hippocampus.
- Circadian rhythm, sleep/wake cycle; neuroanatomy of resting state and activation.
- Behaviour and motivation. Neuroanatomy of emotions, empathy, well-being, aggression, fear, anxiety and depression.
- Cognitive functions. Neuroanatomy of determination, planning, alertness together with learning&memory, personality, consciousness and creativity.

Endocrine organs

- Microscopical anatomy and development of the pituitary gland. Portal circulation
- Microscopical anatomy and development of the pineal gland
- Microscopical anatomy and development of the thyroid gland
- Microscopical anatomy and development of the parathyroid gland
- Microscopical anatomy and development of the suprarenal gland
- Histology of the islands of Langerhans

Organs of special senses

- Microscopical structure of the skin and skin appendages
- Coats of the eyeball
- Chambers of the eye, vitreous body
- Lens, accommodation

- Neuroanatomy of vision. Visual pathway, visual recognition, neuroanatomy of reading and understanding of written/text.
- External ear, tympanic membrane. Middle ear, auditory tube, hearing ossicles.
- Spiral organ of Corti. Auditory pathway. Neuroanatomy of hearing, understanding and control of speech.
- Fine structure of the labyrinth, tracts of the vestibular system. Control of balancing and posture together with the movements of the eye and head. Awareness of spatial position.

Method and type of evaluation:

Final examinations are composed of written theoretical and oral practical parts. The written theoretical examination is done using an e-learning module while the practical examination is conducted with the help of digitized histological tissue slides.

1. Written pretest (e-learning module) Every student, irrespective of the result of the written test may continue with the oral examination.
2. Microscopic Anatomy - identification of structures on digitized tissue slides - including relevant theoretical questions from the subject matter of the semester
3. One CNS question (exemptions could be earned during the semester in case the result of the 1st midterm is 4 or 5)

Students are given separate marks for each part of the examination. Unsuccessful partial examinations result in the failure of the semifinal examination. When failing at the practical part, the written test will not have to be repeated in case the result was a 4 or a 5 only. Upon the termination of the examination the Head of the Examination Committee composes the final mark from the partial marks earned in the written and practical parts.

How to register for the examination? Via the NEPTUN system

Possibilities for exam retake:

According to the Study and Examination Policy

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

List of textbooks

1. Langmann's Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
2. Histology: A Text and Atlas: With Correlated Cell and Molecular Biology; 7th Edition by MH Ross and W Pawlina ; Wolters Kluwer 2015, ISBN 9781451187427
3. Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O'Dowd and P Woodford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473
4. Stevens & Lowe's Human Histology , Elsevier, 4th ed ISBN 978-0-723435020, 2015.
5. Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.
- 6.
7. The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384
8. Histology Manual 1-3. by A. Nemeskéri and K. Kocsis: István Apáthy's Foundation, 2019.
9. A. L. Kierszenbaum Histology and Cell Biology: An Introduction to Pathology, 4th Edition, Paperback with STUDENT CONSULT Online Access and E-Book ISBN: 9780323085885; 2015
10. Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033

Further study aids:

To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology (<http://semmelweis.hu/anatomia>) or from Knowledgebase on the Library homepage: (https://lib.semmelweis.hu/knowledge_base).

MOLECULAR CELL BIOLOGY I

Institute of Biochemistry and Molecular Biology
Department of Molecular Biology
EOK Building, H-1094 Budapest, Tűzoltó u. 37-47.

Lecturer of the course: Miklós Csala MD, DSc (csala.miklos@semmelweis.hu)

Course coordinator: Gergely Keszler MD, PhD (keszler.gergely@semmelweis.hu)

Credit: 4

Number of lessons per week: lectures: 2; practicals: 2

The subject provides the foundations of modern molecular medicine, emphasizing points of interest for diagnostics, intervention and therapeutic applications. It serves as a base for several fields in medicine, such as molecular pathology, molecular diagnostics, pharmacology, gene therapy and medical biotechnology.

Prerequisites for subject registration:

Successful exams in Medical Chemistry as well as in Medical Biochemistry I.

Lectures:

1. Introduction to molecular cell biology
2. Structure and function of nucleotides and nucleic acids. Packaging of DNA into chromatin
3. Structure of the human genome 1
4. Structure of the human genome 2
5. Principles of DNA replication. Replication in prokaryotes
6. Replication in eukaryotes
7. DNA repair
8. Methods in molecular biology 1: genetic polymorphisms
9. Methods in molecular biology 2: PCR, investigation of length variations
10. Methods in molecular biology 3: Investigation of SNPs
11. Transcription in prokaryotes 1
12. Transcription in prokaryotes 2
13. Transcription in eukaryotes, mRNA processing
14. Regulation of transcription
15. Alternative ways to regulate eukaryotic gene expression
16. The genetic code, translation 1
17. The genetic code, translation 2
18. The genetic code, translation 3
19. Posttranslational modification of proteins
20. Protein folding, quality control
21. Protein targeting into metabolic compartments 1
22. Protein targeting into metabolic compartments 2
23. MicroRNAs
24. Epigenetics
25. Methods in molecular biology 4: real-time PCR
26. Methods in molecular biology 5: gene expression analysis
27. Methods in molecular biology 6: DNA cloning
28. Quality control Protein targeting into metabolic compartments
29. Protein targeting into metabolic compartments 1 Methods in molecular biology 1: genetic polymorphisms
30. Protein targeting into metabolic compartments 2 Methods in molecular biology 2: PCR, investigation of length variations
31. Proteostasis, the ubiquitin–proteasome system Methods in molecular biology 3: Investigation of SNPs
32. Mechanisms of autophagy Methods in molecular biology 4: real-time PCR
33. Molecular biology of viruses 1 Methods in molecular biology 5: gene expression analysis
34. Molecular biology of viruses 2 Methods in molecular biology 6: DNA cloning

Practicals: (4x45 min every other week):

1. Introduction, Column chromatography
2. Genotyping of a taste receptor polymorphism (PCR-RFLP I)
3. PCR-RFLP II

4. PCR-RFLP III
5. Midterm examination
6. Induction of beta-galactosidase in *E. coli*
7. Biuret test, Ellmann's reaction

Acknowledgment of the semester:

Attendance of at least 75% of the practical lessons is prerequisite of acknowledging the semester. In case of more than two missed labs the semester cannot be acknowledged and the student is not going to be allowed to sit for the terminal exam. Missed practicals can be made up only in the same week with another group; certificate of participation issued by the host teacher has to be presented by the student to his/her own teacher. However, only one make-up class can be attended during the semester. Students can collect "practical points" during the labs. These points are taken into account at the Molecular cell biology II. final exam at the end of the academic year. It is obligatory to pass the theoretical midterm in week 9 or 10.

Theoretical midterm examination

The theoretical midterm exam will take place during weeks 9–10. The midterm exam is oral; one has to pick just one question from the topic list. The examiner cannot be your own lab teacher. Passing the midterm is prerequisite of getting the signature at the end of the semester. Students earning "excellent (5)" or "good (4)" midterm marks will earn 2 or 1 practical points, respectively, to be added to the practical points collected during the semester. Failed or missed midterms can be made up twice. In case of medically certified absences one may receive any grade in the retake midterm. In the case of retaking a failed or unexcusedly missed midterm, the maximum grade one can receive is a "pass (2)".

Examination and grading system:

The oral exam is based on the topic list announced at the beginning of the semester, and it takes place before a two-member committee (examiner and co-examiner). Students pick three random questions from the DNA, RNA and Protein group of the following topic list. The exam can be passed if all three topics are sufficiently answered.

Topic list:

I. DNA

1. Chemical structure of nucleotides; primary and secondary structures of nucleic acids (DNA and various RNAs)
2. Condensation levels of DNA in the eukaryotic cells; the role of topoisomerases and chromatin proteins
3. Structure of the human genome: coding and gene regulatory sequences; non-coding genomic sequences: introns, pseudogenes, repetitive sequences
4. Principles of the semiconservative DNA replication; replication fork, leading and lagging strand
5. DNA replication in the pro- and eukaryotic cells; comparison of the enzymes, proteins involved
6. The telomere; function and significance of the telomerase; biological and medical significance of its presence or absence
7. Common types of DNA damage and repair mechanisms; DNA lesions versus mutations
8. Repair of DNA deamination
9. Formation and repair of thymine dimers
10. Formation and repair of DNA mismatch
11. Formation of spontaneous point mutations
12. Possible effects of point mutations or single nucleotide polymorphisms on the encoded proteins
13. The principles and mechanisms of PCR and real-time PCR; their application in research and medicine
14. Meaning of genetic mutations and polymorphisms and methods of their analysis (RFLP, allele-specific PCR, DNA sequencing and primer extension)

II. RNA

1. Structure and function of RNA polymerase of *E. coli*; initiation of transcription in prokaryotes; the prokaryotic transcription unit
2. Termination of transcription in prokaryotes; post-transcriptional RNA modifications in prokaryotic cells
3. Regulation of transcription in prokaryotes
4. The eukaryotic transcription unit; initiation and termination of transcription in the eukaryotic cells
5. Regulation of transcription in eukaryotes
6. Maturation of mRNA
7. Regulation of the eukaryotic gene expression by proteins binding to UTR segments of mRNA
8. Formation and regulatory functions of microRNAs in eukaryotic cells
9. Significance of DNA methylation and histone modifications
10. Alternative maturation of eukaryotic mRNA, and subsequent modifications in their coding sequence – their roles in the control of gene expression
11. DNA-binding proteins and their characteristic structural motifs with examples
12. In vitro analysis of gene expression by reverse transcription real-time PCR and DNA microarray

III. Proteins

1. The genetic code; codon-anticodon interaction; function and role of aminoacyl-tRNA synthetases
2. Structure and function of the ribosome; the ribosome cycle; role of tRNA in translation
3. Initiation of translation in pro- and eukaryotic cells
4. Regulation of eukaryotic translation; the role of eIF2 α phosphorylation
5. Elongation and termination of translation in pro- and eukaryotic cells; pharmacological inhibitors of translation
6. Post-translational modifications of collagen, membrane tethering posttranslational modifications, protein phosphorylation
7. Regulation of transcription by posttranslational modifications; glycosylation
8. Maturation and quality control of proteins; ERAD
9. Intracellular protein trafficking by gated transport
10. Intracellular protein trafficking by transmembrane transport
11. The role of genetic variations in the development of diseases, the importance and possibilities of identifying genetic factors
12. Production of recombinant DNA (cloning), and its main applications (reporter and expression vectors)

Recommended textbook

Lodish: Molecular Cell Biology (8th edition)

MOLECULAR CELL BIOLOGY II.

Institute of Biochemistry and Molecular Biology
Department of Molecular Biology
EOK Building, H-1094 Budapest, Tűzoltó u. 37-47.

Lecturer of the course: Miklós Csala MD, DSc
(csala.miklos@semmelweis.hu)

Course coordinator: Gergely Keszler MD, PhD
(keszler.gergely@semmelweis.hu)

Credit: 5

Number of lessons per week: lectures: 3; practicals: 2

The subject provides the foundations of modern molecular medicine, emphasizing points of interest for diagnostics, intervention and therapeutic applications. It serves as a base for several fields in medicine, such as molecular pathology, molecular diagnostics, pharmacology, gene therapy and medical biotechnology.

Prerequisites for subject registration:

Successful exams in Molecular Cell Biology I and Medical Biochemistry II

Lectures:

1. Control of the cell cycle 1
2. Control of the cell cycle 2
3. Control of the cell cycle 3
4. Control of the cell cycle 4
5. Programmed cell death – apoptosis 1
6. Programmed cell death – apoptosis 2
7. Molecular basis of tumorigenesis
8. Types of non-apoptotic programmed cell death
9. Proteostasis, the ubiquitin–proteasome system
10. Mechanisms of autophagy
11. Molecular biology of viruses 1
12. Molecular biology of viruses 2
13. Methods in molecular biology knock-out techniques
14. Methods in molecular biology gene therapy
15. Nuclear receptors. Transcriptional factors, DNA-binding domains
16. Signal transduction 1
17. Signal transduction 2
18. Signal transduction 3
19. Signal transduction 4
20. Intracellular signals: mTOR, AMP kinase, hypoxia
21. Mechanisms of ageing
22. Components of the cytoskeleton. Molecular motor proteins
23. Vesicular transport. Mechanisms of exo- and endocytosis
24. Formation of the metabolome of cellular compartments 1
25. Formation of the metabolome of cellular compartments 2
26. Endoplasmatic and mitochondrial stress response
27. Extracellular matrix, tissue architecture, adhesion molecules
28. Methods in cell biology (cell cultures, cell fractionation, in vivo microscopy)

Practicals: (4x45 min every other week):

1. Molecular cloning and in vitro protein synthesis 1: recombinant DNA construction, bacterial transformation
2. Molecular cloning and in vitro protein synthesis 2: analysis of the DNA construct, in vitro mRNA synthesis
3. Molecular cloning and in vitro protein synthesis 3: protein expression by in vitro translation
4. Purification of a bacterially expressed protein by affinity chromatography
5. Theoretical midterm exam
6. SDS-page and western blot
7. Analysis of subcellular fractions

Acknowledgment of the semester:

Attendance of at least 75% of the practical lessons (i.e. not missing more than two labs) is prerequisite of acknowledging the semester. It is also obligatory to pass the theoretical midterm exam (see below).

Theoretical midterm examination

The theoretical midterm exam will take place during weeks 9–10. The midterm exam is oral; one has to pick just one question from the topic list. The examiner cannot be your own lab teacher. Passing the midterm is prerequisite of getting the signature at the end of the semester. Students earning “excellent (5)” or “good (4)” midterm marks will earn 2 or 1 practical points, respectively, to be added to the practical points collected during the semester. Failed or missed midterms can be made up twice. In case of medically certified absences one may receive any grade in the retake midterm. In the case of retaking a failed or unexcusedly missed midterm, the maximum grade one can receive is a “pass (2)”.

Practical midterm examination

An optional, written practical midterm online Moodle test can be taken at the end of the semester. The test consists of 20 questions (each question worth 1 point) covering the experiments performed in the 1st and 2nd semesters. The questions are to be answered in the (random) order as they appear; i.e. it is not possible to page back or forth. Performance at the laboratory activity during both semesters and theoretical midterm scores are also taken into account in the evaluation. Scores earned in the practical midterm (max. 20) will be added to the max. 6–6 practical points and max. 2–2 theoretical midterm points that could be collected during both semesters. Students who have earned at least 25 points (out of a possible maximum of 36) will receive exemption from the practical topics in the comprehensive exam.

Examination and grading:

The oral exam is based on the topic list announced in the beginning of the semester, and it takes place before a two-member committee (examiner and co-examiner). Students pick five random questions from each group of the following topic list. The exam can be passed if all five topics are sufficiently answered. Students who have achieved at least 25 practical points during the two semesters, receive a bonus: no practical question has to be answered. This bonus is valid during the whole exam period (in case of a retake exam), as well as in the next semester (in a “CV”-course).

Topic list

I. DNA and RNA

1. Chemical structure of nucleotides; primary and secondary structure of nucleic acids (DNA and different types of RNA)
2. Condensation of the genetic material in pro- and eukaryotic cells; the role of topoisomerases and chromatin proteins
3. Structure of the human genome: coding and regulatory sequences; noncoding genomic sequences: introns, pseudogenes, repetitive sequences
4. The role of genetic variations in the pathogenesis of diseases; methods to study genetic factors
5. Principles of the semiconservative DNA replication; replication fork, leading and lagging strand synthesis
6. Comparison of DNA-replication in pro- and eukaryotes
7. Telomeric repeat sequences: replication of the telomeric regions of eukaryotic chromosomes; functions and importance of the telomerase
8. The most important types of DNA damage; repair of base deamination
9. Formation and repair of thymine dimers; mismatch repair
10. Types of point mutations; mechanisms of their development; possible effects of DNA sequence variations on the corresponding protein
11. Structure and function of the RNA-polymerase of E. coli; initiation and termination of transcription in prokaryotes
12. Characterization, role and synthesis of different types of RNA
13. Regulation of transcription in prokaryotes, definition of operon; positive and negative regulation
14. Structure of the eukaryotic genes, initiation and termination of transcription in eukaryotes
15. Regulation of the transcription in eukaryotes
16. Processing of the eukaryotic mRNA

17. Function and application of PCR and real-time PCR
18. Methods for the investigation of genetic mutations and polymorphisms (RFLP, allele-specific PCR, DNA-sequencing and primer extension)
19. Generation and application of recombinant DNA, reporter- and expression vectors

II. Post-transcription

1. Regulation of eukaryotic gene expression at post-transcriptional level (alternative splicing, RNA editing, regulation of RNA stability, RNA quality control)
2. Regulation of eukaryotic gene expression by RNA interference (miRNA, siRNA)
3. Epigenetic regulation of eukaryotic transcription: the role of DNA methylation and histone modifications
4. The genetic code; structure and function of tRNAs; aminoacyl-tRNA synthetases; codon-anticodon connections
5. The structure of prokaryotic and eukaryotic ribosomes; the ribosome cycle; binding of tRNA to ribosomes
6. Initiation of the translation in pro- and eukaryotes; regulation of eukaryotic translation; the role of phosphorylation of eIF2 α
7. Elongation and termination of pro- and eukaryotic translation; pharmacological inhibitors of translation
8. Post-translational modifications of proteins
9. Types, structure and synthesis of collagen
10. Investigation of gene expression by real-time PCR and DNA-microarray methodology
11. Definition of proteostasis; types of intracellular protein degradation
12. Structure and function of the proteasome; role of immune-proteasome and TAP
13. Types, mechanism and role of autophagy
14. Lytic and lysogenic replication cycles of bacteriophages
15. Classification of animal viruses; structure and replication of retroviruses
16. Principles of human gene therapy (in vivo vs. ex vivo methods, gene augmentation, CRISPR/Cas9 system)
17. Biomedical application of genetic engineering processes (transgenic animals; knock-out, knock-in and knock-down techniques; cloning)

III. Signal transduction and cell cycle

1. Nuclear receptors: steroid, thyroid, retinoid and Ah receptors
2. Classification and function of membrane receptors
3. Types and functions of GTP-binding proteins in signaling
4. Activation mechanisms of serine / threonine protein-kinases with examples
5. cAMP signaling pathway; regulation of gene expression by cAMP
6. Phosphatidylinositol signaling pathways
7. NF κ B and TGF β signaling
8. Structure and function of tyrosine kinase receptors, the Erk1 / Erk2 MAP kinase cascade
9. Insulin signaling
10. Integrating role of mTOR, and its effects on translation
11. Role of AMPK in the regulation of the metabolism and autophagy

12. Mechanisms of cellular oxygen sensing; adaption to hypoxia
13. Regulation of the cell cycle in the G1 phase, transition to S phase
14. Regulation of the cell cycle in the G2 and M phases
15. Molecular sensors detecting DNA damage and completion of DNA replication during the cell cycle
16. Molecular background of tumor generation
17. Structure and function of the apoptosome, DISC and PIDosome complexes
18. Members of the Bcl-2 superfamily and their roles in various apoptotic pathways, the „survival signal“
19. Function and activation of apoptotic caspases, role of granzyme B
20. Types of non-apoptotic programmed cell death
21. Regulation of p53 levels and activity; role of p53 in determining the cell's fate
22. Molecular mechanisms involved in aging

IV. Cell Biology

1. Principles of the organization of the eukaryotic cells; compartmentation; main features of subcellular organelles
2. Structure of cytoskeleton; structure and function of motor proteins
3. The protein secretory pathway; role of the rab cycle in the regulation of vesicular transport
4. Endo- and exocytosis
5. Formation of the proteome of subcellular organelles; principles and mechanisms of protein sorting
6. Protein targeting in the secretory pathway
7. Protein targeting into mitochondria and peroxisomes; uptake of substrates into lysosomes
8. Nuclear import and export of macromolecules
9. Endoplasmic reticulum stress, connection between the Unfolded Protein Response (UPR) and apoptosis
10. Protein quality control in the endoplasmic reticulum; the fate of misfolded proteins; ERAD
11. Characteristics of the proteome of subcellular organelles; maintenance of the internal milieu of subcellular organelles
12. Role of the extracellular matrix in signal transduction (e.g., integrin receptors), role of the extracellular matrix in the formation of metastasis
13. Methods in cell biology: cell culturing, cell fractionation, in vivo microscopy, flow cytometry, FACS

V. Lab

1. Quantification of proteins by biuret reaction and Ellmann-method
2. Investigation of subcellular cell fractions
3. Investigation of the gene expression in prokaryotes: induction of β -galactosidase in E. coli
4. Purification of a bacterially expressed protein by affinity chromatography
5. SDS-polyacrylamide gel electrophoresis and Western blot
6. In silico tools in molecular biology
7. Genotyping of the TAS2R38 tasting receptor by PCR-RFLP
8. Analysis and generation of a recombinant DNA
9. In vitro transcription and translation

PHYSICAL EDUCATION III.

Department of Physical Education

Subject: Physical Education III.

Type of Subject: Obligatory

Credit: 1

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

The syllabus

1st Week: General information

Health and Safety, Fire and Environmental protection. The mid-year adoption requirements, the construction of the classes and the presentation of the university recreational and sports opportunities for extra – curricular activities. Heart rate measurement exercises. Ruffier test and evaluation of the results.

2nd Week: Athletic

Different athletic exercises like throwing, shot put. Preferably outdoors with the aim of learn how to execute the exercise with a proper form and breathing technique.

3rd Week: Tennis

Introducing and learning advanced technical elements (serve, volley) and game.

4th Week: Agility ladder

To perform different exercises to improve speed, balance and concentration. Preferably outdoors, on grass ground.

5th Week: Relay race and competitive games

To improve explosiveness, skills and experience good team spirit.

6th Week: Football

Practicing the technical elements of football in pairs and game situation.

7th Week: Circuit training

Functional exercises with bodyweight and exercises with basic equipments to improve general coordination skills.

8th Week: Badminton

Introducing the technical and tactical elements of doubles game. Game applying all the previously known rules.

9th Week: Completing a practical exercise

10th Week: Meta

Reminders of the basic need to know about META. Learn tactical elements of the game and using them. Aim to improve ball skill development, reaction time, explosiveness and collective gaming experience.

11th Week: Obstacle course

To complete a built up obstacle course using different creeping-climbing, hovering, pulling, skipping, throwing techniques for general skill development.

12th Week: Mobilisation

Dynamic stretching exercises with and without equipment to prevent the health of the joints by maintaining and developing the mobility of it.

13th Week: Skipping rope

Skill developing exercises with skipping rope individually and in pairs, in place and in motion at different levels.

14th Week: Kettlebell

Different kind of strengthening exercises with kettlebell.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./week sport training (competitive sport, for qualified only): cheerdance, cheerleader, men's football, handball, basketball, volleyball)

Requirements to participate in the sessions and the potential for absences:

Active participation in sport classes.

The method of proof for the workshops and the exam absence:

The absence can not be proved, should make up for the lost lessons.

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

Active participation in ten classes (for trainings 15 times!) approved by the staff.

How to prove absence regarding the exam:

Absence must be retaken!

PHYSICAL EDUCATION IV.

Type of Subject: Obligatory

Credit: 1

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

1st week: General information

Accident, fire and environmental knowledge. Requirement for acceptance of the semester system, the structure of the classes and the presentation of the university recreational sports opportunities for extra-curricular activities.

2nd week: Basketball

Dribbling and shooting skill improving drills. Games: 1 on 1; 2 on 2; shooting contests, king of the court. Scrimmage.

3rd week: Wall-bar exercises

Enhance strength and balance by climbing, declining, hanging, skipping, pulling, pushing etc. exercises.

4th week: Circuit training

A chain of compete drills in a certain time period with and without equipment. The aim is to improve the general level of strength and stamina.

5th week: Floorball

Passing and receiving skill improving drills. Exposing shots on goal (wrist- slap- and snapshots). Scrimmage.

6th week: Drills in pairs

Strength, agility, coordination and battling skill improving exercises with a partner incorporated.

7th week: Volleyball

Introducing the defensive elements of the game (receiving serves, blocks). Exposing unknown rules. Games.

8th week: Game-day

Introducing and practicing different kind of cohesion enhancing games (Tick-Tac-Toe, etc.)

9th Week: Completing a practical exercise

10th week: Circuit training

Specialized chain of drills for strengthen the shoulder, back, chest, arm and leg muscles, considering the fitness level of the Students.

11th week: Tennis

Introducing variations of ground strokes and grip types (slice, topspin, lobs etc.) Exposing the rules of doubles. Games (all around the world, etc.)

12th week: Badminton

Exposing the rules and the basic tactical elements of the doubles game. Scrimmage.

13th week: Core exercises

Body-weight exercises targeting to strengthen the muscles of the trunk thus develop a strong fascia to protect it from the harmful effects of overdose sitting (studying)

14th week: Medicine-ball exercises

Strength and coordination (complex) skill developing exercises by throwing, rolling, passing, lob, shot-put, etc. with a partner incorporated.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2×90 mins./week sport training (competitive sport, for qualified only): cheerdance, cheerleader, men's football, handball, basketball, volleyball)

Requirements to participate in the sessions and the potential for absences:

Active participation in sport classes.

The method of proof for the workshops and the exam absence:

The absence can not be proved, should make up for the lost lessons.

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

Active participation in ten classes (for trainings 15 times) approved by the staff.

How to prove absence regarding the exam:

Absence must be retaken!

MEDICAL MICROBIOLOGY I.

Institute of Medical Microbiology

Program Director: Prof. Dr. Dóra Szabó

Tutor: Dr. Ágoston Ghidán

Second Semester

Week	Lectures (2 hours per week)
1.	Introduction. General information about the tuition. The place of Medical Microbiology among natural sciences, its significance, sub-fields and short history. Fundamentals of the morphology, physiology and genetics of bacteria.
2.	Pathogenic nature and virulence of bacteria. Pathomechanism, molecular pathogenesis, virulence factors. Infection and disease.
3.	Defence mechanisms of the host against infections. Active and passive immunisation. Vaccines.
4.	Antibacterial drugs: Modes of action and interactions of antibacterial drugs. Principles and practice of the antibacterial chemotherapy. Origin, mechanisms, induction, transfer, spreading, elimination and control of resistance of bacteria against antibacterial drugs
5.	Introduction to the classification of medically important bacteria: fundamentals of taxonomic, epidemiological, nosological, as well as pathogenetical classification. Gram-positive non-spore forming rods: <i>Corynebacterium</i> , <i>Listeria</i> , <i>Erysipelothrix</i> , <i>Lactobacillus</i> Normal flora of the vagina.
6.	Gram-positive aerobic cocci: <i>Streptococcus</i> and <i>Staphylococcus</i> genus. Normal flora of the skin.
7.	Gram-negative aerobic and microaerophilic cocci and coccobacilli: <i>Neisseriaceae</i> , <i>Pasteurellaceae</i> , <i>Haemophilus</i> genus Normal flora of the upper respiratory tract.
8.	Gram-negative aerobic rods and coccobacilli: <i>Pseudomonas</i> , <i>Legionella</i> , <i>Brucella</i> , <i>Bordetella</i> , <i>Francisella</i> genus.
9.	Gram-negative facultative anaerobic rods Normal flora of the gastrointestinal tract. Extraintestinal diseases caused by Gram-negative enteric bacteria. Pathogens of the gastrointestinal tract I: <i>Vibrio</i> , pathogenic <i>Escherichia coli</i> , <i>Campylobacter</i> , <i>Helicobacter</i> .
10.	Pathogens of the gastrointestinal tract II: <i>Yersinia</i> (yersiniosis), <i>Shigella</i> (shigellosis), <i>Salmonella</i> (salmonellosis). The enteric fever (<i>Salmonella typhi</i> and <i>paratyphi</i>), as well as <i>Yersinia pestis</i> .
11.	Gram positive aerobic and anaerobic spore-forming bacteria: <i>Bacillus</i> and <i>Clostridium</i> genus Obligate anaerobic bacteria and associated infections: Gram-positive: <i>Peptostreptococcus</i> , <i>Propionibacterium</i> , <i>Eubacterium</i> , <i>Bifidobacterium</i> , <i>Arachnia</i> , Gram-negative: <i>Veillonella</i> , <i>Bacteroides</i> , <i>Fusobacterium</i>
12.	Acid-fast bacteria: <i>Mycobacterium</i> , <i>Nocardia</i> , <i>Actinomyces</i>
13.	Spirochaetales: <i>Treponema</i> , <i>Borrelia</i> , <i>Leptospira</i> .
14.	Rickettsiales, Chlamydiales, Mycoplasmatales

Second Semester

Week	Bacteriology Practicals (2 hours per week)
1.	Introduction. Rules and instrumentation of the safe handling of microbes. Safety in the laboratory. Basic microbiological methods I: Microscopic examinations.
2.	Basic microbiological methods II: Cultivation of bacteria and biochemical activity of bacteria
3.	Basic microbiological methods III: Sterilisation. Disinfection
4.	Basic microbiological methods IV: Susceptibility of bacteria to antimicrobial drugs
5.	Basic microbiological methods V: In vitro immunological reactions
6.	Midterm examination I. and Systematic bacteriology I: Identification of Gram-positive aerobic rods
7.	Systematic bacteriology II: Identification of Gram-positive cocci: Staphylococcus
8.	Systematic bacteriology III: Identification of Gram-positive cocci: Streptococcus
9.	Systematic bacteriology IV: Identification of Gram-negative cocci and coccobacilli, and Gram negative aerobic rods
10.	Systematic bacteriology V: Identification of Gram-negative facultative anaerobic rods
11.	Systematic bacteriology VI: Identification of the aerobic and anaerobic spore-forming bacteria, as well as the obligate anaerobic and microaerophilic bacteria
12.	Midterm examination II. and Systematic bacteriology VII: Identification of irregular Gram-positive rods
13.	Systematic bacteriology VIII: Spirochaetes
14.	Systematic bacteriology IX: Rickettsiae, Chlamydiales and Mycoplasmatales



Faculty of Medicine

3rd year

FACULTY OF MEDICINE

PRECLINICAL MODULE

STUDY PROGRAMME

Third year in the 2025/2026 academic year

5th Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
Clinical ECG	AOKKAR680_1A	1		2				3	Medical Biophysics II	examination
Internal Medicine – Propedeutics	AOKBHK1111_1A, AOKBOK1112_1A	0		3				3	Medical Physiology II OR Medical Genetics and Immunology II, Macroscopic Anatomy and Embryology II, Introduction to Patient Care	examination
Medical Microbiology II.	AOKMIK022_2A	1.5		2				3	Medical Microbiology I	comprehensive examination
Medical Statistics, Informatics and Telemedicine	AOKFIZ974_1A	1		1.5				2	Medical Biophysics II	examination
Pathology I	AOKPIB1110_1A, AOKPTK1109_1A	4		4				8	Medical Physiology II, Macroscopic Anatomy and Embryology II, Microscopic Anatomy and Embryology II	examination
Pharmacology I	AOKFRM1108_1A	2		3				5	Medical Microbiology I, Molecular Cell Biology II, Medical Physiology II	examination
Physical Education V	AOKTSI009_5A	0		1				0	Physical Education (PE) III *	signature
Translational Medicine and Pathophysiology I.	AOKTLM740_1A	1.5		1.5				3	Medical Physiology II, Macroscopic Anatomy and Embryology II, Medical Biochemistry II	examination

6th Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
Basic Surgical Techniques	AOKKMI.....1A	0.6		1.5				2	Medical Physiology II, Macroscopic Anatomy and Embryology II	examination
Medical Ethics, Bioethics and Medical Law	AOKMAG1195_1A	2						2	Medical Psychology, Medical Sociology	examination

LIST OF TEXTBOOKS (The list may change!)

- 1 Bickley, L.S.: Bates' Guide to Physical Examination and History Taking. 12th ed. Wolters Kluwer, 2016.
- 2 Murray, Rosenthal, Kobayashi, Pfaller: Medical Microbiology. 9th ed. Elsevier, 2020
- 3 Robbins: Basic Pathology, 2008. V. Kumar, A. K. Abbas, N. Fausto, R. Mitchell Saunders; 8 edition
- 4 Szende B, Suba Zs.: Introduction to Histopathology. Bp. Medicina, 1999.
- 5 Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0
- 6 Owen, Punt, Stranford, KUBY Immunology · W. H. Freeman and Company · New York · 2013; International Edition ISBN-13: 978-14641-3784-6; ISBN-10: 1-4641-3784-6

Recommended textbooks:

- 1 Kumar & Clark's Clinical Medicine. Ed. Feather, Randall, Waterhouse. Elsevier, 10th ed. 2020. ISBN 9780702078682
- 2 Harrison's Principles of Internal Medicine. Ed. Jameson, Fauci, Kasper, Hauser, Longo, Loscalzo. 20th ed. McGraw Hill Inc. 2018
- 3 William J. Marshall, Stephen K. Bangert: Clinical Chemistry. 5th ed. Elsevier Health Sciences 2004. ISBN: 0723433283.
- 4 H. Theml, H. Diem, T. Haferlach: Color Atlas of Hematology 2nd ed. Georg Thieme Verlag 2004. ISBN: 9783136731024
- 5 N. Goldschlager et al.: Principles of Clinical Electrocardiography. 3rd ed. 1989. Appleton and Lange ISBN: 0-8385-7951-5.
- 6 Mahta, Atul B. Hoffbrand, A. Victor: Haematology at a Glance 2nd ed. Blackwell Publishing 2005. ISBN: 1405126663
- 7 Carl A. Burtis: Tietz Textbook of Clinical Chemistry. W.B. Saunders 3rd 1999 ISBN 0721656102
- 8 Carl A. Burtis: Tietz Fundamentals of Clinical Chemistry. WB. Saunders 5th 2001 ISBN 0721686346
- 9 Davis et al.: Clinical Laboratory Science. (Strategies for Practice.) 1988. Lippincott-Raven Cldh Text. ISBN: 0-397-50860-3
- 10 E. Rubin-J.L. Farber: Pathology (J.B. Lippincott 1994). – 3rd edition (1999)
- 11 Nemes Z.: Atlas of Histopathology (TEMPUS edition, Debrecen 1998)
- 12 C.P.L. Wheater, H.G. Burkitt, Stevens J.S. Lowe: Basic Histopathology, a Colour Atlas and Text. (Churchill Livingstone; 4th Rev Ed edition, 2002)
- 13 Zaladni A.: 500 Practice Questions about Pathology (Semmelweis University of Medicine)
- 14 Illyés Gy.: Path Nebulo 2000. Version 1.0 (English-Hungarian)
- 15 Székely E.: Practice on Histopathology I-II. (Semmelweis University of Medicine) - video

CLINICAL ECG

Semmelweis University, Faculty of Medicine

Name of the managing institute (and any contributing institutes):
Heart and Vascular Center
Institute of Translational Medicine

Credit value: 3

Weeks 1–7:

Total number of lessons/week:

4 lecture: 2 practical course: 2 seminar: 0

Weeks 8–14:

Total number of lessons/week:

2 lecture: 0 practical course: 2 seminar: 0

Subject type: obligatory course

Academic year: 2021/2022

Name of the course leader: Zoltán Benyó MD, PhD, DSc (weeks 1-7)

His/her workplace, phone number: Institute of Translational Medicine, 210-0306

Position: director, professor

Date and registration number of their habilitation: 2008, 259

Name of the course leader: Dávid Becker MD, PhD, (weeks 8-14)

His/her workplace, phone number: Heart and Vascular Center, +36-1-458-10

Detailed curriculum:

Weeks 1–7, lectures (2-45 min):

Week	Translational Medicine (45 min)	Cardiovascular Center (45 min)
1	The concept and classification of arrhythmias. Mechanisms of origin of tachyarrhythmias.	Examination of a patient with supraventricular tachycardia. Differential diagnosis of narrow QRS tachycardias.
2	Classification of conduction disorders, mechanisms of bradyarrhythmias	The practical significance of impulse formation and conduction disorders
3	Repolarization disorders. ECG signs of different forms of ischaemic heart disease.	The role of ECG in the investigation of chest pain pathologies and its role in risk stratification.
4	Ventricular arrhythmias	Differential diagnosis of wide QRS tachycardias. Detection of ventricular tachycardias, ECG criteria.
5	Basics of pacemaker systems	ECG of a patient with pacemaker
6	Cases with multiple abnormalities	Description of complex ECGs, ECG differential diagnostics.
7	Cases to learn from	Revision

Weeks 1-7, practicals:

- ECG lead systems, nomenclature. Analysis of normal ECG tracings. Estimation of frequency and heart axis. The ladder diagram.
- Recognition of nodotopic and heterotopic pacemaker disturbances, supraventricular and ventricular tachycardias on ECG tracings.
- Recognition of SA, AV and intraventricular conduction disturbances. Aberrant conduction.
- Angina and NSTEMI. Localization and staging of ST-elevation infarcts.
- Recognition of electrolyte abnormalities, atrial and ventricular strain and hypertrophy.
- Recognition and practice of multiple abnormalities.
- Mid term exam

Weeks 8-14, practicals:

During the practicals, theoretical knowledge is correlated with clinical practice at the bedside of the wards of the Heart and Vascular Center, and ECG curves of patients are analyzed.

From week 14 – end of the exam period: Examination (written)

Position: deputy director

Date and registration number of their habilitation: 2020, 02

Objectives of the subject, its place in the medical curriculum:

The aim of the subject is to prepare students for the courses in cardiology and internal medicine.

The student should be able to recognize the conditions requiring immediate cardiac intervention and the most important arrhythmias.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Nagyvárad square Building, 1089 Bp. Nagyvárad tér 4. (weeks 1–7: lectures and practicals)

Heart and Vascular Center, 1122 Budapest, Városmajor u. 68. (weeks 8–14: practicals)

Successful completion of the subject results in the acquisition of the following competencies:

The student will be able to independently record an ECG and give a professionally correct description of a 12-lead ECG at rest. He/she will be able to estimate basic parameters, identify abnormalities and list clinical conditions that may cause the abnormalities described. Of particular importance is the ability to recognize ST-elevation myocardial infarction, atrial fibrillation and arrhythmias requiring acute intervention.

Course prerequisites:

biophysics, physiology

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

biophysics, physiology, cardiology

Special study work required to successfully complete the course:
none

Requirements for participation in classes and the possibility to make up for absences:

Students can miss two practices, above that they have to make up. It is not possible to make up lectures, but you can make up the practicals in another group in the same week.

Methods to assess knowledge acquisition during term time:

An oral mid term of the material from the basic course (first 6 weeks) in week 7 (analysis of ECG tracings. Attendance is obligatory.

Requirements for signature:

Successful (at least satisfactory) oral demonstration (as the subject is taught by two different departments).

Type of examination:

Written MCQ test

Requirements of the examination:

Recognition of attendance

Method and type of evaluation:

Grading is based on performance in the written test.

How to register for the examination:

through the Neptun system

Possibilities for exam retake:

In accordance with the study and examination regulations

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

1. Thaler, Malcolm S.: Az egyetlen EKG-könyv, amire szükség lehet, Medicina Kiadó, 2019
2. Malcolm S. Thaler: The Only EKG Book You'll Ever Need, Wolters Kluwer, 2019
3. Trappe, Hans-Joachim, Schuster Hans-Peter: EKG-Kurs für Isabel, Thieme, 2013
4. Simon András-Tornóci László: EKG érthetően (munkafüzet), Semmelweis Kiadó, 2015
5. Simon András-Tornóci László: Understanding ECG (workbook), Semmelweis Kiadó, 2016

INTERNAL MEDICINE - PROPEDEUTICS

First (Groups 10-18) or Second (Groups 1-9) Semester

Department of Internal Medicine and Oncology
Department of Internal Medicine and Hematology

Course directors: *prof. István Takács* and *prof. Tamás Masszi*

Course coordinators: *dr Péter Studinger* and *dr Katalin Keltai*

Exam type: oral exam

Credit: 3

Objective of the course: The primary objective of Internal Medicine Propedeutics is to acquire clinical proficiency in two relevant areas: health history and physical examination. During bedside practices students learn how to interview a patient and take the health history. They are introduced to and practice the techniques of physical examination, and they experience and interpret the common and typical findings in health and in diseases. By learning the essential elements of the diagnostic process, Internal Medicine Propedeutics is a fundamental discipline not only for Internal Medicine but all clinical fields of medicine.

Completion of the course enables medical students to take medical history from an adult patient, to conduct a comprehensive physical examination and to interpret and summarize the findings in a medical document. Students also learn how to develop a professional physician-patient relationship. After completion of the course, students have the opportunity to improve their knowledge during the obligatory Summer Practice.

Requirements for signature: Participation on at least 75% of all sessions. At the end of the course, after the student has taken his/her attendance sheet to the secretariat, the Course Director grants credits to students in the Neptun system.

Practices:

1. Introduction to medicine. Patient interview and health history
2. Approach to symptoms, patient documentation (patient chart, flowsheet, follow up)
3. Methods of physical examination: inspection, palpation
4. Methods of physical examination: percussion, auscultation
5. Practicing physical examination of the thorax and lung I.
6. Practicing physical examination of the thorax and lung II.
7. Practicing physical examination of the heart I.
8. Practicing physical examination of the heart, ECG evaluation.
9. Practicing blood pressure and pulse measurement, evaluation of the vascular system
10. Practicing physical examination of the abdomen I.
11. Practicing physical examination of the abdomen II.
12. Practicing evaluation of changes in body temperature and examination of the urogenital system. Bedside blood glucose measurement.
13. Practicing physical examination of the musculoskeletal system, breasts and lymph nodes.
14. Summary and review

Type of examination: end-term (semi-final) oral examination. The exam has two parts: bedside patient examination followed by answering two questions from the topic list.

During bedside patient examination the student is required to demonstrate the acquired skills in taking medical history and physical examination as well as interpret the findings.

The oral question part allows the student to demonstrate lexical knowledge.

A grade from 1 (fail) to 5 (excellent) is given, that is the mean of the three scores obtained for the oral and bedside patient examination.

Topic list for the oral questions

1. Components of a comprehensive patient interview, medical history.
2. Significance of inspection in the physical examination.
3. Pulmonary findings during auscultation.
4. How to differentiate pneumonia, pleural effusion, bronchitis, asthma pneumothorax with physical examination.
5. Physical signs of dispoene, their causes and differentiation.
6. Rules of auscultating the heart, heart sounds and murmurs.
7. Systolic murmurs.
8. Diastolic murmurs.
9. Diagnosing mitral stenosis with physical examination.
10. Diagnosing mitral insufficiency with physical examination.
11. Diagnosing aortic stenosis with physical examination.
12. Diagnosing aortic insufficiency with physical examination.
13. Physical signs and symptoms a circulatory failure.
14. Physical examination of the large vessels, arteries and veins.
15. Measuring body temperature, types of fever.
16. Significance of changes in complete blood count and differential count.
17. Signs of iron deficiency.
18. Palpation of the spleen, causes of splenomegaly.
19. Examination of the lymph nodes. Causes of lymphadenomegaly.
20. The significance of scoring performance status in oncological diseases.
21. Methods and significance of assessing bone mineral density.
22. Methods of examining the urogenital system. Signs of urinary tract infection.
23. Palpation and auscultation of the abdomen. Abnormal findings.
24. Diagnosis of acute abdomen, list possible causes.
25. Physical findings in patient with ascites.
26. Physical examination of the liver.
27. Signs and symptoms of gall bladder stones, examination methods.
28. Signs and symptoms of acute and chronic cholecystitis, examination methods.
29. Signs and symptoms of acute and chronic pancreatitis, examination methods.
30. Signs and symptoms of diseases of the small and large intestine, examination methods.
31. Diagnosis of acute appendicitis.
32. Signs and types of ileus.
33. Physical signs and symptoms of endocrine diseases.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Lynn S. Bickley: Bates' Guide to Physical Examination and History Taking. (Wolters Kluwer, 12th ed., 2016.) ISBN: 9781469893419

MEDICAL MICROBIOLOGY II.

Institute of Medical Microbiology

Program Director: **Prof. Dr. Dóra Szabó**

Tutor: **Dr. Ágoston Ghidán**

Second Semester

Week	Lectures (1,5 hours per week)
1.	Medical Mycology
2.	Medical Parasitology – 1
3.	Medical Parasitology – 2
4.	Medical Parasitology – 3
5.	General Virology
6.	• DNA viruses – 1 Adenoviruses, Herpesviruses
7.	• DNA viruses – 2 Pox-, Parvo- and Papillomaviruses
8.	• RNA viruses – 1 Orthomyxo-, Paramyxo- and Togaviruses
9.	• RNA viruses – 2 Arbo- and Roboviruses
10.	• RNA viruses – 3 Polio-, Rota-, Calici- and Astroviruses
11.	Hepatitis viruses
12.	Retro viruses. AIDS. Viral oncogenesis
13.	• Slow viruses and Prions. Control of viral diseases. Antiviral chemotherapy
14.	• Iatrogenic and Nosocomial infections

Week	Practicals (2 hours per week)
1.	Medical Mycology
2.	Medical Parasitology – 1 Amoebas, Flagellata
3.	Medical Parasitology – 2 Plasmodia, Toxoplasma, Cryptosporidium
4.	Medical Parasitology – 3 Helminthes
5.	General Virology
6.	DNA viruses
7.	RNA viruses
8.	Midterm exam II.
9.	Clinical Bacteriological Diagnosis – 1: Skin, wound and eye infections
10.	• Clinical Bacteriological Diagnosis – 2: Respiratory tract infections
11.	• Clinical Bacteriological Diagnosis – 3: Infections of the uro-genital tract. Abdominal and Enteral infections. Sexually transmitted diseases
12.	• Clinical Bacteriological Diagnosis – 4: Bacteraemia, sepsis, endocarditis, meningitis
13.	Summary and review
14.	Practical exam

MEDICAL STATISTICS, INFORMATICS AND TELEMEDICINE

lecture 1 hour/week practice 1.5 hour/week

2 credits

Tutor: Dr Dániel Sándor Veres

week	lecture topic	practice topic
1	Principles of quantitative medicine.	Introduction. Data types. Introduction to data types.
2	Summary of data: descriptive statistics	Graphical representation of data and interpretation of plots I. Plotting frequencies: visualization of samples with a large number of elements on a histogram, bar plot.
3	Event, probability, distribution.	Graphical representation of data and interpretation of plots II. Box plots, scatter plot, mosaic plot. Outliers. Interpretation of percentile curves. Descriptive values. Determination of descriptive values from a large sample size.
4	Estimations.	Distributions. Using binomial distributions. Using normal distributions.
5	Principles of hypothesis testing in medical practice.	Reference interval. Approximate calculation for normal distribution. Interpretation. Confidence intervals. Simple calculation of the confidence interval of mean. Interpretation.
6	T-tests; chi-square tests. Multiplicity.	Hypothesis tests. Logic of hypothesis tests.
7	Correlation. Simple linear regression.	Hypothesis test and confidence interval calculation on difference between two ratios. Chi-square tests, Fisher exact test. Confidence interval of difference between two ratios.
8	Arguing.	Hypothesis test and confidence interval on difference of means. Student t-tests. Making t-tests. Interpretation of effect size, confidence interval and p-value. Multiplicity. Examples for multiple testing.
9	Confounding, biases. Linear regression as a tool against confounding	Correlation, regression. Interpretation of correlation coefficient. Making simple linear regression, interpretation of the slope.
10	Evaluation of diagnostic tests.	Regression models. Interpreting the results of regression models.
11	Statistical concepts in epidemiology. Prevalence, incidence, risk, odds. ROC curves. Likelihood ratios.	Diagnostic tests I. Diagnostic tests.
12	Communication with a statistician. Sample size. Data tables. Survey tips.	Diagnostic tests II. Odds, OR, RR. Likelihood ratios.
13	Introduction to medical decision theory, Bayesian theory: a priori and a posteriori distributions, learning model.	Preparing data. Organizing data tables.
14	Databases, expert systems, AI supported diagnostics, BigData.	Possibility to write an exam test.

PATHOLOGY I-II.

Department of Pathology and Experimental Cancer Research

Head of Department: **Prof. Dr. András Matolcsy**

Program Director: **Prof. Dr. Csaba Bödör**

Tutor: **Dr. Gergely Rácz**

Credit value: 8

Weeks 1-14: Total number of lessons/week: 8 lecture: 3 practical course: 5 seminar: 0

Subject type: obligatory course

Academic year: 2025/2026

Index

- General information - Lectures, practices, pathology competition
- Examinations: Semifinal
- Examinations - Final
- Schedule per day
- Schedule for the lecture and practice content per week
- List of textbooks
- Contact list of Tutors

General information

Objective of instructions and its place in the curriculum

The aim of teaching the pathology subject is to familiarize the students with pathological changes and the pathomechanism of diseases. In the course of the training, students get to know the examination methods and diagnostic procedures of pathology and gain insight into clinicopathological thinking. The training takes place in the form of classroom lectures, clinicopathological practices, histology, autopsy and organ demonstration practices.

Lectures

The topic of the lectures includes both general and systemic pathology. Each lecture lasts 1 hour 15 minutes and is illustrated with board layouts, ppt. macroscopic and microscopic photographs, radiologic images, interesting autopsy cases illustrating the presented material. Knowledge of the development and course of diseases, knowledge of the nomenclature of diseases, recognition and knowledge of basic histopathological and macroscopic changes, knowledge of clinicopathological correlations.

Attendance of the lectures is not mandatory, but the lectures are part of the material that can be counted in the exams.

Practices

There are 14 two practice hours (1.5 hours) practices in both semesters, which are divided into histopathology and autopsy. There are 14 one hour (45 min.) additional plenary clinicopathology practice every week on Friday in the Lecture Hall.

The histopathology practices provide basic histopathology skills.

The topic of the histopathology practices matches that of the lectures. Brief theoretical background for the presented slides will be discussed in the frame of the practice. The pathological lesions will be presented in form of digital slides and will be demonstrated by the tutor with the help of a computerized multidiscussion/teleconsultation system. The digitalized slides will be individually studied and analyzed by the students as well. The digital slides are also available for the students through the internet any time (<https://www.3dhistech.com/solutions/digital-pathology-rx/>)

The preserved preprepared specimens connected the actual material will be demonstrated during the histopathology practices.

During autopsy practices the students will learn the basic skills of autopsy and how to recognize what's pathological and will gain skills to demonstrate and describe these lesions. The emphasis is on the clinicopathologic aspects of the discussed cases. The clinician

staff or the attending physician usually will be called at the end of every autopsy practices in order to realise a common consultation, discussion and summary with the end of take home messages.

The medical and patient information provided during autopsies, lectures and demonstrations is confidential. The requirement to maintain professional secrecy and preserve confidentiality also applies for medical students.

It is strictly forbidden to make any kind of record (photography, video, sound-record) of the material provided during the tuition and demonstrations in the facilities and building of the Department, especially during lectures and practices (excluding the autopsy practices, where students are allowed to make pictures certain gross alteration of the demonstrated organs). The material presented during the tuition is the intellectual property of the Department and their presentation is directly controlled by the Department. Therefore, it is not intended for the public and must not be published or arbitrarily recorded, alternatively taken away without the permission of the Department. Violation of the rules mentioned above implies disciplinary action. Exception can be made only based on the previous and written permission provided by the Program Director. The Department reserves the rights to completely control the communication of the information about the Department.

Midterm exams: There are no midterm exams nor in the first and not in the second semester as well.

Pathology competition

The only pathology competition will be held just before the last week of the **2nd semester**. Clinicopathology based macroscopic photographs will be projected, and in the former, based on documentation, the participants should recognize and describe an autopsy case and answer the case connected questions.

Students use code word. The first 3 place winner's category will be awarded depending on the percentage of the result points achieved. More information will be announced on the lecture held by the Program Director or the Registrar Tutor.

Consultation

Upon request there is a possibility for a consultation with always the tutor. The students are welcome to autopsy practices of other groups for retake or extra occasion as long as it does not disturb the ongoing practice. There is no planar consultation during any semester.

Examinations

SEMIFINAL:

1. Prerequisites:

Attendance of the lectures is not mandatory, but the lectures are part of the material that can be counted in the exams. At least 75% attendance and participation in practical sessions is mandatory. The practice leaders (tutors) fill out an attendance form at the beginning of each practice. Over the course of the semester, absences that exceed three practical sessions in the autopsy room, three absences in histology/organ demonstration practical sessions, three absences in clinicopathology practice, one absence in more than one consultation practical session must be made up in the semester. A histology-organ demonstration exercise can only be replaced with an exercise on the same topic, in Hungarian or English. Autopsy and consultation practice can be replaced at any time, with any group, in both Hungarian and English. Absences from more than three dissection and histology-organ demonstration sessions, as well as one consultation practice session, must be confirmed in writing by the practice supervisors or the person in charge of studies. The clinicopathology lectures in Fridays are practices and they are not able to be replaced. Department of Pathology and Experimental Cancer Research has the right for not acknowledging the semester.

The semifinal exam consists of practical and theoretical parts. All exam starts with practical exam followed by theoretical part.

2. Practical exam:

1 first semester histopathology slide and 1 first semester specimen demonstration.
2 marks will be given.

3. Theoretical part is an oral exam:

Semifinal exam questions: 2 topics (A and B-C mixed)

1 topic: (general pathology) Sign with the letter "A"

1 topic: (oncology, cardiology, respiratory system). Sign with the letter "B"- "C"

The list of these theoretical questions is on the website of the Department.

2 additional marks will be given.

Evaluation: Failure of the practice exam is *not obligatory failure* of the *semifinal exam*.

Summary by the exam committee 1 final, result mark will be given in the index: practice marks (2) + oral marks (2). It should be kept in mind that the final mark is not merely the mathematical average of the given grades of different parts of the exam! Serious mistakes or "clear spots" in your knowledge may significantly affect the final mark or even result in a failed exam.

Suspension: If you have any problem during the practical exam, ask the supervisor. In case of communicating, unacceptable behaviour, cheating (usage of mobile tools, books, notes, etc.) your exam is immediately suspended and the exam will not be evaluated and counts as a failed exam. Written report of the incident will be prepared and signed by the teachers.

FINAL EXAM

Prerequisites:

Attendance of the lectures is not mandatory, but the lectures are part of the material that can be counted in the exams. At least 75% attendance and participation in practical sessions is mandatory. The practice leaders (tutors) fill out an attendance form at the beginning of each practice. Over the course of the semester, absences that exceed three practical sessions in the autopsy room, three absences in histology/organ demonstration practical sessions, three absences in clinicopathology practice, one absence in more than one consultation practical session must be made up in the semester. A histology-organ demonstration exercise can only be replaced with an exercise on the same topic, in Hungarian or English. Autopsy and consultation practice can be replaced at any time, with any group, in both Hungarian and English. Absences from more than three dissection and histology-organ demonstration sessions, as well as one consultation practice session, must be confirmed in writing by the practice supervisors

The exam begins between 8:00 am and 9:00 a.m. at the Department of Pathology and Experimental Cancer Research, meeting at the Digital Histology practice room, ground floor. The students to be examined will be identified by picture ID cards by the supervisor before starting the exam. Therefore, students should present a picture ID, otherwise they are not allowed to take examination!

Exam dates: You will be notified about the dates offered by the Department before the exam period and they will be finalized at the Staff/Student meeting. Then these fixed days will figure in NEPTUN.

Usually Tuesdays and Thursday are the regular exam dates and app. 25-30 EM students are accepted each exam day.

Important! Taking examinations before the exam period is not permitted! (University Policy). In exceptional cases (such as near-delivery, etc.), you must have a written permission from the Dean's Office.

Registration: The internet based sign up system (NEPTUN) regarding pathology has been established for 3rd year students as well. The sign up procedure is controlled and regulated by the software and the institute cannot interfere with the system. The officially signed up students will be scheduled for examination.

Rescheduling the exam date: The list of examinees is completed 1 hour before the examination date. The NEPTUN system automatically closes the sign up list by expiration of the deadline. Example: if the exam is on Tuesday, you may remove your name before Monday 12:00 pm. After that changes are not permitted. If you do not show up on the given exam date, you should justify it within 3 days at the head of the Institute or at the tutor responsible for the English program. Otherwise, "not appeared" note is written in your index, and the exam is not allowed without having a retake ticket! The skipped exam is deducted from the number of possible retake exams.

Retake exam: In case of failure or for those who are unsatisfied with the result of the first exam a retake exam should be taken to improve the mark. For that a retake ticket is required from the secretariat. If one retakes an exam to improve the previous mark it is not granted that mark of the retake exam cannot be the same or worse than the previous mark.

Every parts of the exam must be retaken - the practical exam as well. One must also register on the NEPTUN system and indicate that this is the first, second, etc. retake exam. Without retake ticket and NEPTUN registration one is not allowed to take an examination.

Any further details regarding the exam and exam dates will be discussed on a Students-Professor sitting held in the 7-8 gradual week, first semester.

The date of the meeting is to be announced on the lecture and by a NEPTUN message.

or the person in charge of studies. The clinicopathology lectures in Fridays are practices and they are not able to be replaced. If one does not fulfill the above mentioned prerequisites the Department of Pathology and Experimental Cancer Research has the right for not acknowledging the semester. Further requirement is to pass the semifinal exam before.

The final exam consists of practical and theoretical parts. All exam starts with practical exam followed by theoretical part.

Practical exam: 2 histopathology slides of any semester and 1 specimen demonstration of any semester and 1 organ demonstration in the autopsy room. During this part of the exam dissected organs or organ complexes are to be described. The student should be able to orientate the organ (or organ complex) properly, to describe it fully and evaluate the pathological alterations and establish diagnoses.

3 marks will be given as the result of the practical exam.

Theoretical part is an oral exam:

Final exam questions: 3 topics (A, B, C)

1 topic: (general pathology) Sign with the letter "A"

1 topic: (oncology and cardiology). Sign with the letter "B"

1 topic: (systemic pathology). Sign with the letter "C"

The list of these theoretical questions is on the website of the Department.

3 additional marks will be given as the result of the oral exam.

Evaluation: Failure of the practice exam, is *obligatory failure* of the final exam.

Summary by the exam committee 1 final, result mark will be given in the index: practice exam marks (3) + oral exam marks (4) (3). It should be kept in mind that the final mark is not merely the mathematical average of the given grades of different parts of the exam! Serious mistakes or "clear spots" in your knowledge may significantly affect the final mark or even result in a failed exam.

Suspension: If you have any problem during the practical exam, ask the supervisor. In case of communicating, unacceptable behaviour, cheating (usage of mobile tools, books, notes, etc.,) your exam is immediately suspended and the exam will not be evaluated and counts as a failed exam. Written report of the incident will be prepared and signed by the teachers.

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dates and app. 25-30 EM students are accepted each exam day. Important! Taking examinations before the exam period is not permitted! (University Policy). In exceptional cases (such as near-delivery, etc.), you must have a written permission from the Dean's Office.

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Rescheduling the exam date: The list of examinees is completed 1 hour before the examination date. The NEPTUN system automatically closes the sign up list by expiration of the deadline. After that changes are not permitted. If you do not show up on the given exam date, you should justify it within 3 days at the head of the Institute or at the tutor responsible for the English program. Otherwise, "not appeared" note is written in your index, and the exam is not allowed without having a retake ticket! The skipped exam is deducted from the number of possible retake exams.

Retake exam: In case of failure or for those who are unsatisfied with the result of the first exam a retake exam should be taken to improve the mark. For that a retake ticket is required from the secretariat. If one retakes an exam to improve the previous mark it is not granted that mark of the retake exam cannot be the same or worse than the previous mark. Every parts of the exam must be retaken - the practical exam as well. One must also register on the NEPTUN system and indicate that this is the first, second, etc. retake exam. Without retake ticket and NEPTUN registration one is not allowed to take an examination.

Any further details regarding the exam and exam dates will be discussed on a Students-Professor sitting held in the 7-8 gradual week of the second semester. The date of the meeting is to be announced on the lecture and by a NEPTUN message.

Schedule

Lectures	1st semester		2nd semester	
	Monday	10:00 – 11:15		09:45 – 11:00
	Wednesday	8:00 – 9:15		8:00 – 9:15

Practices	1st semester		2nd semester	
Group 10,11,12	Monday	11:45-13:15	Monday	11:45-13:15
	Thursday	11:30 – 13:00	Thursday	11:30 – 13:00
	Friday	09:00-9:45	Friday	09:00-9:45
Group 13,14,15	Wednesday	12:00 – 13:30	Wednesday	12:00 – 13:30
	Friday	09:00-9:45	Friday	09:00-9:45
	Friday	12:00 – 13:30	Friday	12:00 – 13:30
Group 16,17,18	Wednesday	14:00 – 15:30	Wednesday	14:00 – 15:30
	Friday	09:00-9:45	Friday	09:00-9:45
	Friday	14:00 – 15:30	Friday	14:00 – 15:30

1st SEMESTER

	LECTURES and Clinicopathology parctices	HISTOPATHOLOGY and PREPARATION
Week 1	The place and role of Pathology in the Medicine. Structure of pathology and methods. Definition of Death, Signs of Death, Necrosis and Apoptosis. Clinical and forensic pathological aspects of the natural and non-natural death	Practice 1- Introduction Safety rules Digital teaching system Teleconsultation E-school
Week 2	Examples of Necrosis. Myocardial Infarction. Reversible Cell Injury. Sampling and diagnostic pitfalls of in the pathological workup	Practice 2- Necrosis 1. <i>Histology:</i> Anemic infarction, kidney Infarctus haemorrhagicus pulmonis Acute myocardial infarction Reperfusion injury Cerebral infarct <i>Preparation:</i> Infarctus anaemicus renis Ruptura cordis, haemopericardium Infarctus recurrens myocardii Gangraena humida antebrachii Infarctus obsoletus myocardii et aneurysma cordis Encephalomalacia alba et encephalomalacia rubra
Week 3	Lipid accumulation, Atherosclerosis, Protein accumulation, Amyloidosis.	Practice 3- Necrosis 2. <i>Histology:</i> Liponecrosis pancreatis Lymphadenitis tuberculosa Apoptosis <i>Preparation:</i> Liponecrosis pancreatis Caseatio tuberculosa lympholandelae Necrosis tumoris
Week 4	Endogeneous and Exogeneous Pigments, Calcification, Lithiasis Heart hemochromatosis and amyloidosis	Practice 4- Abnormal Accumulation <i>Histology:</i> Steatosis hepatis alcoholica (HE) Atheromatosis arteriae (HE) Infiltratio adiposa myocardii (HE) Amyloidosis renis (Congo Red) IRDS (PAS) <i>Preparation:</i> Steatosis diffusa hepatis Atheromatosis aortae Amyloidosis lienis et renis
Week 5	Cellular adaptations: Hypertrophy, Hyperplasia, Atrophy, Metaplasia	Practice 5- Adaptation <i>Histology:</i> Hypertrophia myocardii, CIHD Hyperplasia glandulae suprarenalis Bronchus, squamous metaplasia (HE) Microcalcification, DCIS (HE) <i>Preparation:</i> Cholelithiasis – Gallbladder stones Hypertrophia ventriculi sinistri cordis Hypertrophia ventriculi dextri cordis
Week 6	Stagnation, oedema, shock Thrombosis, Embolism Lymphedema and elephantiasis	Practice 6 - Circulation 1. <i>Histology:</i> Oedema pulmonis (HE) Induratio brunea pulmonis (Prussian blue) Hepar moschatum adiposum (HE) Thrombosis arteriae femoralis (HE) <i>Preparation:</i> Thrombosis venae Thrombosis arteriae Thrombus muralis laminata in aneurysma aortae Thromboembolia trunci brachiocephalici

	LECTURES and Clinicopathology parctices	HISTOPATHOLOGY and PREPARATION
Week 7	DIC Hemorrhage Differential diagnostics of disseminated cutaneus hemorrhages	Practice 7 - Circulation 2. <i>Histology:</i> DIC (fibrin staining) Embolia lipomatosa (Oil-red) <i>Preparation:</i> Erosiones mucosae ventriculi Haemorrhagia subarachnoidealis Apoplexia glandulae suprarenalis
Week 8	Acute inflammation and sepsis Clinicopathology of sepsis	Practice 8 - Acute inflammation <i>Histology:</i> Pericarditis fibrinosa Bronchopneumonia Appendicitis acuta ulcerophlegmonosa Pneumonia lobaris <i>Preparation:</i> Pericarditis fibrinosopurulenta Pneumonia lobaris
Week 9	Chronic Inflammation	Practice 9 - Chronic Inflammation <i>Histology:</i> Myocarditis rheumatica (HE) Tuberculosis pulmonis (HE) Tuberculosis pulmonis (ZN) Granuloma corporis alienis (HE) Granulation tissue (HE) Sarcoidosis (HE) <i>Preparation:</i> Tuberculosis pulmonis
Week 10	Mechanisms of Immune-Mediated Injury Immune deficiency Diseases I. Rejection of Transplants Autoimmun diseases II. Rejection following heart transplantation	Practice 10 - Immunology <i>Histology:</i> Polypus nasi (HE) Asthma bronchiale (PAS) Acute rejection (HE) Lupus nephritis (PAS) Scleroderma (HE)
Week 11	Carcinogenesis, Etiology of Neoplasia Chemical, microbial and radiation carcinogenesis. Preneoplastic conditions. Characteristics of Benign and Malignant Neoplasms Clinicopathology of the pulmonary space-occupying lesions	Practice 11 - Oncology 1. <i>Histology:</i> Squamous cell metaplasia, cervix HPV infection_condyloma_LSIL HSIL_CIN3 Invasive carcinoma, cervix Papilloma laryngis (HE) Carcinoma basocellulare (HE) Carcinoma planocellulare cutis (HE) Polypus adenomatosus coli (HE) Adenocarcinoma coli (HE) <i>Preparation:</i> Papilloma laryngis Polypus intestini crassi Haemangioma hepatis
Week 12	Targeted diagnosis and treatment of cancer Pediatric diseases (congenital and prenatal diseases, childhood tumors) Oncoteam 1: late metastatising mechanisms Oncoteam 2: Childhood leukemias	Practice 12 - Oncology 2. <i>Histology:</i> Leiomyoma Leiomyosarcoma Osteosarcoma Wilms tumor Neuroblastoma (HE) Teratoma adultum (HE) Metastasis carcinomatosa lymphnodi (HE) Metastasis carcinomatosa hepatis <i>Preparation:</i> Cysta dermoides Lymphangiosis carcinomatosa pulmonis Melanoma malignum cutis Metastasis carcinomatosa cerebri, melanoma Metastasis carcinomatosa vertebrarum Metastasis lymphoglandularum melanomatis Osteosarcoma manus

	LECTURES and Clinicopathology parctices	HISTOPATHOLOGY and PREPARATION
Week 13	Vascular pathology Anomalies of cardiac development, IHD Diseases of endocardium, myocardium, pericardium Case demonstrations: Young adult, athlete sudden cardiac death. Infective endocarditis.	Practice 13 – Cardiology 1. <i>Histology:</i> Arteriosclerosis Atherosclerotic plaque_calcified Atherosclerotic plaque_atheromatous Acute myocardial infarction Chronic myocardial infarction <i>Preparation:</i> Fallot tetralogy Defectus septi atrii (ASD) Defectus septi ventriculi (VSD) Cardiomyopathia dilatativa (DCM) Cardiomyopathia hypertrophica (HOCM) Vitium aortae Dissectio coronariae Thrombosis globuli in atrio sinistri cordis
Week 14	Lesions of the upper respiratory tract. Pulmonary infections Obstructive and Restrictive pulmonary diseases. Lung tumors. Pleural lesions. COVID pneumonia (clinical/pathological case)	Practice 14 Pulmonology <i>Histology:</i> Aspergillosis (HE, Grocott) Pneumocystis pneumonia (HE, Grocott) Cystic fibrosis Adenocarcinoma pulmonis Carcinoma microcellulare pulmonis Mesothelioma <i>Preparation:</i> Emphysema pulmonis et emphysema bullosum pulmonum Haemorrhagic pneumonia caused by H1N1 influenza Neoplasma malignum peripherialis pulmonis

2nd Semester

Week 1	• Methods of hematology diagnostics. Classification of Anemia • Diseases of the Myeloid system • Clinicopathological discussion of CML	Practice 1 - Hematology 1. <i>Histology</i> • Megaloblastic erythroid hyperplasia (MGG) • AML- pb (MGG) • AML- pb (MPO) • CML accelerated phase (MGG) • Myelofibrosis (HE) • Myelofibrosis (reticulin)
Week 2	• Diseases of the Lymphoid system • Clinicopathological discussion of Multiple Myeloma	Practice 2- Hematology 2. <i>Histology:</i> • Follicularis hyperplasia (HE) • Follicularis lymphoma grade 1 (HE) • Follicularis lymphoma (BCL-2) • CLL - pb (MGG) • Diffuse large B-cell lymphoma (HE, CD20) • Myeloma multiplex, bm (MGG) • Hodgkin-lymphoma NS (HE) • Non-Hodgkin lymphoma (extranodal) • CLL-1 • CLL-2 <i>Preparation:</i> • Hodgkin lymphoma- Cervical lymph nodes • Myeloma multiplex, - Ribs • Nodularis lymphoid spleen infiltration - (Porphyl spleen)
Week 3	• Infectious and inflammatory disorders of the liver. Hepatic failure. Liver cirrhosis. • Toxic injuries of the liver. Liver tumors. Disorders of the gallbladder. • Clinicopathological discussion of Hemangioendothelioma	Practice 3 - Hepatology <i>Histology:</i> • Cholecystitis chronica • Hepatitis chronica - HCV • HBV-hepatitis • Cirrhosis hepatis (HE, Picro) • Carcinoma hepatocellulare <i>Preparation:</i> • Hepar polycysticum

Week 4	• Pathology of the oral cavity, salivary gland, oesophagus, stomach and small intestine • Clinicopathological discussion of Head-Neck tumor	Practice 4 - Gastrointestinal pathology 1. <i>Histology:</i> • Parotis pleomorph adenoma • GIST (HE, CD117) • Gastritis (HE, Giemsa) • Ulcus pepticum ventriculi • Adenocarcinoma ventriculi (diffuse type) <i>Preparation:</i> • Adenocarcinoma ventriculi et metastasis carcinomatosa hepatis • GIST • Ulcus duodeni • Ulcus ventriculi • Varicositas oesophagii
Week 5	• Pathology of the large intestine and the peritoneum • Pathology of the pancreas. Diabetes mellitus • Clinicopathological discussion of Pancreatitis	Practice 4 - Gastrointestinal pathology 2. <i>Histology:</i> • Celiac disease • Ulcerative colitis - biopsy • Ulcerative colitis - specimen • Crohn colitis • Pancreatitis chronica • Carcinoma pancreatis <i>Preparation:</i> • Colitis ulcerosa • Diverticulosis et polyposis sigmae • Diverticulum perforatum sigmae • Pancreatitis acuta • Adenocarcinoma pancreatis capitis et metastasis carcinomatosa hepatis
Week 6	• Hypophysis, thyroid gland • Parathyroid gland, adrenals, MEN • Clinicopathological discussion of GH-secreting pituitary adenoma	Practice 6 - Endocrinology <i>Histology:</i> • Multinodulare goiter • Hashimoto-thyroiditis • Carcinoma papillare thyroideae • Pheochromocytoma <i>Preparation:</i> • Macroglossia propter adenoma hypophysealis
Week 7	• Malformations. Clinical manifestations of renal disease. Glomerular diseases • Diseases affecting tubules and interstitium. Diseases involving blood vessels • Clinicopathological discussion of Glomerular diseases	Practice 7- Nephrology <i>Histology:</i> • RPGN • Nephropathia diabetica (PAS) • End-stage-kidney (HE, picosirius) <i>Preparation:</i> • Cysta simplex renis • Ren soleiformis - trisomia 18
Week 8	• Urinary outflow obstruction. Renal tumors. • Pathology of the urinary bladder • Clinicopathological discussion of Renal tumor	Practice 8 – Urinary tract <i>Histology:</i> • Carcinoma renis (HE) • Carcinoma transitiocellulare <i>Preparation:</i> • Carcinoma renis • Pyelonephritis chronica • Urocystitis acuta haemorrhagica
Week 9	• Pathology of the female genital tract • Pathology of the uterus and pregnancy • Pathology of pregnancy. Clinicopathological discussion of endometriosis	Practice 9 - Female genital organs <i>Histology:</i> • Carcinoma planocellulare cervicis uteri • Teratoma maturum cysticum/cysta dermoides ovarii • Serosus carcinoma, High grade (cystadenocarcinoma ovarii) • Hyperplasia simplex • Endometrioid endometrium carcinoma • Ovarian follicular cyst <i>Preparation:</i> • Carcinoma endometrii • Cystadenocarcinoma ovarii • Endometriosis ovarii • Mola hydatidosa • Extrauterine gravidity • Real umbilical cord knot

Week 10	• Pathology of the breast	Practice 10 - Brest <i>Histology:</i> • Fibrocystic disease • Invasive carcinoma, NST • Invasive carcinoma, lobular • Ductal carcinoma in situ (DCIS) • Fibroepithelial tumor <i>Preparation:</i> • Malignant breast tumor
Week 11	• Pathology of the male genital tract	Practice 11 – Male genital organs <i>Histology:</i> • Seminoma • Embryonal carcinoma • Teratoma postpubertale • Nodular hyperplasia, prostate • Adenocarcinoma prostatae <i>Preparation:</i> • Carcinoma penis • BPH
Week 12	• Malformations, cerebrovascular diseases, edema, herniation, and hydrocephalus • CNS tumors, infections. • Diseases of myelin, neurodegenerative disorders. • Clinical and pathological differential diagnostics of CNS diseases	Practice 12 – Neurology <i>Histology:</i> • Glioblastoma • Medulloblastoma • Meningeoma • Parkinson's disease • Schwannoma <i>Preparation:</i> • Anencephaly • Haemorrhagia pontis (Duret hemorrhage) • Hydrocephalus externus • Hydrocephalus internus • Meningeoma • Metastasis multiplex cerebri (melanoma malignum) • Butterfly tumor
Week 13	• Non-neoplastic diseases of the skin • Neoplastic skin diseases • Clinicopathological discussion of skin	Practice 13 – Dermatology <i>Histology:</i> • Naevus intradermalis cutis • Melanoma malignum cutis • Carcinoma basocellulare <i>Preparation:</i> • Keloid • Sarcoma Kaposi
Week 14	• Pathology of the musculoskeletal system	Practice 14 – Musculoskeletal system <i>Histology:</i> • Osteochondroma, bone • Osteosarcoma, bone • Fasciitis nodularis, subcutaneous tissue • Desmoid fibromatosis, mesenterium • Desmoid fibromatosis, mesenterium (beta catenin) • Rhabdomyosarcoma, brain • Liposarcoma-retroperitoneum • Synovial sarcoma-subcutaneous tissue <i>Preparation:</i> • Chondroma • Neurofibroma • Osteosarcoma

List of textbooks:

Kumar, Abbas, Aster Robbins and Cotran: Robbins Basic Pathology (Elsevier, 10th Edition, 2017), ISBN: 978-0-323-35317-5
Andras Matolcsy (edited by) Basic Pathology – A Socratic Approach (Medicina, 2nd edition, 2016), ISBN: 978-963-226-567 6

WEBPAGE:

General informations and downloads: <https://semmelweis.hu/patologia/>

Online available slide center (digital slides): <http://193.6.208.216/SlideCenter/Login>

Ms. Maria Cserneky shall be approached with technical problems regarding server availability:

e-mail: cserneky.maria@semmelweis-univ.hu

SlideViewer free download:

<https://www.3dhistech.com/solutions/digital-pathology-rx/>

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PATHOLOGY I - II.

Department of Pathology, Forensic and Insurance Medicine

Head of Department: **Prof. Dr. András Kiss**

Index

Lectures

List of textbooks

Histopathology practices - slides for the histopathology exam and slide demonstrations

General information - Lectures, practices, competition

Examinations: Examination

Examinations - Final

Schedule

Schedule for the academic year

1st SEMESTER

	LECTURES	HISTOPATHOLOGY
Week 1	Introduction Intracellular storage. Cell injury Reversible cell injury (hydropic swelling, atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia). Irreversible cell injury (necrosis, apoptosis, ischemic cell injury, external damaging agents, calcification, hyalinization, aging).	Practice 1- Introduction Safety rules Digital teaching system Teleconsultation E-school
Week 2	Hemodynamic disorders I. Basics of hemodynamics. Hemorrhage, active and passive hyperemia. Disorders of fluid homeostasis and electrolytes. Edema. Hemodynamic disorders II. Thrombosis, embolism. Infarction. Shock.	Practice 2- Cell injury, adaptation, storage disorders Coagulative necrosis, Liquefactive necrosis Apoptosis Hypertrophy Hyperplasia Fatty degeneration Amyloidosis Infiltratio adiposa myocardii Bronchus - squamous metaplasia
Week 3	Inflammation I. Definition. Symptoms. Vascular permeability. Inflammatory mediators and their origin. Cellular recruitment. Acute inflammation. Systemic manifestations of inflammation. Inflammation of avascular tissues. Wound healing, regeneration and repair. Classification of cells and tissues according to their regenerative capability. Extracellular matrix. Inflammation II. Chronic inflammation. Fibrosis, scar formation. Granulomatous inflammation: (tuberculosis, syphilis. etc.)	Practice 3- Hemodynamic disorders I. Acute congestion - pulmonary edema Chronic pulmonary congestion Hemosiderin in alveolar macrophages ("heart failure cells") Chronic congestion in the liver ("nutmeg liver") Shock, DIC
Week 4	Cardiovascular pathology I. Structure of vessels. Atherosclerosis. Aneurysms. Hypertensive vascular disease. Inflammatory disorders of blood vessels. Microvascular disease. Diseases of the veins and lymphatic vessels. Vascular tumors. Cardiovascular pathology II. Endocarditis, myocarditis, pericarditis. Rheumatic heart disease. Ischemic heart disease.	Practice 4- Hemodynamic disorders II. Thrombus Fat embolism Anemic infarction – kidney Hemorrhagic infarction - lung
Week 5	Cardiovascular pathology III. Congenital heart diseases. Cardiomyopathies. Heart failure. Systemic diseases involving the heart. Cardiac tumors. Neoplasia I. Neoplasia - definition. Characteristics of benign and malignant tumors. Histological classification of tumors. Grading.	Practice 5- Inflammation, cell repair Acute appendicitis Fibrinous pericarditis Granulation tissue Foreign body granuloma Rheumatic myocarditis
Week 6	Neoplasia II. Causes of neoplasia. Epidemiology. Chemical, physical and biological carcinogenesis. Prevention. Screening. Neoplasia III. Molecular mechanisms of tumor development: protooncogenes, oncogenes, tumor suppressor genes, growth factors.	Practice 6- Midterm I (cell injury, hemodynamics, inflammation) Cardiovascular diseases Arteriosclerosis Atherosclerosis Acute myocardial infarction Myocardial infarction - healing Endocarditis Viral myocarditis Temporal arteritis Kaposi-sarcoma

	LECTURES	HISTOPATHOLOGY
Week 7	Neoplasia IV. Tumor growth, tumor progression, metastasis. Familiar cancer Neoplasia V. Prognostic factors in tumor pathology. Staging and grading of tumors. TNM. Handling of surgical biopsy material	Practice 7- Neoplasia I Squamous metaplasia Condyloma (LSIL) CIN 3 (HSIL) Invasive carcinoma
Week 8	Childhood tumors	Practice 8- Neoplasia II. (Benign and malignant tumors) Squamous papilloma Squamous cell carcinoma Adenoma Adenocarcinoma Lymph node metastasis Liver metastasis
Week 9	Methods of pathology I. Grossing, HE and special staining techniques, immunohistochemistry. FNAB, core biopsy.	Practice 9- Neoplasia III. (Soft tissue and childhood tumors) Leiomyoma Leiomyosarcoma Osteosarcoma Wilms tumor Neuroblastoma Mature teratoma Fascitis nodularis Desmoid fibromatosis Rhabdomyosarcoma Liposarcoma
Week 10	Genetic and developmental disorders. Gene pathology I. Single-gene abnormalities. Autosomal dominant and recessive inheritance, sex-linked disorders. Lysosomal storage disease. Genetic and developmental disorders. Gene pathology II. Chromosomal abnormalities. Morphogenic disorders, malformations, multifactorial inheritance. Prenatal diagnosis. Familiar diseases and symptoms.	Practice 10- Biopsy techniques, protein- and DNA-based diagnostics Cytology smear Core needle biopsy Biopsy by endoscopy Frozen section Special stains Immunohistochemistry FISH Polypus nasi Asthma bronchiale Acute rejection Lupus nephritis Scleroderma
Week 11	Methods of pathology II. Diagnostic parameters, requirements, which guide the clinical protocols. Molecular diagnostics of tumors. Targeted therapy Immunopathology Constituents of the immune system. Hypersensitive reactions. Allergy. Transplantation. Immunodeficiency. AIDS.	Practice 11- Hematopathology I. Reactive lymphadenopathy Hodgkin's lymphoma Nodal non-Hodgkin's lymphoma Extranodal non-Hodgkin's lymphoma Multiple myeloma
Week 12	Autoimmune diseases Etiology. Monosystemic diseases (e.g. chronic atrophic gastritis, myasthenia gravis, Graves disease, Hashimoto thyroiditis, Addison disease, Insulin-dependent diabetes mellitus, multiple sclerosis) and Oligo- polysystemic diseases (e.g. SLE, Sjögren syndrome, RA, scleroderma, dermatomyositis) Hematopathology I. Hemopoietic system. Normal function (bone marrow, lymph nodes, spleen). Morphology and immunologic evaluation. Disorders of platelets and coagulation. Anemias, polycythemia. Neutrophilia. Proliferative disorders of mast cells. Monocytosis. Sinus histiocytosis. Benign disorders of lymphoid cells.	Practice 12- Practical exam (1 organ, 1 histology slides, 3 questions from the definition list)
Week 13	Hematopathology II. Acute myeloproliferative syndromes (acute leukaemias). Chronic myeloproliferative syndromes (CML, myelofibrosis, thrombocytemia). Acute and chronic lymphocytic leukemias. Disorders of the spleen. Hematopathology III. Lymphomas (Hodgkin, non-Hodgkin). Metastatic tumors in bone marrow and lymph nodes.	Practice 13- Hematopathology II. Megaloblastos vérvérvés AML CML Myelofibrosis CLL
Week 14	Infectious diseases Viral diseases (tick-borne viruses, polio, smallpox, herpes, CMV, EBV, rubella, varicella, mumps, influenza), Rickettsiae, Spirochetes. Bacteria (tularaemia, pertussis, legionella, brucellosis, listeriosis, clostridial infections (tetanus, botulism), Streptococci) Actinomycosis. Mycobacteria (tbc, leprosy). Protozoa (malaria, toxoplasmosis, amebiasis) Environmental and nutritional pathology Smoking, alcoholism, drugs. Iatrogenic injuries. Environmental chemical and physical factors. Obesity, protein malnutrition, vitamins	Practice 14 - Consultation

2nd Semester

	LECTURES	HISTOPATHOLOGY
Week 1	Head and neck Neoplastic and non-neoplastic lesions of the lips, oral cavity, tongue, teeth, salivary glands, sinuses, pharynx, larynx, ear. Respiratory system I. Diseases of conducting airways and lung parenchyma. Diffuse alveolar damage. Chronic obstructive pulmonary disease (COPD). Restrictive lung diseases.	Practice 1- Pulmonary pathology I. - non-neoplastic diseases IRDS Bronchopneumonia Lobar pneumonia Tuberculosis Boeck sarcoidosis Cystic fibrosis Pneumocystis pneumonia
Week 2	Respiratory system II. Development of lung cancer. Neoplasia (primary cancer of the lung, metastasis, benign tumors). Etiology, genetic abnormalities. Diseases of the pleura. Gastrointestinal tract I. Esophagus (anatomy and developmental disorders, inflammation, trauma, tumors). Pathology of the stomach (part 1).	Practice 2- Pulmonary pathology II- neoplastic Small cell carcinoma Squamous cell carcinoma Adenocarcinoma Mesothelioma
Week 3	Gastrointestinal tract II. Pathology of the stomach (part 2) and small bowel. Appendix. Gastrointestinal tract III. Pathology of the Colon (congenital disorders, infections, diverticular disease, inflammation, Crohn's disease, ulcerative colitis, vascular diseases, neoplasms, other disorders). Peritoneum.	Practice 3- Gastrointestinal pathology I. Peptic ulcer - stomach Gastritis chronica (H. pylori) Carcinoma sigillocellulare GIST Pleomorphic adenoma – parotid gland
Week 4	Pathology of the liver I. Anatomy and function of the liver.. Bilirubin-metabolism and jaundice. Hepatic failure. Hepatorenal syndrome. Viral hepatitis. Chronic hepatitis. Cirrhosis. Portal hypertension. Non-viral hepatitis. Pathology of the liver II. Alcoholic liver disease, toxic liver injury. Hemochromatosis. Vascular disorders.	Practice 4- Gastrointestinal pathology II. Celiac disease Ulcerative colitis Crohn's disease
Week 5	Pathology of the liver III. Neoplasms. Gallbladder and bile ducts (congenital anomalies, cholecystitis, cholelithiasis, cholangitis, neoplasms) Pathology of the exocrine pancreas Developmental abnormalities, inflammation, tumors of the exocrine pancreas.	Practice 5- Liver pathology Alcoholic hepatitis Viral hepatitis Cirrhosis Hepatocellular carcinoma Chronic cholecystitis
Week 6	Endocrinology I. Pathology of the endocrine pancreas: Diabetes mellitus. The hypothalamus-hypophysis system. Pathology of the pituitary gland. The thyroid gland: hypo- and hyperfunction, inflammations, tumors. Endocrinology II. Pathology of the parathyroid gland. Hypo- and hyperfunction and other diseases of the adrenal cortex. Tumors of the adrenal gland. Pineal gland. Ectopic hormone production	Practice 6- Pathology of the pancreas Acute pancreatitis Chronic pancreatitis Adenocarcinoma of the pancreas Neuroendocrine tumor
Week 7	Renal pathology I. Anatomy. Definitions. Clinical syndromes. Cystic renal diseases. Destructive and non-destructive tubulointerstitial diseases. Kidney biopsy. End stage kidney. Renal pathology II. Glomerulonephritis.	Practice 7- Endocrine pathology Goiter Autoimmune thyroiditis (Hashimoto) Thyroid gland-follicular adenoma Thyroid gland-papillary carcinoma Pheochromocytoma
Week 8	Renal pathology III. Tumors of the kidney. Kidney transplantation.	Practice 8- Renal- and uropathology Kidney biopsy – diabetic nephropathy End-stage kidney disease Renal cell carcinoma Transitional cell carcinoma
Week 9	Uropathology Congenital abnormalities of the urinary tract. Urinary bladder (malformations, inflammation, tumors). Urethra. Penis and scrotum. Male genital tract Diseases of the epididymis, testes, prostate.	Practice 9- Uropathology- prostate, testis Prostatic hyperplasia Prostatic adenocarcinoma Testis- seminoma Testis -embryonal carcinoma

	LECTURES	HISTOPATHOLOGY
Week 10	Gynecologic pathology I. Pathology of the vulva and vagina. Non-neoplastic diseases of the cervix. Precancerous lesions of the cervix. HPV. Screening. Conisation. Cervic carcinoma. Bethesda system. Gynecologic pathology II. Pathology of the uterus. Uterine bleeding disorders. Endometrial hyperplasia, endometriosis. Tumors of the endometrium, myometrium and serosa. Pathology of the fallopian tube and the ovaries.	Practice 10- Midterm III. (lung, GI, liver, endocrine, kidney, urology and male genital system) Gynecologic pathology Ectopic pregnancy Endometriosis Endometrial hyperplasia (simple) Endometrial carcinoma Follicular cyst- ovary Mucinous cystadenoma-ovary Serous cystadenoma-ovary High grade serous carcinoma-ovary Choriocarcinoma
Week 11	Breast pathology I. Symptoms and diagnosis of breast diseases. Malformations. Benign symptomatic lesions (inflammations, fibrocystic disease, epithelial dysplasia and its significance, benign tumors).	Practice 11- Breast Pathology Fibrocystic disease Fibroepithelial tumors Ductal carcinoma in situ (DCIS) Invasive carcinoma (NST, lobular)
Week 12	Breast pathology II. Malignant tumors - epidemiology, risk factors. Histologic classification of breast cancer. Prognostic factors in breast cancer. Non-epithelial malignancies of the breast. Screening: non-palpable breast lesions. The male breast.	Practice 12- CNS histopathology Purulent meningitis Meningeoma Glioma Brain metastasis Parkinson-disease
Week 13	Neonatology Pregnancy-related pathology. Premature birth and its complications. Intrauterine infections and their sequelae. Twin pregnancy. Diseases of the perinatal period. Sudden infant death Central nervous system I. Trauma, vascular and circulatory disorders. CSF dynamics. Encephalomyelitis, meningitis. Congenital malformations. Demyelinating diseases. Neurodegenerative diseases. Pathology of the eye and ear. Metabolic diseases.	Practice 13- Skin pathology Seborrheas-keratosis Basal cell carcinoma Melanocytic naevus Malignant melanoma
Week 14	Central nervous system II. Neoplasms (neuroectodermal, embryonic, ectopic tissue, metastasis). Peripheral nervous system (neuropathies, inflammations, trauma, tumors). Skin pathology Basics of skin pathology. Primary lesions. Dermatitides. Infectious conditions of the skin. Skin manifestations of systemic diseases. Tumors of the surface epithelium and skin appendages. Pigmented nevi and malignant melanoma	Practice 14- Interesting autopsy case presentation Consultation

General information

Study materials are available via Moodle system.

List of textbooks

Kumar, Abbas, Aster Robbins and Cotran: Robbins Basic Pathology (Elsevier, 10th Edition, 2017), ISBN: 978-0-323-35317-5
Szende B., Suba Zs Introduction to Histopathology (Medicina, 1999)

WEBPAGE

General informations and downloads: <http://semmelweis.hu/patologia2/en/>
Online available slide center (digital slides): <https://slidecenter.semmelweis.hu>
User name and password for Java based version: student_jav
User name and password for SlideViewer based usage: student_pv

The visit of the internet based SlideCenter and Practice Test on tuition and exam dates is allowed after 4 p.m. only!

Mr. Gábor Drozda and Mr. Endre Kontsek shall be approached with technical problems regarding server availability:

e-mail: for Mr. Gábor Drozda: drozda.gabor@semmelweis.hu
for Mr. Endre Kontsek: kontsek.endre@semmelweis.hu

SlideViewer free download:
<https://www.3dhitech.com/research/digital-microscopes-viewers/slideviewer/>

Lectures

The topic of the lectures include both general and systemic pathology. Each lecture lasts 1 hour 15 minutes and is illustrated with macroscopic and microscopic photographs, radiologic images, illustrating the presented material. Occasionally interesting autopsy cases will be demonstrated during the lectures.

Practices

There are 14 two + two hour practices in both semesters, which are divided into autopsy and histopathology. Not more than 3 autopsy practices and not more than 3 histopathology practices can be missed in each semester. Catch up is possible only for autopsy hall practices, students can join other groups and their presence should be registered and signed by the tutor of the autopsy hall practice attended. In case the absences exceed the allowed limit the student will not be accepted for examination.

The **histopathology practices** provide basic histopathology skills. The topic of the histopathology practices matches that of the lectures. Brief theoretical background for the presented slides will be discussed in the frame of the practice. The pathological lesions will be presented in form of digital slides and will be demonstrated by the tutor with the help of a computerized multidiscussion/teleconsultation system. The digitalized slides will be individually studied and analyzed by the students as well. The digital slides are also available for the students through the internet every day from 4 p.m. till 8 a.m. the next day.

During **autopsy practices** the students will learn the basic skills of autopsy and how to recognize what's pathological and will gain skills to demonstrate and describe these lesions. The emphasis is on the

clinicopathologic aspects of the discussed cases. If there is no autopsy available, organ demonstration will take place on plastinated organs. Alternatively, visit of the laboratories (Laboratory of Histopathology, Laboratory of Immunohistochemistry and Laboratory of Molecular Pathology) of the Department will be on the program.

The medical and patient information provided during autopsies, lectures and demonstrations is confidential. The requirement to maintain professional secrecy and preserve confidentiality also applies for medical students.

It is strictly forbidden to make any kind of record (photography, video, sound-record) of the material provided during the tuition and demonstrations in the facilities and building of the Department, especially during lectures and practices (including autopsy and histology practices). The material presented during the tuition is the intellectual property of the Department and their presentation is directly controlled by the Department. Therefore, it is not intended for the public and must not be published or arbitrarily recorded, alternatively taken away without the permission of the Department. Violation of the rules mentioned above implies disciplinary action. Exception can be made only based on the previous and written permission provided by the Head of the Department. The Department reserves the rights to completely control the communication of the information about the Department.

Midterm exams: There are one midterm exam in the first and second semester, respectively. Similarly to the written part of semifinal and final exams, midterms are performed in the e-school system. In addition, on week 12 of the first semester practical exam is held.

The participation of the midterm exams is obligatory. If a student does not attend one of the midterms, annual signature will be withdrawn. Additional (non-scheduled) events for the midterm may be provided only for certificated medical reasons.

Pathology competition

Pathology competition has two rounds in the 2nd semester, it is expected to take place in weeks 11 and 13. Macroscopic photographs will be projected in the first round and diagnoses should be given. The students with the best results (up to 8-10 people, depending on the number of participants) will enter the second round. The second round has two parts: theoretical and histopathology parts. In the former, based on documentation, the participants should recognize and describe an autopsy case (virtual autopsy). During the histopathology part, participants should recognize and describe a neoplastic and a non-neoplastic slide. Students use pseudonyms in both rounds. Those students who enter the second round are exempt from test writing, those who recognize both of the histopathology slides in the second round are exempt from histopathology. Students who are finally ranked position 1-3 exempt autopsy in the final exam.

Consultation

Upon request there is a possibility for a consultation with the tutor. The students are welcome to autopsy practices of other groups for retake or extra occasion as long as it does not disturb the ongoing practice. **There is no consultation during the exam period.**

EXAMINATIONS

SEMIFINAL:

1. Prerequisites:

Absences: not more than 3 autopsy practices and not more than 3 histology practices (histology practice and autopsy hall practice counts separately) can be missed in each semester. If one does not fulfill the above mentioned prerequisites the Department of Pathology, Forensic and Insurance Medicine has the right for not acknowledging the semester.

Midterm exams: Participation of the midterm exams during each semester is obligatory.

2. Practical exam will be held during the week 12 practice. One should be able to recognize the organ (complex), orientate it properly, precisely describe the pathological lesions and establish a macroscopical diagnosis. In addition, examinee should be able to recognize and describe one histology slide, and answer three questions from the definition list (see our webpage). Successful completion of the organ demonstration as part of the practical exam is a prerequisite for passing the exam. Students who receive a 'fail' grade will be required to repeat the organ demonstration at a prearranged time before the semester examination.

3. The semifinal exam is a written test!

The material for the examinations is based on the book, the lectures and practices as well. The questions are prepared based on the official pathological textbook, but the factual data of the lectures are also constituents of the written test.

The test consists of **60 questions** in the e-school system. The students have 60 minutes for writing the test. The test is given in one session, there will be no break during the examination. Your sitting order is determined by the actual supervisor. The written test will be held in the **Histopathology practice room** using the teleconsultation computerized system. Every student to be examined on a certain exam day will receive the same set of questions, however, in different order within one question and regarding the numbering of the questions as well. The actual set of questions will be randomly selected from a pool by the computer. Upon submission of the test for evaluation, the computer will evaluate it. The result is immediately available and will be recorded. **Since there is no possibility of human error in the correction the result of the written test is not subject of personal consultation.**

The test questions include simple choice (one correct answer out of 5), multiple choice (2 answers are correct), "true-false" analysis and definitions should be given. Every correct answer of a multiple choice question will be awarded with one point, false statements of the multiple choice questions will result in one point deduction in order to avoid randomly crossing every possible answer of the multiple choice questions. Altogether, the deductions can not conclude a negative score, the worst score for one question is 0. Before submitting the test for evaluation the answers might be changed. Copying the questions are not permitted. The results are posted at the same day, generally early afternoon.

Evaluation: The passing level of the written test is 60% (without extra points, see below), below 60% the exam is immediately failed. If the level of 60% is achieved, the points received on the midterm and practical exam will be added to percentage received on the written test.

Extra points: In the mid-term exam of the 1st semester, students who achieve 60% will receive 1 point, students who achieve 75% will receive 2 points and students who achieve 90% will receive 3 points, which will be added as a percentage to the semester exam. For the practical exam, students will receive a fail (0 points), pass (1 point), or pass (2 points) grade for all three sections, which will be added as percentage to the semester test exam score. The maximum number of extra points available is 9.

60-69,99%:	=2
70-79,99%:	=3
80-89,99%:	=4
90-100%:	=5

Suspension: If you have any problem during the test, ask the supervisor. In case of communicating, unacceptable behaviour, cheating (usage of mobile tools, books, notes, etc.), your exam is immediately suspended and the exam will not be evaluated and counts as a failed exam. Written report of the incident will be prepared and signed by the teachers.

4. The exam for EM begins at 8.30 a.m. sharp at the **Department of Pathology, Forensic and Insurance Medicine** meeting at the **Histology practice room**. The students to be examined will be identified by picture ID cards by the supervisor before starting the exam. Therefore, students should present a picture ID, otherwise they are not allowed to take examination!

5. Exam dates: You will be notified about the dates offered by the Department before the exam period and they will be finalized at the Staff/Student meeting. Then these fixed days will figure in NEPTUN. Important! Taking examinations before the exam period is not permitted! (University Policy). In exceptional cases (such as near-delivery, etc.), you must have a written permission from the Dean's Office.

6. Registration: The internet based sign up system (NEPTUN) regarding pathology has been established for 3rd year students as well. The sign up procedure is controlled and regulated by the software and the institute can not interfere with the system. The officially signed up students will be scheduled for examination.

7. Retake exam: In case of failure or for those who are unsatisfied with the result of the first exam a retake exam should be taken to improve the mark. For that a retake ticket is required from the secretariate. If one retakes an exam to improve the previous mark it is not granted that mark of the retake exam can not be the same or worst than the previous mark.

The retake exam - the first retake exam as well - may be oral by request!!!

One must also register on the NEPTUN system and indicate that this is the first, second, etc. retake exam. Without retake ticket and NEPTUN registration one is not allowed to take an examination.

FINAL EXAM

The material for the examinations is based on the book, the lectures and practices as well!

The examination will take place at the Department of Pathology, Forensic and Insurance Medicine, starting with the written test in the Histology Practice Room.

The final exam starts at 8.30 a.m. sharp!!!

MEETING POINT: In the Histology Practice Room at the Department.

The students to be examined will be identified by picture ID cards by the supervisor before starting the exam. Therefore, students should present a picture ID, otherwise they are not allowed to take examination!

The final exam consists of two practical and two theoretical parts. The practical parts are **histopathology** in the histology practice room and **organ demonstration** in the autopsy hall. The theoretical parts are: **written test (60 questions – 60 minutes)** and **oral exam about theoretical topics** – concerning not only the organ or organ complex to be demonstrated, but the complete material discussed in the official pathology books as well as the material presented in the lectures. **The written test is obligatory part of the exam! The passing limit is 60%.** The test is given in one session, there will be no break during the examination. Your sitting order is determined by the actual supervisor.

Parts of the final exam:

I. Written test: The test questions include simple choice (one right answer out of 5), and multiple choice (2 correct answers are correct), "true-false" analysis. Every correct answers of multiple choice questions will be awarded with one point, false statements of the multiple choice questions will result in one point deduction on order to avoid randomly crossing every possible answers of the multiple choice questions. Every answer should be marked in the computer. Before submitting answers for evaluation the answers might be changed.

Extra points: In the mid-term exam of the 2nd semester, students who achieve 60% will receive 1 point, students who achieve 75% will receive 2 points and students who achieve 90% will receive 3 points, which will be added as a percentage to the result of the written test. The maximum number of extra points available is 3.

Evaluation: Each correct answer is worth of 1 point. The written test is passed if the result reaches 60% without any extra points added.

60-69,99%: = 2
70-79,99%: = 3
80-89,99%: = 4
90-100%: = 5

II. Histology part: After test writing, examinees are required to take the histology part of the final. Two slides from the pool are given to the student and the examinee should describe the organ (if there is one present on the side) and the histological findings. Finally, a correct diagnosis should be given. The histology part can not be examined by the tutor of the student.

III. Organ demonstration: After the test and histology, organ demonstration follows. During this part of the exam dissected organs or organ complexes are to be described. The student should be able to orientate the organ (or organ complex) properly, to describe it fully and evaluate the pathological alterations and establish diagnoses.

IV. Oral exam: 3 theoretical questions of the oral examination are from a list of theoretical questions (one from group A, B and C). The list of these theoretical questions is on the website of the department.

If the written exam or the histological part of the final exam is failed, the examination may be continued, but the final mark must be less than 5. If both the written test and the histological exam are failed, the examination is discontinued with an final mark of 1. If either the organ demonstration or the theoretical questions are failed, the final mark for the final exam is mark 1.

The final mark will be decided by the exam board of the institute based on the marks received on the practical and theoretical parts of the final exam. It should be kept in mind that the final mark is not merely the mathematical average of the given grades of different parts of

the exam! Additional factors, for example your midterm results, your general performance during the academic year (evaluated by your tutor), the competition results, etc. are also taken into consideration. Serious mistakes or "clear spots" in your knowledge may significantly affect the final mark or even result in a failed exam.

Retake exam: In case of failure or for those who are unsatisfied with the result of the first exam a retake exam should be taken to improve the mark. If the student retakes the exam to improve the previous mark, the mark of the retake exam may be the same or worst than the previous mark. The student must also register on the NEPTUN system and indicate that this is the first, second, etc. retake exam. Without retake ticket and NEPTUN registration the student is not allowed to take an examination.

By retake examination in case of failure, the written test or/and the histology exam or/and the organ demonstration should not be repeated in case it has reached at least grade 3 by the previous examination.

In case of a retake exam that serves as improving the grade, the complete examination should be repeated, except if the written test/histology/autopsy part was grade 5.

Announcement of the results is at the same day.

Suspension: If you have any problem during the test, ask the supervisor. In case of communicating, unacceptable behaviour, cheating (usage of mobile phone, books, notes, etc.) your exam is immediately suspended and the exam will not be evaluated and counts as failed exam. Written report of the incident will be prepared and signed by the teachers.

Responsible tutor: Dr. Éva KOCSMÁR (kocsmar.eva@semmelweis.hu)

Tutors:

Dr. András KISS
Dr. András BUDAI
Dr. István KENESSEY
Dr. Tibor VÁRKONYI
Dr. Eszter SZATMÁRI
Dr. Lilla MADARAS
Dr. Judit HALÁSZ
Dr. Zsófia KRAMER
Dr. Zorán MÁLI
Dr. Attila KOVÁCS
Dr. Alíz GÖGL
Dr. Gábor LOTZ
Dr. Glória RADVÁNSZKI
Dr. Deján DOBI
Dr. József TÍMÁR

PHARMACOLOGY I.

First and Second Semester

Semmelweis University, Faculty of Medicine
Department of Pharmacology and Pharmacotherapy

Semmelweis University, Faculty of General Medicine – single, long-cycle medical training programme
Name of the host institution (and any contributing institutions):
Name of the subject: Pharmacology I.
in English: Pharmacology I.
in German: Pharmakologie I.
Credit value: 4

Semester: 5th (as defined in the curriculum)

Total number of classes per week: 4.5

lectures: 2

practical lessons: 2.5

seminars: -

Type of subject: obligatory

Academic year: 2024/2025 1st semester

Course director (tutor): Dr. Ferdinandy, Péter
Contact details: Department of Pharmacology and Pharmacotherapy, 1089 Budapest, Nagyvárad tér 4. Tel: +36-1-2104416, e-mail: ferdinandy.peter@med.semmelweis-univ.hu
Position: Head of Department, full professor
Date of habilitation and reference number: June 2 2001., 26/2001 Hab.

Objectives of the course and its place in the medical curriculum:

Pharmacology is a synthesizing subject, building on what has been learned in the past, especially physiology, biochemistry, pathology, and translational medicine, and is essential for the later acquisition of clinical knowledge. The subject includes: general pharmacology, detailed pharmacology, toxicology and basics of prescription writing. General pharmacology (pharmacodynamics, pharmacokinetics) aims to acquire the basic concepts and knowledge needed for pharmacological thinking, while in detailed pharmacology the student learns the main principles of the mechanism of action, therapeutic effects,

1st week

- Lecture: Introduction to Pharmacology. (development, pharmacogenomics, basics of toxicology – Péter Ferdinandy, MD, DSc, MBA
- Practice: Basics of Pharmacodynamics (quantal dose-response curves, therapeutic indices, tolerance, drug interactions).

2nd week

- Lecture: Pharmacodynamics (receptor theories, drug-receptor interactions) – Pál Riba, MD, PhD
- Practice: Basic principles of drug prescribing. Summary of Product Characteristics.

3rd week

- Lecture: Pharmacokinetics I – Klára Gyires, MD, DSc
- Practice: Parasympathomimetics and parasympatholytics, centrally acting anticholinergic drugs

4th week

- Lecture: Pharmacokinetics II – Kornél Király, MD, PhD
- Practice: Sympathomimetics and sympatholytics

5th week

- Lecture: Presynaptic stimulation and inhibition of cholinergic and adrenergic transmission. – Pál Riba, MD, PhD
- Practice: Pharmacology of the skeletal muscles (centrally and peripherally acting).

6th week

- Lecture: Non-steroidal anti-inflammatory drugs (NSAIDs). Minor analgesics. – Klára Gyires, MD, DSc
- Practice: 1st midterm. Drugs acting on opioid receptors.

7th week

- Lecture: Local anesthetics – Mahmoud Al-Khrasani, PharmD, PhD

adverse effects, major interactions, and partly dosing of medicines. The basics of toxicology describe the mechanisms and targets of major intoxications and thus provide a theoretical background for oxyology education. All of these competencies form the grounds to study clinical pharmacology and prepare students for the skill-level application of pharmacotherapeutic knowledge essential to clinical subjects.

Place of instruction (address of lecture hall or seminar room etc.):
Nagyvárad téri Elméleti Tömb, 1089 Budapest, Nagyvárad tér 4.

Competencies acquired through the completion of the course:

Students understand the pharmacological terminology, learn the mechanism of action, therapeutic effects, adverse effects, important interactions of drugs and the basics of dosing. They understand the mechanisms and targets of the most important poisonings, as well as the knowledge of the basic rules of prescription writing.

Prerequisites for course registration and completion:

Medical Microbiology I, Molecular Cell Biology II, Medical Physiology II

OR

Medical Microbiology I Medical Physiology II, (Medical Biochemistry III OR Medical Biochemistry, Molecular and Cell Biology III., OR Molecular Cell Biology II.)

Conditions for concurrent course registration and permission thereof in the case of a multi-semester subject:

Since it is a mandatory subject all the students in the third year of medical education must register.

Student headcount conditions for starting the course (minimum, maximum) and method of student selection:

Through NEPTUN system.

Detailed course description:

(Theoretical and practical instruction must be broken down into lessons (weeks), numbered separately. Please provide the names of lecturers in both types of lessons, indicating guest lecturers. This information is not to be attached separately. CVs of guest lecturers, however, must be attached.)

- Practice: Drugs affecting uric acid metabolism. Drugs for headache syndromes.

8th week

- Lecture: Antipsychotics – Anikó Görbe, MD, PhD
- Practice: Sedative-hypnotics, anxiolytics

9th week

- Lecture: Drugs acting on the extrapyramidal motoric system. Nootropic agents – Pál Riba, MD, PhD
- Practice: Antidepressants, drugs against mania, mood stabilizers

10th week

- Lecture: General anesthetics – Anikó Görbe, MD, PhD
- Practice: Anticonvulsants (antiepileptics). Adjuvant analgesics.

11th week

- Lecture: Antiviral drugs – Zoltán Giricz, PharmD, PhD
- Practice: 2nd midterm Cell wall synthesis inhibitor antibiotics.

12th week

- Lecture: Antifungal drugs. Antimycobacterial drugs. – Pál Riba, MD, PhD
- Practice: Protein synthesis inhibitor antibiotics

13th week

- Lecture: Anthelmintic and antiprotozoal agents. Antiparasitic drugs. – Zoltán Varga, MD, PhD
- Practice: Inhibitors of nucleic acid synthesis and antibiotics with other mechanisms of action. Disinfectants, antiseptics.

14th week

- Lecture: Biological Drugs. Orphan Drugs. Advanced Therapy Medicines. Vaccines – Anikó Görbe, MD, PhD
- Practice: Nutrients, traditional plant medicines, vitamins, anorectic drugs.

Related subjects due to interdisciplinary fields (both obligatory and elective) and potential overlaps between subjects:

Physiology, biochemistry, molecular biology, pathology, translational medicine, internal medicine, cardiology, pulmonology, neurology, psychiatry, clinical pharmacology

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

Maximum number of absences is 25 percent of the number of practices in the semester. In the case of absence, the student can attend another class the same week.

Form of assessment in the study period:

(including the number, topics and scheduling of oral and written tests, their share in the overall evaluation, make-up tests and improvement tests)

During the semester, we organise two compulsory midterm tests in weeks 6 and 11. Making up or improving the midterm (or both midterms) will be possible in week 13. The improvement midterm may only be an oral exam.

The course material for the first midterm test (study material from week 1 to 5): General Pharmacology (Pharmacodynamics, Pharmacokinetics). Pharmacology of cholinergic and adrenergic transmission. Skeletal muscle relaxants.

Second midterm test (study material from week 6 to 10): NSAIDs, Drugs affecting uric acid metabolism, Drugs for headaches, Local anaesthetics, Opioids, Neuropsychopharmacology (Prescribing and the Summary of Product Characteristics are not included in the midterm test.)

The midterm tests will count towards the semester semifinal exam results:

1. 10% of the students in the top of the whole year may be awarded an excellent mark (5) and further 10% of the students in the second top 10% may be awarded a good mark, provided that they achieve at least 2x80% (2x24 points) in the midterm tests. Offering the excellent mark (five=5) requires at least 90% average result of the two tests (54/60 points). If the number of these students is less than 20% of the whole year, only they will be offered a mark, if more than 20%, the top 10% will be offered a mark. Only the results of the first attempts count towards the offered semifinal mark, not the improved midterms.
2. If the student scores better than 60% (minimum 19 points) in both midterm tests, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded. There is no exemption from the Core Concept topics.
3. If the student fails both midterm tests (even at the time of a retake) or fails to achieve 33% (10 points) in either midterm test or the improvement exam, the student will receive a grade penalty on the semifinal exam.
4. In the case of a repeated semifinal exam after a failure, the negative and, in the case of an improvement semifinal exam, both the positive and the negative modifications are cancelled

Number and type of assignments for individual work and the deadline for submission:

-

Requirements to obtain the teacher's signature:

The number of absences must not be more than 25 percent of the number of practices in the semester.

Type of assessment (comprehensive examination, end-term examination, term-grade, term-grade on a three-grade rating scale, no examination):

oral end-term semifinal examination**Examination requirements:**

(list of examination topics, subject areas of tests / examinations, lists of mandatory parameters, figures, concepts and calculations, practical skills)

In the oral semifinal exam, at first 5 active substances selected from the obligatory list of active substances must be identified and their mechanism of action explained. If the student does not recog-

nize at least 3 of the active substances, he/she will not be allowed to continue and will receive a fail mark. After successful completion of one core-concept question and two topics of two lists of topics (one from each), an acceptable level of knowledge of pharmacology must be demonstrated.

Core concept topic list

1. Stages of drug development in brief.
2. Types of clinical trials.
3. History of the Hungarian pharmaceutical industry.
4. Molecular targets of drugs
5. Receptor theory - agonist, partial agonist, antagonist, inverse agonist
6. Efficacy, potency
7. Dose-effect relationships at population level
8. Adverse drug reactions
9. Therapeutic index
10. Tolerance, tachyphylaxis, dependence
11. Absorption of drugs
12. Membrane transport mechanisms.
13. Distribution of drugs
14. Bioavailability
15. Volume of distribution
16. Phases of drug biotransformation
17. Excretion of drugs
18. Linear and non-linear pharmacokinetics
19. Clearance
20. Half-life
21. Saturating and maintenance dose
22. Drug accumulation and cumulation
23. Enzyme inducers
24. Enzyme inhibitors
25. Pharmacodynamic interactions - synergism
26. Pharmacodynamic interactions - antagonism
27. Pharmacokinetic drug interactions - at the level of absorption
28. Pharmacokinetic drug interactions - at the level of distribution
29. Pharmacokinetic drug interactions - at the level of metabolism
30. Pharmacokinetic drug interactions - at the level of elimination
31. Characterisation of biological medicinal products
32. Orphan drugs
33. Advanced therapy medicinal products. Vaccines
34. Nutritional supplements
35. Traditional herbal active substances
36. Medical device
37. Principles of antimicrobial treatment - selective toxicity
38. Principles of antimicrobial treatment - empirical, targeted and prophylactic therapy
39. Principles of antimicrobial treatment - principles of bactericidal, bacteriostatic antibiotic and antibiotic combinations
40. Principles of antimicrobial treatment - time-, concentration- and exposure-dependent antibiotics
41. Narrow and broad spectrum antibiotics
42. Antibiotic selection considerations - pregnancy, childhood
43. Antibiotic selection considerations - infections affecting specific compartments
44. Considerations for antibiotic choice - comorbidities
45. Classification of drugs according to chemical structure and complexity
46. The Summary of Product Characteristics

Topic list "A"

1. Cholinergic and adrenergic transmission and its presynaptic modification.
2. Cholinomimetics
3. Muscarinic receptor blocking drugs
4. Catecholamines
5. Indirect sympathomimetics. Selective α_1 agonists
6. α_2 -agonists and drugs acting on the imidazoline receptors
7. α -receptor antagonists
8. β -receptor antagonists
9. Centrally and peripherally acting skeletal muscle relaxants
10. Local anesthetics
11. Opioids
12. NSAIDs.
13. Drugs used for treatment of gout. Drugs for headache syndromes

14. Inhalational anesthetics
15. Intravenous anesthetics. Perioperative medication
16. Benzodiazepines
17. Non benzodiazepine anxiolytics and non-benzodiazepine hypnotics.
18. Antipsychotics
19. Monoamine reuptake inhibitors.
20. Non-reuptake-inhibitor antidepressants. Agents used for treatment of manic phase of bipolar disorders.
21. Antiepileptics. Adjuvant analgesics.
22. Drugs of neurodegenerative diseases. (Drugs acting in the extrapyramidal motoric system. Nootropic drugs)

Topic list "C"

1. Disinfectants and antiseptics
2. Antimycobacterial drugs
3. Antiprotozoal and antihelminthic drugs.
4. Antifungal agents
5. Agents to treat Herpes simplex (HSV), varicella-zoster (VZV) virus, cytomegalovirus (CMV). Anti-influenza agents Drugs against Corona- and other viruses
6. Antiretroviral agents.
7. Agents against hepatitis viruses
8. Penicillins
9. Cephalosporins
10. Carbapenems. Monobactams. Beta-lactamase inhibitors.
11. Chloramphenicol. Polymyxins. Antifolate drugs
12. Tetracyclines and glycyclines
13. Aminoglycosides
14. Quinolones and fluoroquinolones
15. Macrolides. Pleuromutins
16. Clindamycin. Streptogramins. Oxazolidinones. Fusidans.
17. Glycopeptides. Lipopeptides. Bacitracin. Mupirocin.
18. Metronidazole. Fidaxomicin. Rifaximin. Nitrofurantoin. Phosphomycin.

Method and type of grading:

(Share of theoretical and practical examinations in the overall evaluation. Inclusion of the results of the end-of-term assessment. Possibilities of and conditions for offered grades.)

The midterm tests will count towards the semester semifinal exam results:

1. 10% of the students in the top of the whole year may be awarded an excellent mark (5) and further 10% of the students in the second top 10% may be awarded a good mark, provided that they achieve at least 2x80% (2x24 points) in the midterm tests. Offering the excellent mark (five=5) requires at least 90% average result of the two tests (54/60 points). If the number of these students is less than 20% of the whole year, only they will be offered a mark, if more than 20%, the top 10% will be offered a mark. Only the results of the first attempts count towards the offered semifinal mark, not the improved midterms.

2. If the student scores better than 60% (minimum 19 points) in both midterm tests, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded. There is no exemption from the Core Concept topics.
3. If the student fails both midterm tests (even at the time of a retake), or fails to achieve 33% in either midterm test with a correction, the student will receive a grade penalty on the semifinal exam.
4. In the case of a repeated exam after a failure, the negative and, in the case of an improvement exam, both the positive and the negative modifications are cancelled.

In the oral semifinal exam, at first 5 active substances selected from the obligatory list of active substances must be identified and their mechanism of action explained. If the student does not recognize at least 3 of the active substances, he/she will not be allowed to continue and will receive a fail mark. After successful completion of one core-concept question and two topics of two lists of topics (one from each), an acceptable level of knowledge of pharmacology must be demonstrated.

Detailed information on the obligatory and the full lists of active substances. If the candidate:

1. knows all the active substances to be studied in full detail, or knows all the active substances with some minor lacks and can mention names of active substances from the full drug list, – mark 5
2. knows all the active substances to be studied and the information to a varying degree and can mention the names of active substances from the full drug list to a varying degree – 2,3,4
3. knows all the active substances to be learned, but only the name and nothing else – unsatisfactory (failure)
4. does not know any active substance names – unsatisfactory (failure)
5. does not know all the active substances from the mandatory list, but knows the active substances from the full list of active substances in the given topic, then points 1,2 or 3 above are taken into consideration, the mark is awarded according to these points

Type of grade: five-mark scale (1=unsatisfactory, 2=satisfactory, 3=average, 4=good, 5=excellent)

List of course books, textbooks, study aids and literature facilitating the acquisition of knowledge to complete the course and included in the assessment, precisely indicating which requirement each item is related to (e.g., topic by topic) as well as a list of important technical and other applicable study aids:

Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0

Materials discussed during lectures and seminars: Moodle (<https://itc.semmelweis.hu>)

Pharmacology II.

Semmelweis University, Faculty of General Medicine – single, long-cycle medical training programme

Name of the host institution (and any contributing institutions):

Department of Pharmacology and Pharmacotherapy

Name of the subject: Pharmacology II.

in English: Pharmacology II.

in German: Pharmakologie II.

Credit value: 5

Semester: 6th (as defined in the curriculum)

Total number of classes per week: 4.5

lectures: 2

practical lessons: 2.5

seminars: -

Type of subject: obligatory

Academic year: 2025/2026 2nd semester

Course director (tutor): Dr. Ferdinandy, Péter

Contact details: Department of Pharmacology and Pharmacotherapy, 1089 Budapest, Nagyvárad tér 4. Tel: +36-1-2104416, e-mail: ferdinandy.peter@med.semmelweis-univ.hu

Position: Head of Department, full professor

Date of habilitation and reference number: June 2 2001., 26/2001 Hab.

Objectives of the course and its place in the medical curriculum:

Pharmacology is a synthesizing subject, building on what has been learned in the past, especially physiology, biochemistry, pathology, and translational medicine, and is essential for the later acquisition

Detailed course description:

1st week

1st week

- Lecture: Anticoagulants, inhibitors of platelet aggregation – Anikó Görbe, MD, PhD
- Practice: Fibrinolytics, drugs against bleeding, drugs acting on blood cell production.

2nd week

- Lecture: Drugs influencing cardiac electrophysiology – Anikó Görbe, MD, PhD
- Practice: Positive inotropic agents.

3rd week

- Lecture: Diuretics, antidiuretics. – Pál Riba, MD, PhD
- Practice: Drugs influencing blood pressure (sympatholytics, nitrates, Ca-channel blockers and other vasodilators. Pharmacology of RAAS.)

4th week

- Lecture: Toxicology I – Gábor Mórotz, PhD
- Practice: Drugs influencing the oxygen demand and oxygen supply of the heart. Drugs improving microcirculation. Drugs affecting lipid metabolism

5th week

- Lecture: Toxicology II – Lea Danics, PharmD, PhD . (1 study hour).
- Practice: Drugs acting on blood glucose control. Drugs controlling body weight..

6th week

- Lecture: Pharmacology of the respiratory system (Bronchodilators and drugs inhibiting the bronchial inflammatory processes, expectorants (secretomotorics, secretolytics, mucolytics), antitussive drugs) – Zoltán Varga, MD, PhD
- Practice: Histamine, antihistamines. Drugs acting on smooth muscles 3rd midterm

7th week

- Lecture: Corticosteroids and their antagonists. Drugs inhibiting steroid hormone synthesis – Bence Ágg, MD, PhD
- Practice: Pharmacology of pituitary hormones. Hypothalamic hormones, hormonal analogs and antagonists. Pharmacology of thyroid gland (thyroid hormones and antithyroid drugs).

Related subjects due to interdisciplinary fields (both obligatory and elective) and potential overlaps between subjects:

Physiology, biochemistry, molecular biology, pathology, translational medicine, internal medicine, cardiology, pulmonology, neurology, psychiatry, clinical pharmacology

of clinical knowledge. The subject includes: general pharmacology, detailed pharmacology, toxicology and basics of prescription writing. General pharmacology (pharmacodynamics, pharmacokinetics) aims to acquire the basic concepts and knowledge needed for pharmacological thinking, while in detailed pharmacology the student learns the main principles of the mechanism of action, therapeutic effects, adverse effects, major interactions, and partly dosing of medicines. The basics of toxicology describe the mechanisms and targets of major intoxications and thus provide a theoretical background for oxyology education. All of these competencies form the grounds to study clinical pharmacology and prepare students for the skill-level application of pharmacotherapeutic knowledge essential to clinical subjects.

Place of instruction (address of lecture hall or seminar room etc.):

Nagyvárad téri Elméleti Tömb, 1089 Budapest, Nagyvárad tér 4.

Competencies acquired through the completion of the course:

Students understand the pharmacological terminology, learn the mechanism of action, therapeutic effects, adverse effects, important interactions of drugs and the basics of dosing. They understand the mechanisms and targets of the most important poisonings, as well as the knowledge of the basic rules of prescription writing.

Prerequisites for course registration and completion:

Pharmacology I, Medical Microbiology II, Pathology I

Conditions for concurrent course registration and permission thereof in the case of a multi-semester subject:

The Department of Pharmacology and Pharmacotherapy does not support concurrent course registration.

Student headcount conditions for starting the course (minimum, maximum) and method of student selection:

Through NEPTUN system.

8th week

- Lecture: Pharmacology of female sexual hormones. Contraceptive medications. – Pál Riba, MD, PhD
- Practice: Androgens, antiandrogens, anabolic steroids, drugs influencing sexual activity. Drugs affecting bone mineral homeostasis.

9th week

- Lecture: Drugs influencing gastric acid secretion, drugs protecting gastric mucosa – Klára Gyires, MD, DSc
- Practice: Core concepts of adverse effects. Toxicology exam

10th week

- Lecture: Immunopharmacology (cytotoxic agents, inhibitors of intracellular signaling, cytokine and cytokine receptor inhibitors) – Zoltán Varga, MD, PhD
- Practice: Appetizers, drugs promoting digestion, antiemetics, prokinetic agents. Laxatives, drugs against diarrhea. Pharmacology of liver and bile.

11th week

- Lecture: Small molecule signal transmission inhibitor anticancer drugs. – Zoltán Varga, MD, PhD
- Practice: Cytotoxic anticancer drugs I. 4th midterm

12th week

- Lecture: Anticancer antibodies. Immunostimulant anticancer agents. – Zoltán Varga, MD, PhD
- Practice: Cytotoxic anticancer drugs II. Anticancer drugs with hormonal mechanisms

13th week

- Lecture: Pharmacodynamic and pharmacokinetic basics of drug interactions – Anikó Görbe, MD, PhD
- Practice: Drugs and pregnancy. Dermatological and ophthalmological drugs - summary

14th week

- Lecture: Pharmacogenomics, personalized medicine, drugs for orphan disease. Special aspects of pharmacology in children and elderly – Zsófia Gulyás-Onódi, MD, PhD
- Practice: Contrast agents. Consultation

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

Maximum number of absences is 25 percent of the number of practices in the semester. In the case of absence, the student can attend another class the same week.

Form of assessment in the study period:

(including the number, topics and scheduling of oral and written tests, their share in the overall evaluation, make-up tests and improvement tests)

During the semester, two obligatory midterm tests will be organized in weeks 6 and 11. These can be made up in weeks 7 and 12. Improvement attempt of the midterm tests (both) will be possible in week 13. The correction may only be a verbal demonstration. The first semester midterms cannot be improved in the second semester.

The course material for the third midterm test (study material from

week 1 to 5 4 and the half of the 5th week lecture): Pharmacology of the cardiovascular system. Drugs acting on lipid metabolism. Drug acting on blood glucose level.

Fourth midterm test (seminar topics of the 5th week, half of the 5th week lecture and study material from week 6 to 10): Endocrine pharmacology. Pharmacology of the respiratory system. Pharmacology of the gastrointestinal system. Histamine and antihistamines. Drugs acting on smooth muscles. Immunopharmacology.

The midterm tests will count towards the final exam results:

1. If the student scores better than 60% (minimum 19 points) in all four midterm tests during the whole year, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded. There is no exemption from the Core Concept topics.
2. If the student achieves at least 80% score of all four midterm tests one final exam topic will be waived as well as the drug recognition question. The waived topic will be chosen by the examiner.
3. At the competition at the end of the year, the student who has at least one midterm of 80% and none of his/her demonstrations is worse than 33%, depending on the result of the competition, will be rewarded: between scores 90-100% the students will choose one of the three topics, between 80-89% the students will choose which one he/she will drop, between 70-79% the examiner will choose one topic to be dropped. The drug recognition question will be waived.
4. If the student fails both midterm tests of the second semester (even at the time of a retake), or fails to achieve 33% (minimum 10 points) in either midterm test with a correction, the student will receive a grade penalty on the first attempt of the final exam.
5. In the case of a repeated exam after a failure, the negative and, in the case of an improvement exam, both the positive and the negative modifications are cancelled. The first semester midterms, if their results were worse than 33%, will not be counted for the final exam.

Number and type of assignments for individual work and the deadline for submission:**Requirements to obtain the teacher's signature:**

The number of absences must not be more than 25 percent of the number of practices in the semester.

Type of assessment (*comprehensive examination, end-term examination, term-grade, term-grade on a three-grade rating scale, no examination*):

oral comprehensive examination**Examination requirements:**

(*list of examination topics, subject areas of tests / examinations, lists of mandatory parameters, figures, concepts and calculations, practical skills*)

To register for the oral examination, the student must pass the toxicology exam during the study period (9th week). The grade in the toxicology exam counts towards the final grade. In the oral final exam, at first 5 active substances selected from the compulsory list of active substances must be identified and their mechanism of action explained (except if the student's four midterm exams reach minimum of 60% - 19 points -each). If the student does not recognize at least 3 of the active substances, he/she will not be allowed to continue and will receive a fail mark. After successful completion of one core-concept question and three topics of three lists of topics (one from each), an acceptable level of knowledge of pharmacology must be demonstrated.

Toxicology topics

6. Management of the poisoned patient I. antidotes
7. Management of the poisoned patient II. Emergency care. Decontamination. Enhancing of elimination of toxins. supportive treatment.
8. Pharmacology of chelators
9. Acid and base poisonings
10. Mercury poisoning
11. Lead poisoning
12. Arsenic poisoning
13. Cadmium poisoning
14. Poisons inducing methemoglobinemia
15. Aliphatic hydrocarbons and aliphatic halogenated hydrocarbons
16. Aromatic hydrocarbons,
17. Nitrobenzene and aniline poisonings
18. DNP, DNOC poisonings
19. Methanol and glycol poisonings
20. Poisonings caused by aliphatic aldehydes.
21. Carbon monoxide poisoning
22. Poisonings caused by insecticides and herbicides
23. Mushroom poisoning
24. Cyanide poisoning
25. Snake and bee bites
26. Poisonous plants

Core concept topic list

1. Stages of drug development in brief.
2. Types of clinical trials.
3. History of the Hungarian pharmaceutical industry.
4. Molecular targets of drugs
5. Receptor theory - agonist, partial agonist, antagonist, inverse agonist
6. Efficacy, potency
7. Dose-effect relationships at population level
8. Adverse drug reactions
9. Therapeutic index
10. Tolerance, tachyphylaxis, dependence
11. Absorption of drugs
12. Membrane transport mechanisms.
13. Distribution of drugs
14. Bioavailability
15. Volume of distribution

16. Phases of drug biotransformation
17. Excretion of drugs
18. Linear and non-linear pharmacokinetics
19. Clearance
20. Half-life
21. Saturating and maintenance dose
22. Drug accumulation and cumulation
23. Enzyme inducers
24. Enzyme inhibitors
25. Pharmacodynamic interactions - synergism
26. Pharmacodynamic interactions - antagonism
27. Pharmacokinetic drug interactions - at the level of absorption
28. Pharmacokinetic drug interactions - at the level of distribution
29. Pharmacokinetic drug interactions - at the level of metabolism
30. Pharmacokinetic drug interactions - at the level of elimination
31. Special groups - drug interactions: pregnancy
32. Special groups - drug interactions: childhood
33. Special groups - drug interactions: ageing
34. Characterisation of biological medicinal products
35. Orphan drugs
36. Advanced therapy medicinal products. Vaccines
37. Nutritional supplements
38. Traditional herbal active substances
39. Medical device
40. Principles of antimicrobial treatment - selective toxicity
41. Principles of antimicrobial treatment - empirical, targeted and prophylactic therapy
42. Principles of antimicrobial treatment - principles of bactericidal, bacteriostatic antibiotic and antibiotic combinations
43. Principles of antimicrobial treatment - time-, concentration- and exposure-dependent antibiotics
44. Narrow and broad spectrum antibiotics
45. Antibiotic selection considerations - pregnancy, childhood
46. Antibiotic selection considerations - infections affecting specific compartments
47. Considerations for antibiotic choice - comorbidities
48. Antidote - definition and examples
49. Pharmacogenetics, pharmacogenomics - definition, examples
50. Classification of drugs according to chemical structure and complexity
51. Drug-induced adverse reaction: sulfonamide allergy and its characterization
52. Drug-induced adverse reaction: serotonin syndrome
53. Drug-induced adverse reaction: neuroleptic malignant syndrome
54. Drug-induced adverse reaction: Stevens-Johnson sy.
55. Drug-induced adverse reaction: pseudomembranous colitis
56. Drug-induced adverse reaction: cheese reaction
57. Drug-induced adverse reaction: orthostatic hypotension
58. Drug-induced adverse reaction: hemorrhage
59. Drug-induced adverse reaction: thrombosis
60. Drug-induced adverse reaction: bone marrow damage
61. Drug-induced adverse reaction: nephrotoxicity
62. Drug-induced adverse reaction: ototoxicity
63. Drug-induced adverse reaction: hepatotoxicity
64. Drug-induced adverse reaction: QT prolongation
65. Drug-induced adverse reaction: bradycardia / AV block
66. Drug-induced adverse reaction: constipation, diarrhea, vomiting
67. Drug-induced adverse reaction: mucosal damage
68. Drug-induced adverse reaction: weight gain/loss
69. Drug-induced adverse reaction: sedation
70. Drug-induced adverse reaction: epileptiform seizures MI
71. Drug-induced adverse reaction: sexual dysfunction
72. Drug-induced adverse reaction: dental and oral cavity adverse reactions
73. The Summary of Product Characteristics

Topic list "A"

1. Cholinergic and adrenergic transmission and its presynaptic modification.
2. Cholinomimetics
3. Muscarinic receptor blocking drugs
4. Catecholamines
5. Indirect sympathomimetics. Selective α_1 agonists
6. α_2 -agonists and drugs acting on the imidazoline receptors
7. α -receptor antagonists
8. β -receptor antagonists
9. Centrally and peripherally acting skeletal muscle relaxants
10. Local anesthetics
11. Opioids
12. NSAIDs.
13. Drugs used for treatment of gout. Drugs for headache syndromes
14. Inhalational anesthetics
15. Intravenous anesthetics. Perioperative medication
16. Benzodiazepines
17. Non benzodiazepine anxiolytics and non-benzodiazepine hypnotics.
18. Antipsychotics
19. Monoamine reuptake inhibitors.
20. Non-reuptake-inhibitor antidepressants. Agents used for treatment of manic phase of bipolar disorders.
21. Antiepileptics. Adjuvant analgesics.
22. Drugs of neurodegenerative diseases. (Drugs acting in the extrapyramidal motoric system. Nootropic drugs)

Topic list "B"

1. Drugs influencing blood coagulation I: Antiplatelet agents. Fibrinolytic drugs. Drugs inhibiting bleeding
2. Drugs influencing blood coagulation II: Anticoagulant drugs
3. Agents used in anemias
4. Positiv inotropic drugs
5. Drugs influencing cardiac electrophysiology.
6. Drugs acting on the renin-angiotensin-aldosterone-system (RAAS)
7. Ca^{++} -channel blockers and other vasodilators
8. Drugs influencing the oxygen demand and oxygen supply of the heart. Drugs improving microcirculation.
9. Drugs affecting lipid metabolism. Drugs controlling body weight
10. Potassium excreting (wasting) diuretics
11. Potassium sparing diuretics, ADH antagonists, osmotic diuretics
12. Glucocorticoids for oral and parenteral use
13. Mineralocorticoids. Topically applied glucocorticoids. Adrenocortical antagonists, inhibitors of corticosteroid synthesis.
14. Androgens, anabolic steroids, antiandrogens. Agents affecting the sexual activity
15. Estrogens and antiestrogens
16. Progestins and antiprogestins. Contraceptives
17. Thyroid and antithyroid drugs. Pituitary hormones. Hypothalamic hormones, hormonanalogs and antagonists.
18. Pancreatic hormones and parenterally applied antidiabetic drugs.
19. Oral antidiabetics.
20. Agents affecting bone mineral homeostasis (calcium, vitamin D, parathyroid hormone, calcitonin, etc.).
21. Selective β_2 -stimulants and other bronchodilators.
22. Antiinflammatory agents inhibiting bronchial inflammatory processes. Antitussive agents and expectorants
23. Drugs influencing gastric acid secretion, protective drugs of gastric mucosa
24. Antiemetic drugs. Prokinetic agents.
25. Drugs used in constipation (laxatives) and diarrhea. Drugs promoting digestion. Pharmacology of liver and biliary tract
26. Histamine and antihistamines
27. Drugs acting on smooth muscles. Drugs influencing uterus contractions.
28. Immunopharmacology I. (cytotoxic agents).
29. Immunopharmacology II. (Inhibitors of cytokine gene expression, 5-ASA derivatives)
30. Immunopharmacology III. (Antibodies and fusion proteins)
31. Drugs used in cancer treatment I (antimetabolites)
32. Drugs used in cancer treatment II (cytotoxic agents targeting DNA)
33. Drugs used in cancer treatment III (Topoisomerase inhibitors. Inhibitors of mitotic spindle)
34. Drugs used in cancer treatment IV. (Hormonal agents)
35. Drugs used in cancer treatment V. (Small molecule signal transduction inhibitors. Retinoids)
36. Drugs used in cancer treatment VI. (Large molecule signal transduction inhibitors. Immunostimulant anticancer drugs.)

Topic list "C"

1. Disinfectants and antiseptics
2. Antimycobacterial drugs
3. Antiprotozoal and antihelminthic drugs.
4. Antifungal agents
5. Agents to treat Herpes simplex (HSV), varicella-zoster (VZV) virus, cytomegalovirus (CMV). Anti-influenza agents Drugs against Corona- and other viruses
6. Antiretroviral agents.
7. Agents against hepatitis viruses
8. Penicillins
9. Cephalosporins
10. Carbapenems. Monobactams. Beta-lactamase inhibitors.
11. Chloramphenicol. Polymyxins. Antifolate drugs
12. Tetracyclines and glycyclcyclines
13. Aminoglycosides
14. Quinolones and fluoroquinolones
15. Macrolides. Pleuromutilins
16. Clindamycin. Streptogramins. Oxazolidinones. Fusidans.
17. Glycopeptides. Lipopeptides. Bacitracin. Mupirocin.
18. Metronidazole. Fidaxomicin. Rifaximin. Nitrofurantoin. Phosphomycin.

Method and type of grading:

(Share of theoretical and practical examinations in the overall evaluation. Inclusion of the results of the end-of-term assessment. Possibilities of and conditions for offered grades.)

To apply for the final examination, the student must have passed the toxicology exam (on week 9). The student may improve the result of the toxicology exam orally with his/her teacher. The grade of the toxicology exam will be counted towards the result of the final exam.

The midterm tests will count towards the semester final exam results:

1. If the student scores better than 60% (minimum 19 points) in all four midterm tests during the whole year, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded. There is no exemption from the Core Concept topics.
2. If the student achieves at least 80% score of all four midterm tests (minimum 4x24 points) one final exam topic will be waived as well as the drug recognition question. The waived topic will be chosen by the examiner.
3. At the competition at the end of the year, the student who has at least one midterm of 80% (minimum 24 points) and none of his/her demonstrations is worse than 33%, depending on the result of the competition, will be rewarded: between scores 90-100% the students will choose one of the three topics, between 80-89% the students will choose which one he/she will drop, between 70-79% the examiner will choose one topic to be dropped. The drug recognition question will be waived.
4. If the student fails both midterm tests of the second semester (even at the time of a retake), or fails to achieve 33% (minimum 10 points) in either midterm test with a correction, the student will receive a grade penalty on the final exam.
5. In the case of a repeated exam after a failure, the negative and, in the case of an improvement exam, both the positive and the negative modifications are cancelled. The first semester midterms, if their results were worse than 33%, will not be counted for the final exam.

In the oral final exam, at first 5 active substances selected from the obligatory list of active substances must be identified and their mechanism of action explained. If the student does not recognize at least 3 of the active substances, he/she will not be allowed to continue and will receive a fail mark. After successful completion of one core-concept question and three topics of three lists of topics (one from each), an acceptable level of knowledge of pharmacology must be demonstrated.

Detailed information on the obligatory and the full lists of active substances. If the candidate:

1. knows all the active substances to be studied in full detail, or knows all the active substances with some minor lacks and can mention names of active substances from the full drug list, – mark 5
2. knows all the active substances to be studied and the information to a varying degree and can mention the names of active substances from the full drug list to a varying degree - 2,3,4
3. knows all the active substances to be learned, but only the name and nothing else – unsatisfactory (failure)
4. does not know any active substance names – unsatisfactory (failure)
5. does not know all the active substances from the mandatory list, but knows the active substances from the full list of active substances in the given topic, then points 1,2 or 3 above are taken into consideration, the mark is awarded according to these points

Type of grade: five-mark scale (1=unsatisfactory, 2=satisfactory, 3=average, 4=good, 5=excellent)

List of course books, textbooks, study aids and literature facilitating the acquisition of knowledge to complete the course and included in the assessment, precisely indicating which requirement each item is related to (e.g., topic by topic) as well as a list of important technical and other applicable study aids: Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0

Materials discussed during lectures and seminars: Moodle (<https://itc.semmelweis.hu>)

PHYSICAL EDUCATION V-VI.

Physical Education and Sportcenter
Subject: Physical Education V.

Type of Subject: Obligatory
Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

The syllabus (preferably a week and numbered):

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.
1107 Bp, Zágrábi utca 14.

1x60 min./week sessions:

- Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, male football, salsa, step aerobics, badminton, beginner ultimate frisbee, advanced ultimate frisbee, zumba
- 1 x 90 mins./week sessions: women's football, ice hockey, beginner tennis, beginner tennis 2,
- 4 x 3 hrs. and 1x 2 hrs. session packages: Golf, Hiking 1, Hiking 2.
- 2x90 mins./week sport training (competitive sport, for qualified only): cheerleader, men's and women football, handball, basketball, volleyball, waterpolo

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Except for the Sport Hiking courses, where you have to attend 4 times due to blocking. 3 of these are on your own course and 1 can be made up by arrangement with the instructor!

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Physical Education and Sportcenter
Subject: Physical Education VI.

Type of Subject: Obligatory

Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

The syllabus (preferably a week and numbered):

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.
1107 Bp, Zágrábi utca 14.

1x60 min./week sessions:

- Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, male football, salsa, step aerobics, badminton, beginner ultimate frisbee, advanced ultimate frisbee, zumba
- 1 x 90 mins./week sessions: women's football, ice hockey, beginner tennis, beginner tennis 2,
- 4 x 3 hrs. and 1x 2 hrs. session packages: Golf, Hiking 1, Hiking 2.
- 2x90 mins./week sport training (competitive sport, for qualified only): cheerleader, men's and women football, handball, basketball, volleyball, waterpolo

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Except for the Sport Hiking courses, where you have to attend 4 times due to blocking. 3 of these are on your own course and 1 can be made up by arrangement with the instructor!

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

TRANSLATIONAL MEDICINE AND PATHOPHYSIOLOGY I-II.

5th semester

Credit value: 3

Number of lessons per week: 42 **lecture:** 21 **practical course:** 21

Academic year: 2023/2024 Semester 1

Name of the course leader: Zoltán Benyó MD, PhD, DSc

His/her workplace, phone number: Institute of Translational Medicine, 06-1-210-0306

Position: Director, University Professor

Date and registration number of their habilitation: 2008, 259

Objectives of the subject, its place in the medical curriculum:

The objective of the course is to have the students understand the complex mechanisms responsible for the development of functional disturbances in common conditions affecting the function of the entire organism through integration of the knowledge imparted by initial courses (most importantly anatomy, biochemistry and physiology), as well as the regulatory processes that are activated in order to fend off these disturbances. Having assimilated the knowledge encompassing organ systems and disciplines and the integrative approach, the students will be ready to understand, in the course of their clinical education, the mechanisms and symptomatology of various diseases and the respective therapeutic possibilities.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Centre of Theoretical Medicine, 37–47 Tűzoltó street, 1094 Budapest
Theoretical Building, 4 Nagyvárad square, 1089 Budapest

Competencies acquired through the completion of the course:

Based on their basic training in anatomy, biochemistry and physiology, the students will become capable of understanding the manifestation, on the organism level, of the pathological processes underlying the most common diseases, their symptoms, causes and potential therapeutic outcomes. Helped by practice sessions closely linked with the theoretical material, the students will acquire the skills necessary for following causality relationships in the disturbances of physiological processes and for recognizing the effects of these disturbances on the totality of the function of the organism, and will gain experience in test methods utilized in clinical practice, their theoretical bases, margins for interpretation and actual execution.

Prerequisites for course registration and completion:

Anatomy, final exam Macroanatomy: AOKATN667_2A
Biochemistry, final exam Biochemistry II.
Physiology, final exam Physiology II.

Conditions for concurrent course registration and permission thereof in the case of a multi-semester subject:

None

Number of students required for the course (minimum, maximum) and method of selecting students:

Based on registration in the Neptun system; offered in the autumn semester for the entire class.

Detailed curriculum:

Semester 1

Lectures (75 min. lectures weekly)

Week 1	Hypertension – Zoltán Benyó
Week 2	Congestive heart failure – László Tornóci
Week 3	Obesity – Éva Ruisanchez
Week 4	Diabetes I: Pathogenesis of Type 1 and 2 diabetes – Domokos Gerő
Week 5	Diabetes II: Pathogenesis of diabetic complication – Domokos Gerő

Week 6	Atherosclerosis and disorders of lipid metabolism – Éva Margittai
Week 7	Disorders of Hemostasis – Zoltán Benyó
Week 8	Endocrine diseases I: Pituitary gland and reproductive system – Zoltán Benyó
Week 9	Endocrine diseases II: Thyroid gland – Tamás Ivanics
Week 10	Endocrine diseases III: Adrenal gland – Tamás Ivanics
Week 11	Menopause – Tímea Tímár
Week 12	Osteoporosis. Calcium and phosphate homeostasis – Gábor Kökény
Week 13	Systemic autoimmune diseases and joint disorders – Gábor Kökény
Week 14	Disorders developing in the course of immobilization and their treatment. Cachexia. Rehabilitation. – Zoltán Benyó

Practices (150 min. lessons biweekly)

Weeks 1-2	Hypertension, ABPM and Clinical case discussion
Weeks 3-4	Blood pressure measurement, arterial pulse wave, ankle-brachial index
Weeks 5-6	Obesity and Diabetes, and Clinical case discussion
Weeks 7-8	Diabetic neuropathy diagnostic procedures
Weeks 9-10	Diabetic vascular function task
Weeks 11-12	Adrenal gland and Thyroid gland, and Clinical case discussion
Weeks 13-14	Menopause and Osteoporosis, and Clinical case discussion

Related subjects due to interdisciplinary fields (both obligatory and elective) and potential overlaps between subjects:

Pathology, Immunology, Laboratory medicine and General medicine

Number and type of assignments for individual work and the deadline for submission:

None

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

Participation at practice sessions is obligatory. Maximum of 1 absence from the practice sessions is acceptable. Absence from more than 1 of the practice sessions in a semester means that the student did not fulfil his/her semestrial study obligations. There is no possibility for making up for absence from lectures; absence from practice sessions can be made up for with another group in the same week, if there is room for additional participants. In case of absence students should immediately contact (e-mail) your course tutors who will decide the request.

Form of assessment in the study period:

(including the number, topics and scheduling of oral and written tests, their share in the overall evaluation, make-up tests and improvement tests)

Students might give account of – which there is no obligatory participation – their theoretical and practical curriculum knowledge of the material so far presented in the lectures and the practical lessons on two occasions in the course of the semester, at predetermined dates/times, in the form of written or online test. Based on the combined results of the two competition rounds, we will prepare a grade offer for the colloquium examination.

Requirements for semestrial signature:

The requirement for the end-of-semester signature: absence from more than 1 practice sessions in a semester also means that the student did not fulfil his/her semestrial study obligations, therefore he/she is not permitted to take the exam.

Type of examination:

Semifinal exam

Requirements of the examination:

1. Definition of hypertension and its different forms; hypertension of known causes; complications of hypertension
2. Essential hypertension; principles of hypertension treatment
3. Heart failure, its causes and symptoms
4. Secondary effects of heart failure, therapeutic options
5. Prevalence, causes and definition of obesity
6. Adipose tissue function and dysfunction
7. Systemic consequences of obesity
8. Pathogenesis of Type 1 diabetes mellitus
9. Pathogenesis of Type 2 diabetes mellitus
10. Microvascular complications of diabetes mellitus
11. Macrovascular complications of diabetes mellitus
12. Classification of dyslipidemias; syndromes of primary hyperlipoproteinemia
13. Syndromes associated with secondary hyperlipoproteinemia
14. Atherosclerosis
15. Conditions associated with coagulation system dysfunction
16. Conditions associated with excessive activation of the coagulation system
17. Simultaneous under- and overacting disorders of the coagulation system
18. Pathogenesis of hypothyroidism and the symptoms of hypothyroidism
19. Pathogenesis of syndromes with hyperthyroidism and symptoms of thyrotoxicosis
20. Pathogenesis of acute and chronic adrenocortical insufficiency, pathomechanism underlying the main symptoms; congenital adrenal hyperplasia

1st Semester, Exam topics, (practice)

Case study presentation of relevant clinical cases to discuss the pathogenesis of typical symptoms, diagnosis and therapeutic approaches in diseases.

Case 1-4. Hypertension

Case 5-8. Obesity – Diabetes

Case 9-12. Endocrine disorder

Case 13-16. Menopause and osteoporosis

Practical tasks, device operation:

1. Methods to measure blood pressure. Practical aspects of correctly performing blood pressure measurement.
2. ABPM and its indications. How is an ABPM test performed? Why is it important to assess diurnal rhythm?
3. Diagnostic criteria of hypertension using different methods of measurement. What are the indications and benefits of home blood pressure monitoring?
4. Investigation methods of vascular aging. The significance of pulse wave velocity and its measurement.
5. Characterization of the physiological arterial pulse wave and its changes with aging.
6. The definition and measurement of the ankle-brachial index. Its significance.
7. Diabetic neuropathy task: the manifestations and symptoms of diabetic neuropathy, their pathomechanism.
8. Examination procedures used for diagnosing neuropathy affecting somatic nerves. Explanation of the physical examination procedures presented in the practical lesson.
9. Diabetic neuropathy Diagnostic procedures used in the investigation of autonomic neuropathic abnormalities. Demonstration of the performance of the Ewing test.
10. Diabetic vascular function task: briefly describe the methods of laser Doppler flow measurement and transcutaneous partial oxygen tension measurement. Describe the blood flow response to heating and its changes in diabetic vascular dysfunction; explain the underlying pathomechanism.
11. Diabetic vascular function task: briefly describe the methods of laser Doppler flow measurement and transcutaneous partial oxygen tension measurement. Explain what post-occlusive reactive hyperaemia is and how it changes with diabetic vascular dysfunction; explain the underlying pathomechanism.

1st Semester, Exam topics, (theory)

21. Pathogenesis of Cushing's syndrome, pathomechanism underlying the symptoms and diagnosis
22. Pathogenesis of primary and secondary hyperaldosteronism; the pathomechanism underlying the symptoms
23. Possible causes of overproduction of growth hormone and prolactin, the pathomechanism of the consequences
24. Male hypogonadism and androgen insensitivity syndrome
25. Disorders of the female hormonal regulation
26. Menopausal transition and menopause
27. Postmenopause
28. Hormonal regulation of calcium and phosphate metabolism in physiological and pathological conditions
29. Hormonal regulation of calcium and phosphate metabolism in physiological and pathological conditions, its effects on the skeletal system
30. Non-osteoporotic bone diseases in adults and extraskeletal effects of vitamin D deficiency
31. General mechanisms in the development of systemic autoimmune diseases
32. Autoimmune joint diseases; rheumatoid arthritis and ankylosing spondylitis
33. Pathomechanism of Systemic lupus erythematosus, systemic sclerosis and Sjögren's syndrome
34. The effect of the immobilization syndrome on somatic functions
35. The effect of immobilization syndrome on autonomic functions

Method and type of evaluation:

Semifinal exam:

The semifinal exam is oral.

Exam exemption may be obtained by achieving exceptional results in the competition, a grade "4" or "5" may be offered as the colloquium/semifinal examination grade.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

The Figures of the lectures available for download at the website, and short written extracts of the lectures ("handout")
Gary D. Hammer, Stephen J. McPhee: Pathophysiology of Diseases: An Introduction to Clinical Medicine– A LANGE medical book 7th edition (2014), 8th edition (2018)

6th Semester

Credit value: 3

Number of lessons per week: 42 **lecture:** 21 **practical course:** 21

Academic year: 2023/2024 Semester 2

Name of the course leader: Zoltán Benyó MD, PhD, DSc

His/her workplace, phone number: Institute of Translational Medicine, 06-1-210-0306

Position: Director, University Professor

Date and registration number of their habilitation: 2008, 259

Objectives of the subject, its place in the medical curriculum:

The objective of the course is to have the students understand the complex mechanisms responsible for the development of functional disturbances in common conditions affecting the function of the entire organism, through integration of the knowledge imparted by initial courses (most importantly anatomy, biochemistry and physiology), as well as the regulatory processes that are activated in order to fend off these disturbances. Having assimilated the knowledge encompassing organ systems and disciplines and the integrative approach, the students will be ready to understand, in the course of their clinical education, the mechanisms and symptomatology of various diseases and the respective therapeutic possibilities.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Centre of Theoretical Medicine, 37–47 Tűzoltó street, 1094 Budapest
Theoretical Building, 4 Nagyvárud square, 1089 Budapest

Successful completion of the subject results in the acquisition of the following competencies:

Based on their basic training in anatomy, biochemistry and physiology, the students will become capable of understanding the manifestation, on the organism level, of the pathological processes underlying the most common diseases, their symptoms, causes and potential therapeutic outcomes. Helped by practice sessions closely linked with the theoretical material, the students will acquire the skills necessary for following causality relationships in the disturbances of physiological processes and for recognizing the effects of these disturbances on the totality of the function of the organism, and will gain experience in test methods utilized in clinical practice, their theoretical bases, margins for interpretation and actual execution.

Prerequisites for course registration and completion:

Pathology I. semifinal

Translation Medicine – Pathophysiology I. semifinal

Conditions for concurrent course registration and permission thereof in the case of a multi-semester subject:

None

Student headcount conditions for starting the course (minimum, maximum) and method of student selection:

Based on registration in the Neptun system; offered in the spring semester for the entire class

Detailed course description:

Semester 2.

Lectures (75 min. lectures weekly)

Week 1	Pathophysiology of gastrointestinal diseases – Gábor Kókény
Week 2	Liver tract disorders – Éva Margittai
Week 3	Acute alcohol and biliary poisoning. Acute and chronic pancreatitis – Éva Margittai
Week 4	Acute kidney injury – Péter Hamar
Week 5	Chronic kidney disease – Péter Hamar
Week 6	Acute respiratory failure – György Losonczy
Week 7	Chronic respiratory disorders – György Losonczy
Week 8	Acid-base disorders – Domokos Gerő
Week 9	Na ⁺ , K ⁺ and water balance; pathophysiology of fluid and electrolyte disorders – Éva Margittai
Week 10	Circulatory shock – Zoltán Benyó

Week 11	Septic and anaphylactic shock – Zoltán Benyó
Week 12	Pathophysiology of ageing – Zoltán Ungvári
Week 13	Secondary disorders developing in malignant diseases – Péter Hamar
Week 14	Consultation lecture

Practices (150 min. lessons biweekly)

Weeks 1-2	GI diseases and Nutritional status analysis, Clinical case discussion
Weeks 3-4	Liver diseases and Clinical case discussion
Weeks 5-6	Kidney diseases and Clinical case discussion
Weeks 7-8	Respiratory diseases and Clinical case discussion
Weeks 9-10	Acid-base disorders and Clinical case discussion
Weeks 11-12	Circulatory shock and Clinical case discussion
Weeks 13-14	Vascular cognitive disorders: fNIRS and cognitive tests

Related subjects due to interdisciplinary fields (both obligatory and elective) and potential overlaps between subjects:

Pathology, Immunology, Laboratory medicine and General medicine

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

Participation at practice sessions is obligatory. Maximum of 1 absence from the practice sessions is acceptable. Absence from more than 1 of the practice sessions in a semester means that the student did not fulfil his/her semestrial study obligations. There is no possibility for making up for absence from lectures; absence from practice sessions can be made up for with another group in the same week, if there is room for additional participants. In case of absence students should immediately contact (e-mail) your course tutors who will decide the request.

Form of assessment in the study period:

(including the number, topics and scheduling of oral and written tests, their share in the overall evaluation, make-up tests and improvement tests)

Students might give account of – which there is no obligatory participation - their theoretical and practical curriculum knowledge of the material so far presented in the lectures and the practical lessons on two occasions in the course of the semester, at predetermined dates/times, in the form of written or online test. Based on the combined results of the two competition rounds, we will prepare a grade offer for the final examination.

Number and type of assignments for individual work and the deadline for submission:

None

Requirements for semestral signature:

The requirement for the end-of-semester signature: absence from more than 1 practice sessions in a semester also means that the student did not fulfil his/her semestrial study obligations, therefore he/she is not permitted to take the exam.

Type of examination:

Final exam

Examination requirements:

1st Semester Exam topics – Theory

1. Definition of hypertension and its different forms; hypertension of known causes; complications of hypertension
2. Essential hypertension; principles of hypertension treatment
3. Heart failure, its causes and symptoms
4. Secondary effects of heart failure, therapeutic options
5. Prevalence, causes and definition of obesity
6. Adipose tissue function and dysfunction
7. Systemic consequences of obesity
8. Pathogenesis of Type 1 diabetes mellitus
9. Pathogenesis of Type 2 diabetes mellitus
10. Microvascular complications of diabetes mellitus
11. Macrovascular complications of diabetes mellitus
12. Classification of dyslipidemias; syndromes of primary hyperlipoproteinemia
13. Syndromes associated with secondary hyperlipoproteinemia

14. Atherosclerosis
15. Conditions associated with coagulation system dysfunction
16. Conditions associated with excessive activation of the coagulation system
17. Simultaneous under- and overacting disorders of the coagulation system
18. Pathogenesis of hypothyroidism and the symptoms of hypothyroidism
19. Pathogenesis of syndromes with hyperthyroidism and symptoms of thyrotoxicosis
20. Pathogenesis of acute and chronic adrenocortical insufficiency, pathomechanism underlying the main symptoms; congenital adrenal hyperplasia
21. Pathogenesis of Cushing's syndrome, pathomechanism underlying the symptoms and diagnosis
22. Pathogenesis of primary and secondary hyperaldosteronism; the pathomechanism underlying the symptoms
23. Possible causes of overproduction of growth hormone and prolactin, the pathomechanism of the consequences
24. Male hypogonadism and androgen insensitivity syndrome
25. Disorders of the female hormonal regulation
26. Menopausal transition and menopause
27. Postmenopause
28. Hormonal regulation of calcium and phosphate metabolism in physiological and pathological conditions
29. Hormonal regulation of calcium and phosphate metabolism in physiological and pathological conditions, its effects on the skeletal system
30. Non-osteoporotic bone diseases in adults and extraskelatal effects of vitamin D deficiency
31. General mechanisms in the development of systemic autoimmune diseases
32. Autoimmune joint diseases; rheumatoid arthritis and ankylosing spondylitis
33. Pathomechanism of Systemic lupus erythematosus, systemic sclerosis and Sjögren's syndrome
34. The effect of the immobilization syndrome on somatic functions
35. The effect of immobilization syndrome on autonomic functions

2nd Semester Exam topics – Theory

1. The pathophysiology of the gastrointestinal system - the diseases of the stomach and the small intestine
2. The pathophysiology of the gastrointestinal system - inflammatory bowel diseases
3. Liver dysfunction I.
4. Liver dysfunction II.
5. The metabolism of alcohol
6. Acute alcohol intoxication
7. Chronic alcoholism
8. The causes and systemic consequences of acute renal failure
9. The causes and definition of chronic renal failure
10. Pathological changes in organs affected by chronic renal failure
11. Pulmonary ventilation disorders and respiratory function tests to detect them; the definition and forms of respiratory failure
12. The symptoms of acute respiratory failure; the effect of consequent hyperventilation on blood gas and acid-base values
13. The effects of prolonged smoking on the large and small airways and on the elastic fibers of the lungs
14. The correlation between FEV1 decline and arterial pO₂ and pCO₂ in chronic respiratory failure (COPD and pulmonary fibrosis)
15. Various types of organ damage caused by chronic global respiratory failure (mainly COPD)
16. Acid-base disorders of metabolic origin: metabolic acidosis and metabolic alkalosis
17. Acid-base disorders of respiratory origin: respiratory acidosis and respiratory alkalosis
18. Sodium (Na⁺) balance disorders
19. Hypo- and hypervolemia (edema)
20. Potassium (K⁺) balance disorders
21. The definition and classification of circulatory shock
22. Forms of hypovolemic shock
23. The different phases of hypovolemic shock
24. The progression of circulatory shock
25. Organ manifestations of circulatory shock
26. Possible causes of cardiogenic shock

27. The definition and mechanism of septic shock and the principles of its treatment
28. The development and consequences of pro- and anti-inflammatory processes, coagulation disorders and endothelial dysfunction in septic shock
29. Molecular and cellular aging
30. Organ-level manifestations of the aging syndrome
31. Secondary disorders caused by tumors I: Disorders of other organs in cancer patients
32. Secondary disorders caused by tumors II: Systemic consequences of cancer
The pathomechanism of systemic inflammation, cachexia and pain

1st Semester Exam topics – Practice

Case study presentation of relevant clinical cases to discuss the pathogenesis of typical symptoms, diagnosis and therapeutic approaches in diseases.

- Case 1-4. Hypertension
Case 5-8. Obesity – Diabetes
Case 9-12. Endocrine disorder
Case 13-16. Menopause and osteoporosis

Practical tasks, device operation:

1. Methods to measure blood pressure. Practical aspects of correctly performing blood pressure measurement.
2. ABPM and its indications. How is an ABPM test performed? Why is it important to assess diurnal rhythm?
3. Diagnostic criteria of hypertension using different methods of measurement. What are the indications and benefits of home blood pressure monitoring?
4. Investigation methods of vascular aging. The significance of pulse wave velocity and its measurement.
5. Characterization of the physiological arterial pulse wave and its changes with aging.
6. The definition and measurement of the ankle-brachial index. Its significance.
7. Diabetic neuropathy task: the manifestations and symptoms of diabetic neuropathy, their pathomechanism.
8. Examination procedures used for diagnosing neuropathy affecting somatic nerves. Explanation of the physical examination procedures presented in the practical lesson.
9. Diabetic neuropathy Diagnostic procedures used in the investigation of autonomic neuropathic abnormalities. Demonstration of the performance of the Ewing test.
10. Diabetic vascular function task: briefly describe the methods of laser Doppler flow measurement and transcutaneous partial oxygen tension measurement. Describe the blood flow response to heating and its changes in diabetic vascular dysfunction; explain the underlying pathomechanism.
11. Diabetic vascular function task: briefly describe the methods of laser Doppler flow measurement and transcutaneous partial oxygen tension measurement. Explain what post-occlusive reactive hyperaemia is and how it changes with diabetic vascular dysfunction; explain the underlying pathomechanism.

2nd Semester Exam topics – Practice

Case study presentation of relevant clinical cases to discuss the pathogenesis of typical symptoms, diagnosis and therapeutic approaches in diseases.

- Case 1-3. Gastrointestinal disease
Case 4-9. Liver disease
Case 10-14. Kidney disease
Case 15-18. Respiratory disease
Case 19-22. Acid-base disorder
Case 23-26. Circulatory shock

Practical tasks, device operation:

1. What options can you name to define nutritional status? What are the advantages and disadvantages of the different methods?
2. How does the body composition monitor based on bioimpedance spectroscopy work? What are the most important parameters that are determined?

3. What are the clinical uses of bioelectrical impedance analyzers? What are the main parameters used in different areas?
4. Describe the abnormal findings in urine tests; describe the most common symptoms and their causes. Reference values.
5. Possible causes of abnormal urine color.
6. The mechanism and clinical significance of neurovascular coupling in functional brain imaging. The theoretical background and practical application of the fNIRS method and its significance in the study of frontal cortical function.
7. Types of cognitive tests and their significance in the diagnosis of neurodegenerative disorders. The significance of the recognition of mild cognitive impairment and the theoretical basis of its differential diagnosis.

Method and type of evaluation:

Final exam:

The Final exam is oral.

Exam exemption may be obtained by achieving exceptional results in the competition, a grade "4" or "5" may be offered as the Final examination grade

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

The Figures of the lectures available for download at the website, and short written extracts of the lectures ("handout").

Gary D. Hammer, Stephen J. McPhee: Pathophysiology of Diseases: An Introduction to Clinical Medicine– A LANGE medical book 7th edition (2014), 8th edition (2018)

BASIC SURGICAL TECHNIQUES

Department of Experimental Cardiology and Surgical Techniques Heart and Vascular Center

Theoretical Block at Nagyváradi Square, Operating Lab ,
1089 Budapest, Nagyváradi sq. 4.

Lecturer: *Professor Dr. Tamás Radovits, Professor Dr. József Sándor, Dr. Kálmán Benke, Dr. Daniella Fehér, Dr. Györgyi Szabó, Dr. Eva Toronyi, Prof. Dr. Masashi Yoshida*

Tutor: *Dr. Daniella Fehér, Dr. Györgyi Szabó, Dr. Domokos Csukás, Dr. Dávid Givi,*

Tutor: *Dr. Györgyi Szabó*

Credit: 2

Second Semester

Prerequisites: Microscopic Anatomy and Histology II., Medical Physiology II.

of surgery in such a way that the students can not only learn the basic elements of surgery, but above they will learn and remember the surgery itself and the Institute fondly. Precondition for practical knowledge and routine patient care is manual dexterity. We provide the possibility to learn and practice the basic surgical techniques. The rules of asepsis and antisepsis will be explained and practiced, nowadays this knowledge is necessary not only for surgeons, but for all doctors who perform invasive procedures. This subject also provides basic information about special behaviour in the operating theatre, preparation of the patient and surgical team before operation. The most important characteristics and use of surgical instruments, suture materials are taught and showed. The wound management is an important part of our teaching. We give an insight in the basics of laparoscopic surgery and provide the opportunity to practice laparoscopic task. We also present the basics of microscopic surgery and show task with this technique.

Lectures: 4 lectures are held during the semester. The lectures are 90 minutes long.

The first lecture is presented on the second week of the semester, Thereafter 1 lecture on the 3., 4. and 5. week.

Practices are held on every second week (7x135 minutes).

1. Basic suturing techniques on the skill models (simple interrupted suture). Basic surgical instruments and their usage.
2. Getting acquainted with the operating room, rules and behavior in the operating room, scrubbing-in and preparation of the surgical field. Knotting techniques.
3. Basic suturing techniques on ex-vivo animal model (interrupted sutures).
4. Basic suturing techniques on ex-vivo animal model (continuous sutures).
5. Demonstration of the laparoscopic tower and instruments.
6. Practicing eye-brain-hand coordination and fine hand movements using a laparoscopic pelvitrainer.
7. Practical exam

Attendance is obligatory in every practice. Because of limited capacity of operating lab, absence cannot be repeated by joining another group. Only one missed practice can be repeated .

Absence Absence from practices is not to exceed 25%. One practice can be retaken in another group after registration on our website.

Requirement: Exam (5 degree evaluation).

Textbook: A. Ferencz, Gy. Wéber, J. Sándor: Basic surgical techniques

MEDICAL ETHICS , BIOETHICS AND MEDICAL LAW

Department:

Institute of Behavioural Sciences

Department of Bioethics

NET Building, 19th, 20th floor

1089. Budapest, Nagyváradi tér 4.

Tel: 210-2953

Secretary: Csilla Motyovszki ,

e-mail: motyovszki.csilla@semmelweis.hu

Tel: 210-2930/56114, NET Building, 20th floor, Room-2015

(28 hours)

2025/2026 year II. semester

Course objectives:

- To enable students to recognize ethical issues when encountered in everyday clinical practice and research
- To provide students with a conceptual-logical system, which helps them to address ethical questions and to resolve ethical dilemmas in an efficient way
- To introduce students to a body of knowledge, which helps them to understand, respect and protect the rights of patients' research subjects and fellow health care professionals
- To help the would be health care professional to understand the responsibility of the individual, of the health care system and of the society as a whole in maintaining health

Lectures:

1. week. Lecture

Principles of Medical Ethics (Jozsef Kovacs)

2. week. (Lecture)

Informed Consent I. (Jozsef Kovacs)

3. week. (Lecture)

Informed Consent II. (Jozsef Kovacs)

4. week. (Lecture)

Competence and Capacity to Make Health Care Decisions (Orsolya Peter)

5. week. Lecture

Ethical Questions of Human Research (Jozsef Kovacs)

Course Faculty:

- Jozsef Kovacs, MD, PhD, (Head of the Department of Bioethics), 210-2930/56115; e-mail: kovacs.jozsef@semmelweis.hu (Room 2003)
- Ágnes Dósa, MD, JD, PhD e-mail: dosaagi@gmail.com (Tel: +36-30-9-912-462)
- Imre Szebik, MD, PhD e-mail: szebik.imre@semmelweis.hu (Room 1914) (Tel: +36-20-824-3195)
- Jenő Lőrincz, MD, JD e-mail: lorincz.jeno@semmelweis.hu (Room 2007) (Tel: +36-30-749-4768)
- Ágnes Zana, PhD e-mail: zana.agnes@semmelweis.hu (Room 2008) (Tel: +36-30-53-01-647)
- Orsolya Péter, JD, PhD, peter.orsolya@semmelweis.hu; peterorsolya@gmail.com (Room 2012) (Tel: +36-30-906-5787)

Course attendance statistics can be found on NEPTUN in the following way:

Taken courses -- options -- Course details -- Attendance statistics.

6. week Lecture

Reproductive Issues (Orsolya Peter)

7. week. Lecture

Organ and Tissue Transplantation (Jozsef Kovacs)

8. week. Lecture

Information Disclosure to Terminally Ill Patients. Telling the Truth to Patients (Orsolya Peter)

9. week Lecture

Confidentiality and Medical Records. Reportable Illnesses, HIV-Related Issues, Sexually Transmitted Diseases (STDs) (Orsolya Peter)

10. week. Lecture

End of Life Issues (Jozsef Kovacs)

11. week Lecture

Doctor-Patient, Doctor-Doctor Relationship (Jozsef Kovacs)

12. week Lecture

Doctor and Society (Jozsef Kovacs)

13. week Lecture

Malpractice (Orsolya Péter)

14. week Lecture

The Rights of Patients (Orsolya Péter)

List of questions

- The principles of medical ethics
- Competence and the capacity to make decisions
- Paternalism in medical practice
- Informed consent
- Information disclosure for terminally ill patients
- Withholding and withdrawal of medical treatment
- Advance Directives
- Do not resuscitate (DNR) orders
- Withholding Fluids and Nutrition in terminally ill patients
- Physician assisted suicide
- Active and Passive Euthanasia
- Terminal sedation and the law of double effect
- Futile medical care
- Determination of death and brain death
- Ethical problems of live organ donation
- Organ donation from brain-dead donors: the system of donor cards.

17. Organ donation from brain-dead donors: presumed consent
18. Reproductive issues (abortion, contraception, sterilization, donation of sperm and eggs)
19. HIV related issues (confidentiality, partner notification, HIV-positive health-care workers, refusal to treat HIV-positive patients) and sexually transmitted diseases (STDs)
20. Malpractice
21. Doctor-patient relationship (beginning and ending the relationship, gifts from patients, doctor/patient sexual contact)
22. Doctor and society (child abuse, elder abuse, impaired drivers, physician participation in executions, torture, spousal abuse, gunshot wounds, gifts and industry funding)
23. Doctor-doctor relationship (reporting impaired physicians, physician disagreements)
24. Confidentiality and medical records
25. Ethical Questions of Human Research
26. The Rights of Patients

Textbook:

Conrad Fischer—Caterina Oneto (2016): Medical Ethics for the Boards. (Third edition) New York: McGraw-Hill Education.
ISBN: 978-1-259-64121-3
MHID 1-25-964121-X

The textbook can be ordered in the following bookshop: Medicina könyvesbolt, Budapest, IX. Üllői út 91/a (tel: 06-1-215-3786)

Lectures: The power point slides of the lectures can be found at the Moodle site of the course and at:
<http://semmelweis.hu/magtud/en/education/faculty-of-medicine>
Password is given on the lectures

A thorough knowledge of the textbook is the absolute minimum for passing the exam, although in itself it may not be enough to pass it. Because the power point slides contain only the outline of each lecture, participation in the lectures is indispensable for a full understanding of the subject.

Diploma work topics:

Dr. József Kovács:

The theory and practice of informed consent.
Ethical problems of experimentation on human subjects.
Ethical questions of withdrawing or withholding life sustaining treatment.

Dr. Jenő Lőrincz:

Sources of morality in medical ethical situations.
Ethical problems of surrogate motherhood.

Dr. László Nemes:

Medical humanities
Narrative medicine
Ethical and social aspects of end-of-life decisions
History of medical ethics and bioethics
Ethics of assisted reproduction
The philosophy of medicine
Medical virtues

Dr. Ágnes Dósa:

Research Ethics. Ethical issues of conducting research on Human Beings. Placebo group. Ethics of scientific publication.
Ethics of Clinical Genetics. Ethics of prenatal genetic testing. Ethics of genetic testing and screening. Ethics of gene therapy.
Ethical issues of obstetric care.

Dr. Orsolya Péter:

Ethical and legal aspects of end-of-life decisions
Ethical and legal issues concerning incompetent patients
Ethical issues concerning patient rights in practice

Dr. Attila Gábor Tóth:

Human Rights in Medicine
Right to life and right to die

MEDICAL ASPECTS OF DISASTER PREPAREDNESS AND RESPONSE

Directorate for Safety Technology
Department for Disaster Management and Education

Supervisor: **Mátyás Simon**

Lecturer: **Csaba Csendes**

Credit value: 0

Second Semester

Purpose of the lecture:

The goal of the subject is to provide basic knowledge of the definition, mission, reasons and circumstances of establishment of civil protection/disaster management, on its place and role in the country's defense/protection system; to provide information on the types of disasters and their features. Based on experience gained in real incidents, to provide information on the peculiarities of disaster management and the tasks of medical authorities in this context.

The syllabus:

(M1) Concept, mission, tasks and establishment of civil protection and disaster management in Hungary. Types and features of disasters, the disaster vulnerability of Hungary, the organizational system of the protection against disasters, command and control of protection, the role of medical authorities.

(M2) The early warning system and signals of disaster management. The elimination of the consequences of disasters, the staff work applied during protection. Features and activities of Hungarian disaster management organizations and authorities, international possibilities of disaster management and the lessons learnt, demonstrated by examples.

Requirements and the potential for absences to participate in the sessions:

The subject consists of 4 modules. Module 1 does not have any pre-requisites; module 2 anticipates the fulfillment of module 1. Students must register to attend the course announced as required. Those who are unable to fulfill module 1 or 2 (do not attend), may participate in a supplementary lesson in the 1st semester of the following year.

The method of certificate for the workshops and the exam absences:

Certificate of absence: medical, official – court of justice, local government, Students' Union, etc.

The mid-term controls' (reports, midterm) number, topic and date, replacements and repairs:

Method of making up for the absence justified by certificate: participation in a supplementary lesson.

Requirements for the signature:

Students must participate in the lesson announced to acquire signature, or in case of absence justified by certificate, in a supplementary lesson. Only registered students may participate in a supplementary lesson announced.

The method of grading: signature

Type of examination: none

Requirements: none, students must fulfill the obligation to attend the lessons.

Application for exam: none

Changing procedure for exam application: none

Absence from the examination: none

Notes, textbooks, study aids and literature list: László Major PhD – Ronald Barham PhD – Dr. György Orgován PhD: Medical Aspects of Disaster Preparedness & Response – Semmelweis Kiadó 2017. ISBN 978-963-331-420-3

SUMMER (INTERNAL MEDICINE) PRACTICE

Managing (and contributing) institutes:

Department of Internal Medicine and Hematology

Department of Internal Medicine and Oncology

In English: Internal medicine summer practical

Total hours: practice: 40 hours/week for 4 weeks

Type of course: obligatory

Responsible for course: Prof. Dr. Tamás Masszi, Prof. Dr. István Takács

Aim of the course, its position in the medical curriculum:

The main aim of the internal medicine summer practical following the 6th semester is, apart from practicing taking medical history and performing physical examination, detailed introduction to and participation in practical clinical work, as well as utilisation of obtained pre-clinical knowledge. Acquiring the basics of the integrative approach of internal medicine, practicing differential diagnostics.

Location of course (address of lecture-hall, seminar room, etc.):

Department of Internal Medicine and Hematology

Department of Internal Medicine and Oncology

External training sites (see list of accepted practical locations)

Acquired competences after successfully completing the course:

Practical and internal medical utilisation of knowledge obtained during theoretical courses and propedeutics within the internal medicine famulus practical. The goal is that the student is able to receive the patient, start examination, set up diagnostic and, as far as possible, treatment plan, as well as to perform routine treatment, under supervision. Furthermore, the aim is to acquire professional and human communication skills with medical staff, patients and their relatives.

Prerequisite(s) for admission to the course:

Attendance requirements of propedeutics and signature in propedeutics. Successful exam in propedeutics is not a criterium for attending summer practical.

Student enrolment requirements (minimum, maximum), method of student selection:

Based on registration in the Neptun system maximum 25 students per shift per Department.

Detailed syllabus:

Students participate in practice 8 hours daily, 5 days a week for 4 weeks **General syllabus:**

Introduction to the internal medical ward and the hospital.

Examination of patient, treatment of assigned patients at an assistant physician level under supervision, according to only partial pharmacological knowledge.

Medical history:

- taking medical history of patient, documenting the organised collected information with medical terms.
- interpretation of medical history in patient's documentation (abbreviations, recognition of connection of events)
- considering an expected home treatment based on medical history

Medication

- connecting the name of the patient's medications with the active ingredients
- identifying indication of drugs (in medical history)
- setting up a medical treatment plan for the condition indicated upon admission

Physical examination

- practicing head-to-toe examination and its professional description
- practicing targeted examination (e.g. patient with dyspnoea, anaemia, hepatic cirrhosis)
- recognising connection between acquired results of physical examination and medical history

Practicing the most important medical interventions

- Measuring pulse, blood pressure, temperature, weight, blood glucose
- Administration methods of medication
- Blood sample collection, injection administration, insulin administration, utilisation of pen (perhaps insulin pump)
- Prepare and administer infusions with supervision, introduction to transfusion
- Utilisation of diagnostic devices (ECG, Doppler, ultrasound, monitor, blood gas)

Introduction to patient's documentation (patient's chart, medical record, glucose chart, fluid chart, critical patient sheet), individual documentation. Professional demonstration of patient case known and followed by student on clinical rounds.

Acquiring skills of communication with patient and relatives, especially of informing patient and confidentiality. Become familiar with informed consents required for interventions, their introduction to patient, obtaining consent.

As far as possible, participation in consultations, in imaging diagnostics, in examination with devices, in clinical pathological consultations, especially in case of patient's known by student.

Participation in professional consultations of the institute.

Schedule

8:00-8:15	AM short meeting about events of night shift, daily tasks
8:15-9:30	AM medical rounds at ward - making rounds in the ward with the ward physician
9:30-10:00	AM clinical case consultation
10:00-10:20	AM coffee break
10:20-11:00	AM participation in ward tasks, participation in scheduled examinations, admission of new patients
11:00 AM-12:00	PM medical rounds with senior physician of ward
12:00-12:30	PM midday medical consultation
12:30-01:00	PM lunch break
01:00-01:30	PM assessment of and consultation on laboratory findings
01:30-02:00	PM consultation on daily tasks, reviewing and correction of documentation, reviewing activities log book, discussion of home study

Cross-border issues of the given course related to other courses (obligatory and elective). Possible overlaps in curriculum: general hospital bedside practice, practical basics of clinical courses

Activities

The student prepares an activity log book during the practical. Each student follows the patient turnover of a hospital bed. Student prepares medical record for the patient assigned to the bed and documents daily events. Student may analyse and explain patient's medication, details of therapy (e.g. choice of antibiotics, adjusting medication of cardiac insufficiency, etc.). Student may document main points of examinations, interventions, consultations they participated in during the day. The log book may be electronic or hand-written.

Requirements for participation in classes and opportunities to make up for absences:

According to the Studies and Exams Code, the criteria for obtaining signature is at least 75% participation in the practical.

Examination of acquired knowledge during term:

cannot be interpreted

Type of exam: report

Exam requirements:

Presentation of activity log book, exam on the subjects listed in the general syllabus within the context of a bedside consultation.

Method and type of class marks:

The completion of the practical is confirmed by a signature. Confirmation is given based on the activity shown during the practical and the complex patient examination at the end of the practice.

How to apply for the exam:

Application happens automatically when applying for the practical.

Opportunity to repeat the exam:

Not applicable.

The list of printed, electronic and online notes, textbooks, study aids and literature to be used for to learn the curriculum (in case of online sources, html address): Bickley, L.S.: Bates' Guide to Physical Examination and History Taking. 12th ed. Wolters Kluwer, 2016.

Practical examination

1. taking medical history of a given patient, documenting the organised collected information with medical terms, complete physical examination of patient and its professional presentation (may be performed previously during the days before the exam, student is expected to present the documentation in the test)
2. theoretical and practical consultation on one item of the exam items.

Exam items

1. targeted examination of patient with dyspnoea
2. targeted examination of patient with anaemia
3. targeted examination of patient with renal insufficiency
4. targeted examination of patient arriving with chest pain
5. targeted examination of patient with fever
6. measurement of pulse, bedside diagnostics of vascular stenosis
7. blood pressure measurement technique, ABPM, assessing values of blood pressure measured at home
8. describing transfusion process (indication, choosing blood supply, bedside tasks)
9. blood glucose measurement (technique), assessing glucose chart, therapy recommendations
10. practical instructions on insulin treatment, describing utilisation of pen
11. primary/hospital treatment of hypoglycaemic patient
12. primary treatment of patient with ketoacidosis
13. diagnosis and treatment of pleural effusion
14. diagnosis and treatment of ascites
15. arterial blood gas analysis (technique, assessment)
16. recognising septic patient/patient in critical condition (ABCDE), report on condition (SBAR)
17. examination procedure of patient with icterus
18. utilisation of bedside ultrasound device
19. administration methods of medication, preparation of infusion
20. placement technique of urinary catheter



Faculty of Medicine

4th year

FACULTY OF MEDICINE

CLINICAL MODULE

STUDY PROGRAMME

Fourth year in the 2025/2026 academic year

Teaching is done in “clean” blocks: Theory + Practice + Exam. (Practices are taught by “shadowing”)
The time span of each block depends on the credit value of the subjects: 1 to 5 weeks
Pharmacology and Pharmacotherapy are taught on a weekly regular basis for 2 × 14 weeks in the 7th and 8th semesters
Pbased on a subject of 2 credits:

- 2 credits × 14 lessons = 28 lessons (1 semester consists of 14 weeks. The number of credits are equal with the lessons in a week)
- Education is provided as 8 lessons in a day: 4 days × 8 lessons = 32 lessons
- The training and the exam must be completed in 2 weeks
- approx. 40 students will be trained by providing 4 days of training and 2 days of exams within 10 working days.

7th–8th Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
OBLIGATORY COURSES										
Cardiology, Heart Surgery, Angiology, Vascular Surgery	AOKKAR1114_1A	2		5				7	Internal Medicine – Propedeutics, Pharmacology II, Clinical ECG	examination
Clinical Pharmacology	AOKFRM1117_1A	0		3				3	Pharmacology II	examination
Dermatology	AOKBOR043_1A	1.5		2.5				4	Pharmacology II, Medical Microbiology II, Pathology II	examination
Emergency Medicine and Oxyology	AOKSGO891_1A	1		1.5				2	Internal Medicine - Propedeutics, Pharmacology I, Translational Medicine and Pathophysiology II	examination
Family Medicine	AOKCSA1133_1A	0			12		8	2	Internal Medicine – Propedeutics, Pharmacology II, Laboratory Medicine*	practical mark
Internal Medicine I. (Metabolism, Endocrinology, Gastroenterology, Nephrology)	AOKBOK784_1A	2		5				7	Internal Medicine – Propedeutics, Pharmacology II, Pathology II	examination
Laboratory Medicine	AOKLMI709_1A	1.5		1				3	Pharmacology II, Pathology II, Translational Medicine and Pathophysiology II.	examination
Medical Imaging	AOKOKA750_1A	1		2				3	Medical Biophysics II, Translational Medicine and Pathophysiology II., Pathology II	examination
Ophthalmology	AOKSZE1143_1A		24		32			4	Internal Medicine – Propedeutics	examination
Oral Surgery and Dentistry	AOKSZB976_1A	0			20		8	2	Pathology II, Basic Surgical Techniques	examination
Otorhinolaryngology	AOKFUL1116_1A	1		1				2	Basic Surgical Techniques, Pathology II	examination
Physical Education VII	AOKTSI009_7A	0		1				0	Physical Education (PE) V *	signature
Physical Education VIII	AOKTSI009_8A	0		1				0	Physical Education (PE) VI *	signature
Pulmonology and Thoracic Surgery	AOKPUL751_1A	1.5		2.5				4	Internal Medicine - Propedeutics, Pharmacology II, Basic Surgical Techniques	examination
Summer Practice – Surgery (1 month)	AOKNSG1134_1A	0						3	Surgery*	practical examination
Surgery	AOKSB1704_1A	3		3				6	Basic Surgical Techniques, Pathology II	examination
Traumatology and Orthopedics	AOKTRA1115_1A	1		4				5	Basic Surgical Techniques, Pathology II, Internal Medicine – Propedeutics	examination
OBLIGATORY ELECTIVE COURSES										
Disaster Medicine	AOVHKT1070_1A		6		8			1		projectwork

LIST OF TEXTBOOKS (The list may change!)

1. Feather – Randall – Waterhouse: Kumar and Clark's Clinical Medicine. (Elsevier, 10th Ed., 2020), ISBN: 9780702078682
2. Adler: ABC of AIDS. 1993. 3rd ed. ISBN 727907611. BMJ
3. Adler: ABC of Sexually Transmitted Diseases. 3rd ed. 1995. ISBN 72790261X. BMJ
4. Becker,W.- Naumann,H.- Pfaltz R.: Ear, Nose and Throat Diseases. Thieme. Stuttgart, New-York, 1994. ISBN 0-86577-536-2 or 3-13-671202-3
5. Répássy,G.: Otolaryngology. Eger, Radó Ny. 2000.
6. Churchill's pocketbook of cardiology. Grubb, NR-Newby,D.E. Edinburgh 2006.
7. Adams,J.C-Hamblen,D.L.:Outline of Orthopaedics. 12th ed. Churchill Livingstone, Edinburgh, 1995. ISBN 0443 05149 6
8. Horst Cotta: Orthopaedics. Georg Thieme Verl. New York, 1980. ISBN 3-13590001-0
9. Szendrői Miklós (szerk.): Orthopaedics. Semmelweis Kiadó, 2008. ISBN 978 963 9656 93 2
10. Bourne, Brewis: Lecture Notes on Respiratory Disease. Blackwell. 5th ed. 1998. ISBN 0-632-04968-5
11. Sabiston Essentials of Surgery. Saunders. 1994. ISBN 0-7216-3492-3.
12. Szabó Gy.ed: Oral and Maxillofacial Surgery. Semmelweis Kiadó, Budapest, 2001.
13. Szende B.-Suba Zs.: Introduction to Histopathology. Medicina, Budapest, 1999.
14. Koerner KR: Manual of Minor Oral Surgery for the General Dentist, Blackwell Munksgaard, 2008
15. Peitzman B.A,Rhodes M, Schwab C.W, Yealy M.Y, Fabian C.T: The Trauma Manual: Trauma and Acute Care Surgery, Third edition, Publisher: Wolters Kluwer / Lippincott Williams & Wilkins
16. Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0
17. Conrad Fischer—Caterina Oneto (2016): Medical Ethics for the Boards. (Third edition) New York: McGraw-Hill Education. ISBN: 978-1-259-64121-3 ;MHID 1-25-964121-X

Recommended textbooks:

1. Jameson – Fauci – Kasper – Hauser – Longo – Loscalzo: Harrison's Principles of Internal Medicine. (McGraw-Hill Education, 21st Ed., 2022). ISBN: 9781264268504
2. Lynn S. Bickley: Bates' Guide to Physical Examination and History Taking. (Wolters Kluwer, 12th Ed., 2016.) ISBN: 9781469893419
3. Davis-Christopher: Textbook of Surgery / Synopsys for students (Sabiston)
4. Clive R. G. Quick, Joanna B. Reed et al.: Essential SURGERY(5th Edit.) Churchill Livingstone
5. Duckworth,T.: Orthopaedics and Fractures. 3rd ed. Blackwell Science, 1995.
6. Semmelweis Egyetem e-learning rendszere Ortopédia fejezet – Semmelweis University e-learning system: Orthopaedics
7. Szécsény-Berentey: Sebészet. Bp. Medicina.
8. Gaál: Sebészet. Bp. Medicina.
9. Littmann: Sebészeti műtéttan. Bp. Medicina.
10. Dermatology Made Easy 1st Edition by Amanda Oakley OR Dermatology Essentials 2nd Edition by Jean L. Bolognia MD
11. Online sources: [UpToDate.com](https://www.uptodate.com) / Dermatology and [DermNet.nz](https://www.dermnet.nz)
12. Peterson: Principles of Oral and Maxillofacial Surgery. Decker, 2004.
13. Robinson PD: Tooth Extraction. A Practical Guide, Oxford, Boston, 2000
14. Ward Booth P, Eppley B, Schmelzeisen R: Maxillofacial Trauma and Esthetic Facial Reconstruction, 2nd Edition, Elsevier, 2011
15. Forrai J.-Ballér P.: Chrestomathy on the History of Medicine. SOTE, Bp. 1992.
16. W. Becker, H.H. Naumann, C.R. Pfaltz: Ear, Nose and Throat Diseases Georg-Thieme Verlag, Stuttgart 1994. ISBN: 3-13-671202-1
17. Rakel,R.E: Essentials of Family Practice. W.B.Saunders Co. 1998.
18. Taylor,R.B.: Fundamentals of Family Medicine. Springer, 1996.

CARDIOLOGY – Heart Surgery, Angiology, Vascular Surgery

Heart Center Department of Cardiology

Tutor: **Dr. György Bárczi**
Dr. Papp Roland

Lectures (2 hours per week)

1. Anatomy and physiology of the heart
2. Cardiomyopathies
3. Acute coronary syndrome
4. Treatment of Chronic Heart Failure
5. Symptoms, diagnosis and conservative treatment of vascular diseases
6. The diagnosis and treatment of Stable Coronary Artery Disease
7. Chest pain differential diagnosis. Life threatening diseases
8. Ventricular arrhythmias. Sudden cardiac death
9. Resynchronisation therapy, mechanical circulatory support, heart transplantation
10. Surgical treatment of arterial diseases
11. Heart surgery in XXI. Century. Revascularization, valve surgery, circulatory support
12. Valvular heart diseases.
13. Pacemaker, ICD indications
14. Primer and secunder prevention
15. Paediatric cardiology
16. Hypertension
17. Supraventricular arrhythmias, atrial fibrillation
18. Antithrombotic, anticoagulant treatment
19. Interventional radiology in the treatment of cardiovascular patients.
20. Infective Endocarditis

Practices (ward rounds, 4,5 hours per week)

Bedside practice:

1. Patient examination
2. ECG; ECG signs of life-threatening cardiac diseases.
3. Basics of echocardiography; Examination of the heart cavities, heart valves, heart muscle, systolic and diastolic function.
4. Heart failure; Symptoms of left- and right-sided heart failure; Differentiation between systolic and diastolic heart failure; Diagnosis of heart failure; Conservative and interventional treatment of heart failure
5. Cardiac valve dysfunction; Clinical signs of valvular heart disease; Auscultation; Systolic and diastolic murmurs; Valvular heart disease diagnosis and treatment; Transcatheter aortic valve implantation; Heart valve repair and replacement surgery; Anticoagulant therapy.
6. Coronary care unit: intra-aortic balloon pump and cardiogenic shock; Symptoms of acute heart failure and cardiogenic shock, Conservative and interventional treatment; Killip classification.
7. Management of ischemic heart disease in outpatient care; Symptoms and diagnosis of acute coronary syndrome; Signs of STEMI and NSTEMI ECG; Differential diagnosis of major chest disorders with chest pain; GRACE score; Clinical forms of ischemic heart disease; Medication of acute myocardial infarction.
8. Management of arrhythmias in outpatient care; Atrial fibrillation; CHA2DS2-VASc score; Supraventricular arrhythmias and malignant ventricular arrhythmias; Bradyarrhythmias. Practical lessons:
9. Invasive cardiology; Indications and implementation of percutaneous coronary intervention; Types of stents; Transcatheter aortic valve implantation.
10. Non-invasive cardiac imaging: cardiac echo, MRI and CT scans; Indications and procedure of these tests; Vulnerable plaque.
11. Electrophysiology; Indications for pacemaker implantation; Types of pacemakers; Indications for electrophysiological examination; Arrhythmia ablation procedures.
12. Vascular surgery in the operating room
13. Cardiac Surgery in the operating room
14. Intervention laboratory practice
15. Practical examination

Type of examination:

Practical exam and colloquium: test and theoretical exam.

Exam topics:

1. Diastolic heart murmurs. Heart sounds.
2. Systolic heart murmurs. Heart sounds.
3. Risk factors, primary and secondary prevention.
4. Dilated cardiomyopathy.
5. Hypertrophic cardiomyopathy.
6. Acute heart failure, cardiogenic shock - etiology, symptoms, diagnostics.
7. Treatment of acute heart failure.
8. Chronic heart failure - etiology, symptoms, diagnostics.
9. Treatment of chronic heart failure.
10. Infective Endocarditis.
11. Pericarditis, pericardial effusion.
12. Aortic valve stenosis. Diagnosis of aortic valve insufficiency.
13. Mitral valve stenosis. Diagnosis of mitral valve insufficiency.
14. Atrial and ventricular septal defects, congenital heart disease.
15. Hypertension I. Etiology, diagnosis.
16. Hypertension II. Treatment. Hypertensive Heart Disease.
17. Anticoagulant treatment and indications.
18. Anti-plaquet treatment and indications.
19. Manifestations and evaluation of Ischemic Heart Disease.
20. Angina pectoris.
21. Non ST segment elevation Acute Coronary Syndrome I. Etiology, manifestations, diagnosis.
22. Non ST segment elevation Acute Coronary Syndrome II. Treatment.
23. ST segment elevation Acute Coronary Syndrome I. Etiology, pathomechanism, diagnosis.
24. ST segment elevation Acute Coronary Syndrome II. Treatment.

25. Heart catheterization. Hemodynamic evaluation. The heart cycle.
 26. Percutaneous coronary revascularization. (PCI)
 27. Differential diagnosis of chest pain syndromes.
 28. Pulmonary embolism.
 29. Bradyarrhythmias.
 30. Supraventricular arrhythmias.
 31. Atrial Fibrillation.
 32. Electrical and pharmacological cardioversion.
 33. Ventricular arrhythmias.
 34. Ablation treatment of arrhythmias.
 35. Pacemaker indications and pacemaker types.
 36. ICD and CRT indications, types.
 37. Non-coronary structural interventions in cardiology (TAVI, Mitraclip, Left atrial appendage closure, etc.)
- 2.**
1. Treatment of aortic valve stenosis, aortic valve insufficiency.
 2. Treatment of mitral valve stenosis, mitral valve insufficiency.
 3. Diagnosis and treatment of aortic dissection
 4. Coronary revascularization: CABG
 5. Treatment of end-stage heart failure with mechanical circulatory support.
 6. Complications of myocardial infarction and their treatment
 7. Epidemiology and risk factor, screening, prevention and conservative treatment of arterial diseases – vasculitis
8. Clinical presentation and physical and imaging examination of arterial diseases. Diabetic foot
 9. Symptoms and physical and visual diagnostic examination of peripheral arterial disease of the lower extremities - diabetic foot
 10. Symptoms and physical and visual diagnosis of chronic venous insufficiency, treatment options
 11. Symptoms, diagnosis, treatment options, early and late complications of deep vein thrombosis
 12. Angiography and intervention - basic endovascular techniques. Basic vascular surgery techniques, vascular grafts
 13. Diseases, symptoms, diagnosis and treatment options of supraaortic branches and upper extremity arteries
 14. Aortic and peripheral aneurysms
 15. Acute aortic syndromes.
 16. Vascular imaging diagnostics (UH, CT, MRI) - Vascular malformations
 17. Renal and visceral occlusive and aneurysmal diseases - artificial arteriovenous fistulas, haemodialysis access.
 18. Endovascular interventions in venous diseases
 19. Theory and practical implementation of extracorporeal circulation. Theory and practical implementation of the application of the heart-lung motor.
 20. Acute cardiac surgery.
 21. Surgical aspects of infectious endocarditis.

Recommended printed, electronic and online notes, textbooks, guides and literature (html address in case of online material) can be used to learn the course material:

Oxford Handbook of Cardiology. The ESC Textbook of Cardiovascular Medicine (2 ed.) <https://www.semmelweisikiado.hu/termek/1551/vascular-medicine>

Students are strongly recommended to visit regularly our website where updated information are available: <http://vszek.semmelweis.hu/education-cardiology>

Clinical Pharmacology

Tutor: *Dr. Pál Riba*

Department of Pharmacology and Pharmacotherapy

Course Director: *Dr. Ferdinandy Péter*

Thematic:

In a block system of 5 days, divided into two weeks, 7 hours of practice per day:

All relevant topics are developed with the involvement of clinical experts. The clinical cases prepared in this way (3-5 cases per topic) are presented and processed in an interactive way on a problem-oriented basis. Related to the above is a description of current therapeutic recommendations.

Day 1:

- Infectious Diseases Treatment Strategy.
- Treatment strategy for respiratory and gastrointestinal diseases

Day 2:

- Endocrine Disease Treatment Strategy
- Treatment strategy for cardiovascular diseases and metabolic syndrome

Day 3:

- Clinical trials and drug registration
- Basics of Drug Development
- Pharmacovigilance, recognition of adverse drug reactions in clinical practice.
- Clinical Addictology

Day 4:

- Strategy for the treatment of psychiatric and neurological diseases
- Treatment strategy of autoimmune diseases
- Clinical Toxicology, Emergency Medicine

Day 5:

- Pharmaceutical Formulations and Prescriptions
- Individualized pharmacotherapy, special patient populations
- Pain Relief

Maximum number of absences is 25 percent of the number of practices in the semester. In the case of absence the student can attend another block class later during the semester.

Certifying absence from the lesson:

Medical certificate is accepted

Exam type:

Written multiple choice test, evaluation with the five-mark scale (excellent=5, good=4, intermediate=3, pass=2, failure=1)

Exam sign up:

Registration has to be done through the NEPTUN system for the days set by the department.

Modifying:

Through the NEPTUN system, as it allows. Students are allowed to take the exam on an exam day of another block.

Certifying absence from the exam:

Medical certificate is accepted.

Literature:

- 1 Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0
- 2 Materials discussed during practices: <http://semmelweis.hu/pharmacology>, Moodle (<https://itc.semmelweis.hu>)

Department of Dermatology-Venerology and Dermatoooncology
Head of the Department: Péter Holló, M.D., Ph.D., Professor of Dermatology

Tutor: Kende Lőrincz M.D., Ph.D., Assistant Professor of Dermatology

Credits: 4

Lectures: 2 hours (90min) /week; practices: 8 hours (8x45min or 4x90min) /day

At the first day's lesson medical students should participate a comprehensive introductory lecture. Afterwards the focus is on the practical education of Dermatology. We hold small group special sessions – e.g. problem-based seminars and in- /outpatient patient contact practices each day during the block.

Objectives of the course:

Learning the morphology, structure, physiology, and general pathology of the skin. Basics of the skin immune system, dermatology-allergology and -immunology.

Symptoms, diagnostics, and management of the following conditions: Bacterial, viral, and fungal infections of the skin. Sexually transmitted diseases infections (STI's). Autoimmune connective tissue diseases, bullous skin disorders and vascular diseases. Inflammatory dermatoses as eczemas, atopic dermatitis, psoriasis, hidradenitis suppurativa etc. Dermato-oncology and dermato-surgery. Skin symptoms of internal diseases. Basic principles of topical, systemic treatments and adverse drug reactions.

Purpose of the training:

- a. **The main goal is the transfer of knowledge for use in general medical practice regarding aetiopathogenesis, diagnostics and treatment of skin diseases.**
- b. **Problem-oriented assessment of skin symptoms and their placement in the context of general medicine.**

Half of the fourth-year students take the subject in the first semester, the other half in the second semester in form of block rotations. The curriculum contains the following topics discussed as problem-based seminars: anatomy and functions of the skin, dermatoinfectology, oncodermatology, dermatoscopy, atopic dermatitis, urticaria and eczema, drug eruptions, bullous diseases, allergic skin diseases, autoimmune skin disorders, psoriasis, sexually transmitted infections, pathology of the skin.

During practices students examine patients, master the description and evaluation of symptoms, dermatological treatment options.

Important notes: All preclinical modules are required. Registration in the Neptun system is imperative at the beginning of the semester.

Attendance of the lectures and practices is obligatory. Absence from 25% of the seminars or practices is accepted.

Each student should attend the seminars and practices according to the block schedule, and his presence is confirmed by the signature of the lecturer.

In case of absence attendance at the practice of another teacher's lesson is accepted, but the deputy teacher's signature is required

Semester requirement: Optional: at the end of block a competition for clinical examination (a written quiz with projected clinical cases) is announced. The best three students/ block are dispensed from taking the practical part of the examination. Sign up in the Neptun system is imperative.

Evaluation: Practical part (clinical examination and discussion of one patient) and theoretical part with randomly selected three main topics compose the semi-final examination.

Sign up and modifying exam: Via Neptun.

Absence from the exam: Only an official medical certificate is accepted within 3 working days.

Department of Emergency Medicine

Tutor: Dr. Bánk Gábor Fenyves PhD

INTRODUCTION

The Emergency Medical Ward was established in 2016 at Semmelweis University, which has been transformed into the Department of Emergency Medicine in May 2021. Our primary task is the admission, triage, stabilization, and often definitive treatment of patients arriving at the University with acute problems from outside of the hospital. We carry out these activities in cooperation with other specialties, often involving them directly, while always taking into account current international guidelines.

Our staff actively participates in undergraduate and postgraduate training of medical and healthcare professionals and play a key role in the development of emergency care in Hungary.

EDUCATION

Undergraduate Training:

The Department is responsible for teaching the First Aid course for first-year students, the compulsory Oxyology and Emergency Medicine course in the fourth year, and the optional Emergency Medicine practice in the sixth year. We also participate as a training site for the Nursing Practice course at the end of the first year and host students for Clinical Work subject rotations. We offer a demonstrator training as an elective subject, aiming to introduce students to educational techniques.

Our educational focus is strongly practice-oriented, therefore in the first year, we use simulation manikins extensively. The fourth-year subject is based on the experience and data gathered during bedside practice and clinical assessment. We have involved the National Ambulance Service and the HDF Medical Centre Health Institution in our teaching to provide a comprehensive view of emergency care for our students. During the elective course in sixth year, each student is expected to perform independent patient assessments and formulate diagnostic and therapeutic plans under the continuous supervision of an attending physician.

The Department also plays an important role in paramedic specialization training of the Faculty of Health Sciences, both theoretically and practically. In the postgraduate education of advanced practice nurses specializing in emergency care, the Department has become a pioneer in integrating this qualification into the national healthcare system, providing high-quality, practice-oriented education.

Alongside the training of outstanding physicians and the professional education of certified nurses at college and university levels, we consider the training of highly skilled nurses and assistants equally important.

We provide practical training opportunities for students from the University's Raul Wallenberg, Bóky János, and Semmelweis Ignác Training Institutes, as well as from the Kanizsai Dorottya Catholic High School and Training Institute.

Postgraduate Training:

The Department is one of the national centres for emergency medicine specialist training and is an accredited training site at the highest (Level III) level of care. In addition to emergency specialist training, we provide training site for emergency medicine rotations required in other residency programs. In 2023, our department coordinated the training of 387 emergency medicine residents and specialist candidates in close collaboration with the Professional Board. Additionally, 131 residents from other specialties completed their required rotations here. Our 11 tutors contributed to more than 500 months of core and specialty training. The postgraduate training system is quality-assured and continuously audited.

We also continue to develop and deliver professional content for mandatory specialty training and further mandatory training courses (e.g., Disaster Medicine, ECG, Mechanical Ventilation) in close collaboration with Semmelweis University's Department of Anaesthesiology and Intensive Therapy and the Counter Terrorism

Centre. Several of our colleagues are instructors in international and national ETC (European Trauma Course) and triage training programs.

SIMULATION TEAM:

The primary goal of our simulation team is the regular training of our staff to ensure high-quality patient care. Healthcare providers participate in realistic, scenario-based simulations (based on real or hypothetical cases) as teams using medium-fidelity manikins. These experiences improve the quality of both undergraduate and postgraduate education. We also teach clinical protocols aimed at standardization, often in an interdisciplinary context. Another key activity is supporting the preparation of teams representing the Department in international simulation competitions.

ULTRASOUND TEAM:

Our ultrasound team focuses on educating our staff in bedside ultrasound based on international and national guidelines. We emphasize the use of ultrasound in differential diagnosis, therapeutic decision-making, and guiding invasive procedures. Our aim is to develop ultrasound skills to a high competency level. The group is also responsible for the maintenance and cleaning of ultrasound machines, training on proper imaging and documentation practices, and integrating ultrasound into ongoing clinical research. We organize regular theoretical and hands-on training and aim to develop an internal "license" system in collaboration with radiologists to regulate the use of bedside ultrasound by emergency physicians.

VIDEO TEAM:

Founded just over a year ago, our young and highly motivated video team aims to meet the demands of a digital world by creating modern educational video materials for students. We produce content for both undergraduate and postgraduate training, accessible through our internal platform. Over the past year, we've created numerous practical training videos that help students acquire essential clinical skills. We believe this work significantly enhances patient safety at the bedside and is a long-term investment in quality care. We plan to continue our work and expand our digital educational resources.

RESEARCH AREAS

Our research activity is primarily based on our own clinical cases but is conducted in cooperation with other departments at the University. We actively conduct research in the fields of emergency ultrasound, gastrointestinal bleeding, stroke and sepsis.

To support our innovation goals, we also collaborate with external industrial partners. We conduct both pharmacological and observational clinical trials across a wide range of medical areas.

Completed studies include:

- **ANNEXA-I trial:** Examined the effects of Andexanet alfa in intra-cerebral haemorrhage patients on Xa inhibitors (2 patients).
- **GILEAD COVID-19 study:** Investigated oral treatment options in COVID-19 patients.

Ongoing studies:

- **TILIA study:** Evaluates the effectiveness and safety of tozorakimab in treating viral pneumonia in patients with supplementary oxygen requirement (21 patients).
- **XUND study:** An AI-based health software trial involving 4,500 patients.
- **NAVOPN2020 Theresa Pneumonia Kit:** Examines markers in pneumonia progression (6 patients).

Internal collaborations include:

- **COVID-19 Biobank:** Involving 121 patients.
- **COVID-19 vaccine effectiveness study:** Involving 320 patients.
- A new **referral network** supports recruitment for other University studies.

The number of PhD-qualified staff is increasing (3 in 2023), with 7 more pursuing PhDs in 2024. Our participants regularly achieve success at STS (Students' Scientific Association) and other national conferences.

Currently available TDK (Students' Scientific Association) / thesis topics:

- **Developing solutions to optimise clinical trial enrollment at the emergency department**
Dr. Dóra Melicher
- **The applicability and potential of longitudinal patient follow-up and structured data query in emergency care**
Dr. Dóra Melicher, Dr. Bánk Fenyves
- **Analysis of patient flow at the emergency department**
Dr. Szabolcs Gaál
- **The role of informing patients in reducing the number of re-admissions**
Dr. Szabolcs Gaál
- **Preventive activities carried out during emergency care**
Dr. Szabolcs Gaál
- **Molecular aspects and emergency treatment of sepsis**
Dr. Bánk Fenyves
- **The role of bedside ultrasound in the differential diagnosis of acute illnesses**
Dr. Péter Vass
- **The place of dynamic coagulation tests (e.g. thromboelastometry) in emergency care**
Dr. Bánk Fenyves, Dr. Judit Imecz, Dr. Péter Vass
- **Treatment strategies for gastrointestinal bleeding**
Dr. Judit Imecz, Dr. Péter Vass
- **The place of blood gas analysis in the diagnosis and therapy monitoring of hypovolemia**
Dr. Péter Vass
- **The role of ultrasound in the diagnosis and therapy monitoring of hypovolemia**
Dr. Péter Vass
- **Volume therapy in various states of shock**
Dr. Szilárd Sándor
- **Cardiological aspects of acute neurological illnesses**
Dr. Csaba Varga
- **Management of major trauma patients**
Dr. László Hetzmann
- **Analysis and use of digital ECG databases in emergency care**
Dr. Csaba Varga

NATIONAL PROFESSIONAL FORUMS:

Dr. Tamás Berényi, a member of the Council of the Medical Professional College for Emergency, Disaster, Military and Law Enforcement Medicine (OSTHK), and former president of the Hungarian Association of Emergency Medicine (a public benefit organization), continues to ensure high-level professional representation.

Dr. Csaba Varga is the head of the Division of Oxyology – Emergency Medicine, Toxicology, Military and Disaster Medicine – and also serves as one of the chairmen of the national specialty examination board. The department's staff members (Dr. Tamás Berényi, Dr. Péter Vass, Dr. Szabolcs Gaál, Dr. Bánk Fenyves, Dr. Judit Imecz) are core instructors of the Advanced Sepsis Life Support (ASLS) Course. Staff members of the Clinic (Barbara Heider, Dr. Szilárd Sándor, Nadin Várhelyi) serve as core instructors of the Hungarian Emergency Triage System (MSTR).

INTERNATIONAL RELATIONS:

We have a cooperation agreement with the University of Massachusetts Department of Emergency Medicine and are developing a partnership with the Emergency Department of East Surrey Hospital in Surrey in the United Kingdom.

We maintain representation in the Council of IFEM (International Federation for Emergency Medicine) and the European Society for Emergency Medicine, as well as in the Emergency Medicine Section of UEMS (European Union of Medical Specialists).

We have an active partnership with the leadership of the American Academy of Emergency Medicine (Stephen R. Hayden, Jonathan S. Johns, Lisa Moreno, Antoine Kazzi).

Hungary is represented by:

- **Dr. Péter Vass**, examiner for both Part A and Part B of the European Board of Emergency Medicine examination, and core instructor and course director of the European Trauma Course (ETC).
- **Dr. Bánk Fenyves** is engaged in a research collaboration with the Department of Emergency Medicine at Massachusetts General Hospital.

PhD PROGRAM:

Starting from the 2024/25 academic year, three doctoral research topics are available at the Department of Emergency Medicine:

- **Epidemiological and organizational aspects of emergency care; data-driven decision support opportunities**
(Supervisor: Dr. Csaba Varga)
- **Pathophysiology, diagnostics, and prognosis of acute conditions**
(Supervisor: Dr. Bánk Fenyves)
- **Clinical research in emergency care with a focus on precision medicine**
(Supervisor: Dr. Dóra Melicher)

FAMILY MEDICINE

Department of Family Medicine

H- 1085 Budapest, Stáhly u. 7-9. Phone: +36-1-355-8530

Head of the Department: Dr. Péter Torzsa M.D. Ph.D.

Credits: 2

Total number of hours: 20 lectures: 8 practices: 16

Type of the course (mandatory/elective): mandatory

Academic year: 2023/2024

Code of the course: AOKCSA695_1A

Aim of the subject and its place in the curriculum:

Health care is based on the family practice system. It's important for future doctors to get to know the gatekeeping function of family practices. It's also important to show them on a one-to-one tutoring basis that family practice is an integrating profession. While getting involved in the work of the family practice medical students are introduced to the preventive approach, the ways of how to solve holistic, complex, bio-psycho-social and somatic problems and the differential diagnostics of frequent diseases. The aim is to teach them how to use and apply the basic means of diagnostic and therapeutic procedures and tools, to give them an insight into the most frequent laws and courses of action they may meet, to develop the medical students' communication skills in practice and to practise how to work with short interventions.

Location of the course (lecture hall, practice room, etc.):

Accredited tutorial practices

The lecture hall of the Department of Family Medicine

Competencies gained upon the successful completion of the subject:

- Preventive approach, screening
- Holistic patient care
- Managing complex bio-psycho-social-health problems
- Frequent chronic illness care
- Differential diagnostics
- How to use basic diagnostic tools on their own and how to assess test results
- Basic health-care-connected legal knowledge

Prerequisite(s) for admission to the subject:

Internal medicine propaedeutics, Pharmacology I, Laboratory medicine

Minimum and maximum number of students registering for the course:

Student selection method in case of oversubscription:

Turn based system.

How to register for the course:

To register for the course in the 'Neptun' system

Detailed thematic of the course:

Lectures

- Lectures take place on the first day of the course in an eight-hour period in the following categories:
- Screening procedures
- Mood- and sleep disorders
- Diabetes screening and care
- Gastrointestinal disease care
- Emergency care in the practice
- Cardiovascular prevention, hypertonic patient care
- Supplementary medicine

Practices

- The subject is taught in blocks. Medical students have five lessons in the family practice on one-to-one tutoring basis on the second and the fourth day plus a three-lesson long case discussion with a practical and differential diagnostic approach.
- During the training session in the family practice medical students will get to know and acquire
 - the possible forms of prevention
 - chronic illness care
 - acute illness care
 - the managing of complex bio-psycho-social problems
 - how to use the available diagnostic and therapeutic devices and tools

The subject of the case discussion includes the most frequent problems in basic care and provides an opportunity to discuss the diagnostic, differential diagnostic and therapeutic ways and possibilities in the following topics in an interactive way:

Screening procedures

- Complex cardiovascular/metabolic diseases
- Frequent, serious communicable diseases
- Patients with musculoskeletal diseases that have a strong negative impact on their life
- Patients with psycho-social problems

Potential overlap(s) with other subjects:

Internal medicine

Policy regarding the attendance and making up absences:

It's obligatory for the student to attend 75 percent of the training sessions.

Means of assessing the students' progress during the semester:

During training the tutor checks whether the students have acquired the practical and theoretical content of the training. There is no formal assessment.

Requirement for acknowledging the semester (signature): It's obligatory for the student to attend at least 75 percent of the training sessions.

Type of the examination:

Assessment of how actively the student has participated in the training by the tutor.

Compiling a 3-4,000 character case study based on what students have learnt through the training period in one of the topics given in advance.

Exam requirements:

Compiling a case study about a specific patient based on the following topics:

Patient picked through screening

A complex cardiovascular/metabolic disease

Frequent serious communicable disease

Patient with a musculoskeletal disease that has a strong negative impact on their life.

A case study displaying psycho-social problems

Parts of the presentation of the case:

1. Anamnesis
2. Current complaints
3. An examination plan
4. Examinations
5. Diagnosis
6. Therapy
7. Care
8. Processing and assessing the case based on professional literature
9. Bibliography

Type and method of grading:

Assessment and grading of the course: with a 1 to 5 term mark:
It's based on the student's activity through the training assessed by the tutor (40 percent) and the grade of the required case study (60 percent).

Assessment of the case study is based on the following:

Grade 1: failing to hand in the essay on the deadline, the number of characters is under 3,000, the case study is not original, but plagiarism

Grade 2: absence of a required part of the case study, unsophisticated wording, serious professional failure

Grade 3: 2-3 professional or formal mistakes

Grade 4: one not too significant professional mistake

Grade 5: precise and accurate wording in the medical jargon, logical conclusions

How to register for the exam:

Registering for the exam in the 'Neptun' system

Opportunities to retake the exam:

In accordance with the Studies and Exams Code.

FAMILY MEDICINE

Department of Family Medicine

H- 1085 Budapest, Stáhly u. 7-9. Phone: +36-1-355-8530

Head of the Department: Dr. Péter Torzsa M.D. Ph.D.

Credits: 2

Total number of hours: 20 lectures: 8 practices:16

Type of the course (mandatory/elective): mandatory

Academic year: 2023/2024

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Aim of the subject and its place in the curriculum:

Health care is based on the family practice system. It's important for future doctors to get to know the gatekeeping function of family practices. It's also important to show them on a one-to-one tutoring basis that family practice is an integrating profession. While getting involved in the work of the family practice medical students are introduced to the preventive approach, the ways of how to solve holistic, complex, bio-psycho-social and somatic problems and the differential diagnostics of frequent diseases. The aim is to teach them how to use and apply the basic means of diagnostic and therapeutic procedures and tools, to give them an insight into the most frequent laws and courses of action they may meet, to develop the medical students' communication skills in practice and to practise how to work with short interventions.

Location of the course (lecture hall, practice room, etc.):

Accredited tutorial practices

The lecture hall of the Department of Family Medicine

Competencies gained upon the successful completion of the subject:

- Preventive approach, screening
- Holistic patient care
- Managing complex bio-psycho-social-health problems
- Frequent chronic illness care
- Differential diagnostics
- How to use basic diagnostic tools on their own and how to assess test results
- Basic health-care-connected legal knowledge

Prerequisite(s) for admission to the subject:

Internal medicine propaedeutics, Pharmacology I, Laboratory medicine

Minimum and maximum number of students registering for the course:

Student selection method in case of oversubscription:
Turn based system.

How to register for the course:

To register for the course in the 'Neptun' system

Detailed thematic of the course:

Lectures

- Lectures take place on the first day of the course in an eight-hour period in the following categories:
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- Emergency care in the practice
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- Supplementary medicine

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The subject of the case discussion includes the most frequent problems in basic care and provides an opportunity to discuss the diagnostic, differential diagnostic and therapeutic ways and possibilities in the following topics in an interactive way:

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Potential overlap(s) with other subjects:

Internal medicine

Policy regarding the attendance and making up absences:

It's obligatory for the student to attend 75 percent of the training sessions.

Means of assessing the students' progress during the semester:

During training the tutor checks whether the students have acquired the practical and theoretical content of the training. There is no formal assessment.

Requirement for acknowledging the semester (signature): It's obligatory for the student to attend at least 75 percent of the training sessions.

Type of the examination:

Assessment of how actively the student has participated in the training by the tutor.

Compiling a 3-4,000 character case study based on what students have learnt through the training period in one of the topics given in advance.

Exam requirements:

- Compiling a case study about a specific patient based on the following topics:
- Patient picked through screening
- A complex cardiovascular/metabolic disease
- Frequent serious communicable disease
- Patient with a musculoskeletal disease that has a strong negative impact on their life.

A case study displaying psycho-social problems

Parts of the presentation of the case:

1. Anamnesis
2. Current complaints
3. An examination plan
4. Examinations
5. Diagnosis
6. Therapy
7. Care
8. Processing and assessing the case based on professional literature
9. Bibliography

Type and method of grading:

Assessment and grading of the course: with a 1 to 5 term mark:
It's based on the student's activity through the training assessed by the tutor (40 percent) and the grade of the required case study (60 percent).

Assessment of the case study is based on the following:

- Grade 1: failing to hand in the essay on the deadline, the number of characters is under 3,000, the case study is not original, but plagiarism
- Grade 2: absence of a required part of the case study, unsophisticated wording, serious professional failure
- Grade 3: 2-3 professional or formal mistakes
- Grade 4: one not too significant professional mistake
- Grade 5: precise and accurate wording in the medical jargon, logical conclusions

How to register for the exam:

Registering for the exam in the 'Neptun' system

Opportunities to retake the exam:

In accordance with the Studies and Exams Code.

INTERNAL MEDICINE I. (METABOLISM, ENDOCRINOLOGY, NEPHROLOGY, GASTROENTEROLOGY)

Department of Internal Medicine and Oncology

1083 Budapest, Korányi S. u 2/a

Course director: Prof. István Takács

Course coordinator: Dr. Péter Studinger

5 weeks

Lectures: 28 hours

Practices: 70 hours

Credit: 7

Objectives of the course:

The primary objective of the course in internal medicine for fourth-year students, who have acquired the basic skills of physical examination, is the symptom-based and patient-oriented education of various segments of internal medicine. Internal Medicine I comprises endocrinology, metabolic disorders, nephrology and gastroenterology. Students become familiar with the diagnostics and the treatment of the most common disorders of these disciplines.

Detailed syllabus: During a 5-week block practice, students spend 14 days in the department, through 4 weeks.

Within the daily schedule, there are lectures for the entire block of students (35-40 students), and case discussion practices in rotation

Schedule:

	Monday	Tuesday	Wednesday	Friday
8:15-9:45	Case discussion 1	Case discussion 2	Case discussion 3	Case discussion 4
10:00-12:15	Bedside practice	Bedside practice	Bedside practice	Bedside practice
13:15-14:00	Lecture 1	Lecture 3	Lecture 5	Lecture 7
14:15-15:00	Lecture 2	Lecture 4	Lecture 6	Lecture 8
15:15-16:00	Consultation	Consultation	Consultation	Consultation

Endocrinology and metabolic diseases

Lectures:

1. Introduction to endocrinology: Diseases of the hypothalamus.
2. Thyroid disorders – symptoms, diagnosis and treatment.
3. Thyroid nodules and cancer.
4. Secondary endocrine hypertension (primary aldosteronism, pheochromocytoma).
5. Glucocorticoid deficiency and overproduction: Addison's disease and Cushing's syndrome, iatrogenic Cushing's syndrome.
6. Diseases of the pituitary.
7. Disorders of the gonads.
8. Disorders of calcium metabolism.
9. Causes and diagnosis of blood glucose disorders.
10. Glucose control in diseases of carbohydrate metabolism.
11. Managing diabetic patients and their complications.
12. Obesity, management and treatment of patients with lipid metabolism disorders.

Case discussions:

13. Diagnosis, treatment and follow-up of patients with pituitary adenoma and hypopituitarism. (90')
14. What to do in case of altered TSH, examination of thyroid disorders. (90')
15. Examination of cortisol overproduction and deficiency, follow-up and management of patients with Cushing's syndrome and adrenocortical insufficiency (90')
16. Diagnosis and treatment of osteoporosis. (90')
17. Managing diabetes mellitus – diet and treatment. (90')

and bedside practices for small groups of students. Students are assigned into groups (14-15 students / group) for the case discussions that are held in rotation. Bedside practices are also held in small groups (7-8 students/group). Every day ends with a consultation. Exams are held on the fifth, final week.

On the first day of the 5th week, students take a 60-min written exam, which is comprised of 12-15 open-ended questions. On the following days (Tuesday-Friday), students continue with a bedside, patient-oriented oral exam. Oral exam is comprised of physical examination of a patient, interpretation of physical findings and discussion of diagnostic and therapeutic approach to the patient's endocrine / metabolic / renal / gastroenterological medical condition. There is not any topic list for the written or the oral part of the exam. A sample written test is provided to students on Moodle to help preparation.

Score-to grade conversion is as follows: 90-100: excellent (5), 80-89: good (4), 70-79: average (3), 60-69: pass (2), <60 or: fail (1). There is not any possibility of an offered grade. Retake of any (written or oral) part of the exam is feasible on the exam week of any subsequent block or on the extracurricular exam week (late August). In case of a failed exam, the student can decide whether to retake the written part, the oral part or both parts of the complex exam.

18. Purine, iron, copper and other rare metabolism disturbances. (90')
19. Thyroid nodules, examination of thyroid cancer, radioiodine treatment. (45')
20. Options of neuroendocrine tumour treatment, endocrine paraneoplastic syndromes. (45')
21. Examination and treatment of hyper- and hypocalcaemia (45')
22. Thyroid ultrasound (45')
23. Managing and follow-up of diabetic patients, complications. (45')
24. Obese patient, metabolic syndrome, when to treat elevated cholesterol. (45')

Nephrology

Lectures:

25. Glomerular diseases.
26. Tubulointerstitial and cystic kidney diseases.
27. Electrolyte disorders.
28. Renal transplantation.
29. Differential diagnostics of renal diseases.

Case discussions:

30. A young female patient with acute kidney injury and liver dysfunction. (90')
31. Approach to a patient with glomerulonephritis. (90')
32. Dialysis treatment. (90')
33. Management of a patient with chronic kidney disease. (45')
34. Vascular disorders of the kidneys, kidney stones and urinary tract infection. (45')
35. Hematuria and proteinuria during pregnancy. (45')

Gastroenterology

Lectures:

- 36. Disorders of the oesophagus and the stomach.
- 37. Disorders of the small bowel, malabsorption and maldigestion.
- 38. Inflammatory bowel diseases.
- 39. Diseases of the large bowel. Functional GI disorders.
- 40. Gastrointestinal bleeding.
- 41. Management of a patient with acute liver failure.
- 42. Disorders of the pancreas.

Case discussions:

- 43. Management of a patient with a pancreatic disease. (90')
- 44. Approach to a patient with acute abdominal pain. (90')
- 45. Approach to a patient with an abnormal liver function test. (90')
- 46. Differential diagnosis and management of obstructive jaundice. (45')
- 47. Approach to a patient with swallowing difficulty. (45')
- 48. Celiac disease. Differential diagnosis of diarrhoea (45')

LABORATORY MEDICINE

Department of Laboratory Medicine

Address: H-1089 Budapest, Nagyvárad sq 4. Floor XIV

Phone +36-1-210-0278 ext: 56318

Acting Directors

General: Prof. Barna VÁSÁRHELYI MD., PhD., DSc.

vasarhelyi.barna@semmelweis.hu

Background

The Department of Laboratory Medicine was founded in 2010 with missions in the following areas:

Education. The main goal is the introduction of basic principles of Laboratory Medicine to graduate medical students. The Department also provides post-graduate education for health-care specialists including physicians and clinical biochemists.

Diagnostics. The Department coordinates laboratory tests across the University, ensuring the accuracy and reliability of the results. It also provides invaluable professional support, aiding in clinical decision-making and enhancing patient care.

Research. The Department actively participates in research studies involving laboratory tests, manages research projects, and has its own PhD program.

Education

The Laboratory Medicine curriculum is based on the knowledge acquired during the studies of Translational Medicine and Pathophysiology in the third year. The main goal is to present different approaches and diagnostic algorithms necessary for efficient test ordering and the evaluation of lab test results. As part of their education, students receive information about the procedures involved in generating laboratory test results (from test ordering to laboratory reports) and the laboratory tests necessary to establish a diagnosis, which are crucial aspects for medical doctors when evaluating a laboratory report. Additionally, novel techniques used in the general laboratory, along with their drawbacks and benefits, are also covered in the curriculum.

Real diagnostic problems are discussed using practical examples during internal medicine training.

Classroom lectures and practices "Laboratory Medicine" for 4th year medical students

Participation in the tuition is obligatory.

The digital slides are available for the students via our website (www.labmed.usn.hu).

Participation in lectures is highly recommended since the exam is partly based on them.

The topics of the lectures include the elements of general and practical clinical laboratory.

The areas to be covered by the planned lectures:

1. Introduction to Laboratory Medicine (Specimen collection and processing. Preanalytical variables. To identify the major factors interfering with laboratory tests. Establishment and use of reference values/intervals.)
2. Concepts in Laboratory Medicine (Interpretation of laboratory test results: sensitivity and specificity of a laboratory test, predictive values. Quality control, quality assurance in clinical laboratories.)
3. Laboratory investigations of hematology diseases. (To understand the basic principles of modern hematology analyzers in clinical laboratories.)
4. Laboratory investigations of hemostatic disorders. (Identify the appropriate laboratory tests for evaluation of the bleeding patient and the thrombotic patient.)
5. Laboratory investigations of inflammation and tissue damage. (To understand how cell injury and inflammation can be tracked through plasma markers.)
6. Immunological investigations in laboratory medicine. (Learn the diagnostic tests required to the assessment of autoimmune disorders.)
7. Laboratory enzyme diagnostics

8. Endocrine investigations in laboratory medicine (Understand the laboratory tests used in the diagnosis of the more commonly encountered endocrine disorders.)
9. Molecular genetics investigation in laboratory medicine
10. Therapeutic drug monitoring (To learn when therapeutic drug monitoring is required and how it is performed for commonly monitored drugs. To identify the common drugs of abuse and learn how they are detected.)
11. Laboratory investigations of tumor markers
12. Laboratory investigations of cerebrospinal fluid and ascites, pleural fluid
13. To learn the laboratory tests used near patients (Point of care testing)
14. To learn the rationale for the selection of laboratory tests in pediatrics, including neonatal screening programs.

The topics of the exercises include some clinical case studies, harmonized with the Internal medicine studies, dealing with the following diagnostic problems:

1. "Sick or not?" screening tests.
2. Hypertensive patient.
3. Obese patient.
4. Diabetic patients.
5. Endocrine patients
6. Patient with fever.
7. Patient with joint complaint
8. Alcoholic patient.
9. Patients with kidney disorders.
10. Liquid, ion homeostasis disorder

We also provide consultation and laboratory visit during the semester. Number and type of assignments for individual work and the deadline for submission:

3 case studies per student for the first session of the block.

Exams:

There will be a test exam, an online multiple-choice question (MCQ) test, and an oral exam for the practical subjects. The final mark consists of two parts: 1. the theoretical MCQ test and 2. the practical mark. The average of these two parts determines the grade for the colloquium. In cases of uncertainty, the tutor will determine the final grade based on your knowledge. We compile blended-learning materials for all theoretical and practical topics, which students can study in their spare time and answer the related test questions within the Moodle system. The system keeps track of their results, and if they perform above 82%, we offer them the exam mark [82-89.9% - 4 (good), 92-100% - 5 (excellent)]. Students participating in the course must complete online theoretical and practical preparation using the e-learning materials, the completion of which is confirmed by the successful completion of the tests in the curriculum.

The practical mark will be calculated as the average of the marks obtained for the presentations, the answers to the questions and tests for the cases, and the multiple-choice question (MCQ) test based on the material covered in the exercises. If any practical section receives an unsatisfactory mark, the practical will not be accepted. The marks for the practical work and colloquium will be available on Moodle no later than 8 p.m. on Saturday evening. If the grade offered is unsatisfactory, you have the option to correct it with your tutor orally.

Taking examination before the exam period is not allowed.

The sign-up procedure is controlled and regulated by the NEPTUN software and the Department cannot interfere with system. The officially signed up student will be scheduled for examination. The list of examinees is completed 2 days before the date of exam; then NEPTUN system automatically closes the sign-up list.

Diagnostic profile of the Department

The Central Laboratory at Semmelweis University forms the basis of the Department. It performs more than 400 different tests in the field of clinical chemistry, hematology, hemostasis, serology, endocrinology, therapeutic drug level monitoring and clinical

microbiology with an annual number over 3 million. The laboratory is classified as FJ-3 meaning that it provides a 24 hour service for 7 days a week. Laboratory reports are provided through GLIMS lab informatics system integrated to eMedSolution.

Research at the Department

Laboratory tests are performed in the majority of clinical studies and drug research. In order to use the results more efficiently the colleague who is directly involved in performing the lab tests also participates in study design and evaluation. Therefore, clinical laboratories at the University are active partners of researchers and medical doctors. The major research profile of the Institute is to characterize specific For updated information please contact the department.

patterns of biomarkers predictive for specific disorders. Characteristic examples are the determination of immune phenotype and analysis of kinetic alteration of intracellular analytes with flow cytometry, measurement of cytokine levels with biochips, genomic analyses (genotyping and gene expression arrays). These instruments and the professional knowledge are also available for research purposes. Medical students are welcome to do research in any of the fields listed above.

Useful and update information about the Institute and the subject of Laboratory Medicine can be found at home page: Semmelweis.hu/laboratorium

MEDICAL IMAGING

Medical Imaging Centre

Head of Department: Pál MAUROVICH-HORVAT MD, PhD, MPH, DSc

Chief of Undergraduate Education: Zsuzsanna LÉNÁRD MD PhD

2-week-long course

Lectures: 14 hours per course

Practices: 28 hours per course

Credits: 3

Objectives of the course and its place in the medical curriculum:

The aim of the course is to: 1) introduce the role of medical imaging and interventional radiology in clinical practice, diagnostics and treatment of diseases; 2) teach the technical basis and clinical applications of the the different radiological modalities, 3) the delineation of the advantages and disadvantages of each modalities; 4) introduce the radiological appearance of most important and clinically relevant pathologies; 5) learn the professional terminology of imaging procedures; 6) discuss the preliminary preparation and scheduling of diagnostic imaging for the patients; 7) introduce the radiological algorithms of the most frequent clinical symptoms and pathological conditions; 8) demonstrate the role of imaging examination in the patient care process and the importance of consultations between clinician and radiologist.

Lectures

- Introduction of imaging modalities
- Basics of ultrasonography
- Basics of X-Ray
- Basics of CT
- Basics of MRI
- Basics of nuclear medicine
- Emergency imaging (abdominal, neuro and thoracic)
- Basics of breast imaging
- Basics of interventional radiology
- Basics of musculoskeletal radiology
- Basics of head and neck radiology
- Artificial Intelligence in medical imaging

Practices

- Demonstration of imaging methods
- Nuclear medicine case reviews
- PACS-based image analysis
- Clinical radiology by interactive case reviews
- Thyroid, vascular and abdominal ultrasound skill practice
- Emergency (FAST, eFAST and RUSH) ultrasound skill practice
- Must-see-images

Textbook

Herring W. Learning Radiology: Recognizing the Basics. 5th Edition, Elsevier, 2023. ISBN 978-0323878173.

OPHTHALMOLOGY

Department of Ophthalmology

Tutor: **Dr. Dorottya Szabó**

Ophthalmology is taught in a 3-week-block system, with the aim of facilitating the transfer of theoretical and practical knowledge in the first two weeks, followed by a final exam.

I. Practical training:

32 lessons (12 lessons: seminars, 16 lessons: practice, 4 lessons online case reports)

Seminars (6x 90 min)

1. anatomy, medical history, visual acuity
2. red eye
3. refractive surgery, cataract, glaucoma
4. sudden visual impairment, retina, eye trauma
5. neuroophthalmology, oncology
6. binocular vision, pediatric ophthalmology

The maximum number of students in a group is four. During the block, the group is assigned to a teacher. The schedule of the block is determined by the teacher (instructor) in accordance with the patient's care obligations.

Attendance in practical training: one group/one teacher. The schedule for the educational programme is determined by the instructor in accordance with their own work schedule.

1. Day 1: 2 x 60 minutes of basic knowledge
Introduction to the Department, in vivo anatomy, anamnesis, vision examination (automatic refraction, colour vision, contrast sensitivity), confrontal examination of visual field, examination of anterior segment, examination of pupillary reactions, assessment of intraocular pressure by palpation, eversion of upper eyelid
2. Day 1-7: Patient presentation: 9x60 min
3. Pre-exam consultation: 1x60 min
4. +1x60 min make-up practice: in consultation with the teacher

Theoretical education: 24 lessons; online course materials via MOODLE interface

Checklist for students: What I should see during the practical sessions:

A: I need to learn simple manual methods (this will be tested in the practical exam)

1. Assessment of visual acuity
2. Estimating intraocular pressure with palpation
3. Opening the eyes manually
4. Examination of eye movements in the six cardinal directions
5. Cover test, recognising strabismus and amblyopia
6. Confrontal visual field testing, eyelid eversion
7. Pupil reactions
8. Examination of the anterior segment with pupil lamp
9. Examination of the red reflex using direct ophthalmoscope
10. Fundus examination using direct ophthalmoscope
11. Schirmer test and break up time
12. Usage of eye drops
13. Bandage

B: Instrumental tests

I would like to be as informed as possible about traditional and new ophthalmic diagnostic and therapeutic procedures.

1. automatic refractometer
2. slit lamp
3. Lang test
4. Hertel exophthalmometer
5. colour vision (Ishihara, Farnworth),
6. contrast sensitivity
7. Schirmer test, tear film break-up time
8. fluorescein corneal staining
9. critical fusion frequency (CFF)
10. IOP measurement with applanation
11. Goldman and automated perimetry
12. anterior segment testing
13. ophthalmic ultrasonography
14. optical coherence tomography
15. invasive angiographies
16. electrophysiological tests
17. intravitreal injection
18. visiting the operating theatre

Net-based practical knowledge: we present 3-5 minute case reports analyzing practical problems related to a specified topic electronically (goes from recording and in pdf)

Topics

1. Pain (pain in the eye, orbital pain, headache) Visual disturbances (loss, visual field defect): cases
2. Non-traumatic visual impairment/vision loss, temporary vision loss: cases
3. Red eye (cases)
4. Anterior segment, accessory structures: cases
5. "Orbita" patients
6. Incomitant or comitant strabismus, diplopia, nystagmus; cranial nerve palsies, ophthalmic aspects of diseases of the autonomic nervous system, eye movement disorders; non-paralytic causes of incomitant strabismus: cases
7. Glaucoma: diagnosis and detection of progression: cases
8. Cataract, ophthalmic oncology: cases
9. Diabetes mellitus, macular degeneration: cases
10. "Papillary" cases
11. Trauma cases
12. Pediatric eye problems, strabismus, amblyopia: examination methods, cases

Special Lab (extra work)

operating theatre for inpatient or outpatient departments
OCT-angiography
electrophysiology

II. Theoretical education

Net-based lectures on the Moodle interface

- ANATOMY, VISION
- RED EYE, ANTERIOR SEGMENT
- EPIDEMIOLOGY, EYELIDS, PUPIL, CATARACT, GLAUCOMA, OPTIC NERVE
- VITREORETINAL DISEASES
- TRAUMATOLOGY
- ONCOLOGY
- BINOCULAR VISION, STRABISMUS, AMBLYOPIA, PREVENTION OF MYOPIA
- PEDIATRIC OPHTHALMOLOGY, OCULAR MANIFESTATIONS OF SYSTEMIC DISEASES

Competencies gained upon the successful completion of the subject:

Competence assessment

1. Red eye: distinguishing serious, vision-threatening conditions from problems that can be managed by a general practitioner
2. Differentiation of conjunctivitis and keratitis
3. Differentiation of conjunctivitis and acute iritis
4. Recognition of conjunctival, corneal foreign body, corneal erosion
5. Recognition of cellulitis orbitae, knowledge of therapeutic approach
6. Signs of acute glaucoma, therapy
7. Causes of sudden visual loss, tasks after recognition
8. Causes of progressive deterioration of visual acuity
9. Recognition of visual field defect, knowledge of therapeutic approach
10. Recognition of amblyopia, strabismus
11. Possible causes of leucocoria
12. Acute treatment of lagophthalmos
13. Palsy of nerves responsible for eye movement, management
14. Clinical manifestation of papilledema, diagnosis and therapy
15. Aim and frequency of ophthalmic screening for diabetes mellitus
16. Management of penetrating/blunt eye injury
17. First aid for chemical injury of the eye

Competence in practice

1. Evaluation of near and far visual acuity
2. Confrontal examination of visual field
3. Examination of eye movement in 6 main directions
4. Examination of ocular alignment. Screening for amblyopia and strabismus in early childhood
5. Examination of pupillary reactions and size
6. Examination of anterior segment with pupillary and slit lamp
7. Appraisal of eye tension by touching
8. Eversion of upper eyelid
9. Removal of conjunctival foreign body
10. Red reflex, direct fundoscopy of optic nerve head, retinal vessels
11. Usage of eye drops, bandage
12. Optical coherence tomography: recognition of a problem
13. Retinal angiographies: indications, side effects
14. Modern diagnostic approaches of anterior segment
15. Ophthalmic ultrasonography

Practical knowledge: Recognition of ophthalmic problems:

1. Visual deterioration
2. Differential diagnosis of red eye (conjunctivitis, keratitis, anterior uveitis, acute glaucoma)
3. Papilledema
4. Visual field defect
5. Acute palsy of nerves III., IV. and VI.
6. Leucocoria
7. Recognition of amblyopia and strabismus in early childhood
8. Protrusion

Treatment alone

1. Conjunctivitis (viral, bacterial, allergic)

First aid

1. Chemical injury
2. Conjunctival foreign body
3. Acute glaucoma

Knowledge of indication for acute ophthalmic consultation

1. Non-traumatic sudden vision loss, visual field defect
2. Chemical injury
3. Acute angle closure glaucoma
4. Mechanical injuries
5. Corneal ulceration
6. Corneal foreign body
7. Acute (possibly within a few days/weeks) protrusio/dislocatio bulbi, reduced mobility, consequent double vision, vision-threatening orbital processes: postseptal cellulitis, spontaneous/traumatic haematoma, rapidly progressive tumours in children and adults; accompanying symptoms may include: inflammatory symptoms, pain, nausea, vomiting, fever (typical pathologies: in childhood: cellulitis, haematoma, rhabdomyosarcoma; in adulthood: spontaneous orbital haematoma, abscess, primary malignant tumours, intraorbital metastasis, endocrine orbitopathy causing optic compression)

Indication of regular ophthalmic screening, related areas

1. Diabetes mellitus
2. Glaucoma
3. Vision screening for amblyopia in childhood
4. Interdisciplinary issues: endocrinology, autoimmune diseases, oral surgery, otorhinolaryngology, neurology

Knowledge of modern diagnostic and therapeutic tools for ophthalmology

1. Diagnostic tools: automatic refractometer, measurement of eye tension, optical coherence tomography, ultrasonography, angiography, corneal topography, endothel microscope, cornea and anterior segment cameras, electrophysiological methods, colour tests, examination of visual field
2. Therapeutic possibilities: laser treatment in anterior or posterior segments, essence of modern microsurgical procedures, eyedrop families: action and side effect

Practical exam material

In practice:

1. Anamnesis
2. Assessment of near and distance visual acuity in adults and in children
3. Confrontal visual field testing
4. Examination of eye movements in the six cardinal directions
5. Checking ocular alignment, screening for amblyopia
6. Examination of the pupil: pupil size, reactions
7. Examination of the eyelids, lacrimal apparatus, conjunctiva, cornea, anterior chamber, iris, and the pupil with pupil lamp
8. Estimating intraocular pressure with palpation
9. Examination of the upper tarsal conjunctiva by eyelid eversion
10. Red reflex, examination of the papilla, posterior segment, retinal vessels by direct ophthalmoscopy
11. Usage of eye drops, bandage
12. Examination methods of the posterior segment (Optical Coherence Tomography, ophthalmic ultrasound, invasive angiographies): problem identification, indication
13. Modern anterior segment diagnostics: problem identification, indication

ORAL SURGERY AND DENTISTRY

Course Leader: Prof., Dr. Zsolt Németh med. habil. PhD
Department of Oro-Maxillofacial Surgery and Stomatology
Dental Training Centre of the Faculty of Dentistry
Department of Community Dentistry

Credit value: 2

Number of lessons per week: 28 hours lecture: 0

practical course: 20 hours seminar: 8 hours

Subject type: obligatory course

Objectives of the subject, its place in the medical curriculum:

The main aim of the „Oral surgery and Dentistry” course for 4th year medical students is to introduce the most specific symptoms, recognition and treatment of the most common dental, oral and maxillofacial diseases. In addition, the knowledge of various specialisations of dentistry is important to medical students because later, as specialised medical doctors - regardless of their specialization – they will find numerous correlations and these skills will prove to be essential in case of many borderline diseases and to face diagnostic difficulties. During the course students learn about the method of oral examination and stomato-oncological screening. The practice focuses on the oral and dental contexts of the disciplines of medicine. It is extremely important for future medical doctors to be aware of the symptoms of systemic diseases in the oral cavity and know which dental and oral diseases may lead to systemic diseases.

Successful completion of the subject results in the acquisition of the following competencies:

As practising physicians, they will be in possession of modern theoretical and practical skills and will be able to perform medical practice on their own and build correct human relationships with their patients and family members, as well as other health professionals. It is important that they receive a comprehensive picture of the concept of oral health. As practising physicians, they will be able to examine the oral cavity and the head and neck region, interpret the lesions and altered functions, and initiate the diagnostic and therapeutic process.

In accordance with the preventive approach that is characteristic of today's medicine, they will be able to prevent and detect teeth (oral) diseases with systemic effects in their early stage.

Course prerequisites:

Pathology II.

Basic surgical techniques

Number of students required for the course (minimum, maximum) and method of selecting students:

Based on registration through the Neptun system.

How to apply for the course:

through the Neptun system

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments! Always attach a CV for guest lecturers!)

The course is educated in block system; the duration of the course is 1 week.

The English language practices will take place according to the schedule of the blocked education.

The course takes place in the building of Department of Oro-Maxillofacial Surgery and Stomatology and in the Dental Training Centre of the Faculty of Dentistry during the educational period (according to the schedule of academic year in Faculty of Dentistry). The courses take place in the building of Department of Oro-Maxillofacial Surgery and Stomatology and in the Department of Community Dentistry of the Semmelweis University, Faculty of Dentistry during the exam period (according to the schedule of academic year in Faculty of Dentistry). The students receive information about the location and the date of the practices at the beginning of the semester in Neptun system.

The schedule of the one-week block:

one - week block					
	Monday	Tuesday	Wednesday	Thursday	Friday
from 8:00 am to 1:00 pm	education	education	education	day off (obligatory)	seminar
from 1:00 pm to 2:00 pm	lunch break	lunch break	lunch break		lunch break
from 2:00 pm to 3:00 pm	education	education	education		exam

About 18-25 students attend the clinics weekly. The students are divided into 3-4 groups (minimum 5 students per small group) based on the application and group assignment in the Neptun system. The small groups of students have practices on Monday, Tuesday and Wednesday. The practices and seminars are held in the educational period (according to the schedule of the academic year in the Faculty of Dentistry) in the Department of Oro-Maxillofacial Surgery and Stomatology and at the Clinics of Dental Training Centre of the Faculty of Dentistry, in the exam period (according to the schedule of academic year in Faculty of Dentistry) in the Department of Oro-Maxillofacial Surgery and the Department of Community Dentistry. The Department where the education is passed is chosen by the students based on the registration and group assignment in the Neptun system.

The students can choose the educational Department/Clinic with the application in Neptun-system. The Departments/Clinics can be selected in the educational period (according to the schedule of the academic year in the Faculty of Dentistry):

/1 – Department of Oro-Maxillofacial Surgery and Stomatology
/2 – Department of Restorative Dentistry and Endodontics
/3 – Department of Prosthodontics
/4 – Department of Pediatric Dentistry and Orthodontics
/5 – Department of Periodontology
/6 – Department of Oro-Maxillofacial Surgery and Stomatology, Subdivision of Dento-alveolar Surgery in Educational Center of Faculty of Dentistry

The Departments/Clinics can be selected in the exam period (according to the schedule of the academic year in the Faculty of Dentistry):

/1 – Department of Oro-Maxillofacial Surgery and Stomatology
/2 – Department of Community Dentistry
/3 – Department of Community Dentistry
/4 – Department of Community Dentistry
/5 – Department of Community Dentistry
/6 – Department of Community Dentistry

The Departments and Clinics are involved in education:

- Department of Oro-Maxillofacial Surgery and Stomatology (Faculty of Dentistry, educational period and exam period)
- Department of Restorative Dentistry and Endodontics (Faculty of Dentistry, educational period)
- Department of Prosthodontics (Faculty of Dentistry, educational period)
- Department of Periodontology (Faculty of Dentistry, educational period)
- Department of Pediatric Dentistry and Orthodontics (Faculty of Dentistry, educational period)
- Department of Oro-Maxillofacial Surgery and Stomatology, Subdivision of Dento-alveolar Surgery in Educational Center of Faculty of Dentistry (Faculty of Dentistry, educational period)
- Department of Community Dentistry (Faculty of Dentistry, exam period)

Topics of each sub-practices:

Maxillofacial and dentoalveolar surgery:

Benign neoplasms of the orofacial region. Praecancerous lesions, prevention of oral cancer, screening methods. Malignant oral tumors and its treatments. Developmental anomalies (craniofacial malformations, cleft lip and palate, dysgnathia). Reconstructive surgery. Traumatology. Inflammatory diseases and therapeutic options. Tooth extraction, dentoalveolar and preprosthetic surgery. Basics of dental implantology. Oral rehabilitation for patients with special needs.

Restorative Dentistry and Endodontics:

Medical and dental history recording. Correlations between medical conditions and dental, periodontal status. High-risk patients. Examination, evaluation of clinical findings and making a diagnosis. Aspects of creating a treatment plan. Prevention options of oral diseases. Age-related changes in oral condition and its results. Diagnosis and treatment methods of caries. Importance of pulpal and periodontal diseases. Types of conservative dentistry procedures. Focal (dental) infection. Use of antibiotics in the field of conservative dentistry. Importance of regular dental examination considering medical status.

Prosthodontics:

Indications and contraindications of prosthodontics treatments. Making a prosthodontic treatment plan: when and which type, fixed or removable and implant-retained prosthetic appliances, etc. Demonstration of the most frequently used fixed and removable prosthetic appliances emphasising which types must be removed from the oral cavity of an unconscious patient. The significance of the control and care of patients after prosthetic treatment. Examination of the temporomandibular joint, its dysfunction (TMD), diagnosis and conservative treatment options. The clinical team treating TMD

The teachers/instructors of Clinics and Departments are involved in education:

Department of Oro-Maxillofacial Surgery and Stomatology:

Sándor Bogdán, Dr., Mihály Vaszkó Dr., Tamás Huszár Dr., Iván Decker Dr., Péter Barabás Dr., Gergely Csókay Dr., Zsófia Somogyi Dr., Tamás Würsching Dr., Gábor Pintér Dr., Szófia Szentpéteri Dr., Péter Lillik Dr., Ákos Dora Dr., Lőrincz Zatik Dr. Anita Gyórfi Dr., Zsolt Németh Dr.

Department of Restorative Dentistry and Endodontics:

Boglárka Szántai Dr., Réka Pap-Németh Dr., Andrea Demeter Dr., Department of Prosthodontics:
Máté Jász Dr. Emőke Takács Dr., Szandra Körmendi Dr., Anna Németh Dr., Mercedes Linninger Dr.

Department of Periodontology:

Györk Kléh Dr., Gábor Szabó Dr., Petra Orosz Dr., Kristóf Forgó Dr., Kristóf Somodi Dr., Boldizsár Bartha Dr., Petra Orosz Dr., Bálint Keglevich Dr., Orsolya Láng Dr., Kinga Kelemen Dr., Afrodité Kőrösi Dr., Fanni Bolya-Orosz Dr., Claudia Paár Dr., Eleonóra Sólyom Dr., Márk Czumbel Dr., Florina Németh Dr.

Department of Pediatric Dentistry and Orthodontics:

István Simon Dr., Gergely Kaán Dr., Lili Ács Dr., Levente Szegedi Dr., Miklós Nagy Dr., Heike Löchli Dr.,

Department of Oral Diagnostics:

Szabolcs Gyulai-Gaál Dr., László Simonffy Dr., Botond Bukovszky Dr.

Department of Community Dentistry:

Gergely Oláh Dr., Márk Répási Dr., Luca Nagy-Csoma Dr.

patients. Detection and treatment of early and late outcomes of complete endentulousness.

Periodontology:

Survey of the patient's oral hygiene and setting professional oral hygiene. Examination of the oral mucosa and diagnosis. Opportunity to assist in subgingival depuration (in non-surgical pocket treatment) and surgical periodontic procedures.

Pediatric Dentistry and Orthodontics:

Dental examination in childhood, medical and dental history, and dental screening. Opportunity to assist in paedodontic procedures e.g. sealant application, primary and permanent tooth filling, primary tooth extraction, and alternative solutions to the treatment of childhood caries. Characteristics of primary, mixed and permanent dentition. Difficulties and emergencies in paedodontics. Scanning and eliminating focal infections. Oral manifestations of childhood infections. Use of anaesthetics and drugs in childhood. The connection between paedodontics- orthodontics and other dentistry specialities. Opportunity to assist in the activation of removable and fix orthodontic appliances. The most frequently used orthodontic appliances. New methods of orthodontics, digitalised procedures and aesthetic appliances. The importance of age in orthodontic treatment.

Oral diagnostics:

Patient with dental symptoms, recording dental and medical history, and making a diagnosis. Considering correlations between medical conditions and dental problems. Examination of the head and neck, stomato-oncological screening. Steps of the intraoral examination, making a description of the clinical findings. Lesions of oral mucosa. Oral manifestations of systemic autoimmune diseases. Oral manifestation of infections. Symptoms of medication side effects. Additional modalities in oral mucosa examination. Dentoalveolar and maxillofacial imaging techniques. Manifestations of medical conditions on dental X-ray. Imaging modalities in traumatic injuries. Imaging techniques in screening.

More specialities contain similar course topics:

Emergency cases and their treatments, the importance of prevention and the connection of medical specialities. Dental and dentoalveolar outpatient department connection to maxillofacial and otolaryngology departments work. Gerontostomatology. Dental infectology. The students (with the help of their tutor) are involved mainly in patient examination, elaboration and discussion of diagnostic-therapeutic plans. Related to the anamnesis and patient examination, the students will discuss the general medical and interdisciplinary aspects of the given symptoms. In case of every examined patient, the symptoms, conditions, diagnostic and treatment options in dental co-disciplines will be discussed. An important element of the oral surgery and dentistry education is that the tutor demonstrates the possible relationship of the symptom or condition to general medical practice. The study materials of practices and other teaching aids related to the course are available to students on the E-learning/Moodle interface.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!).

Possible overlaps of themes:

- Cleft lip and cleft palate – Pediatric surgery, Otorhinolaryngology
- Sinus illnesses – Otorhinolaryngology
- Allergy – Dermatology
- Mucosa – skin diseases – Dermatology, Internal Medicine, Immunology
- Focal diseases – Internal medicine, Dermatology, Rheumatology
- Hemorrhagic patients' care – Hematology
- Dysgnathia – Pediatric Dentistry and Orthodontics
- Head and neck medical imaging – Radiology
- Interventions in general anesthesia – Anesthesiology
- Transfusion – 2-week transfusion course
- Sepsis – Intensive Therapy, Infectology, Microbiology
- Oncologic patients' care – Oncology, Oncoradiology
- Dental, oral surgical care in elder patients – Gerontology
- Injuries of teeth, maxillofacial bone and soft tissue – Traumatology
- Injuries of head, midface and lower jaw fractures – Traumatology, Neurosurgery
- Facial pain – Neurology
- Orbital diseases due to infections and traumatologic causes – Traumatology, Ophthalmology
- Examination of tissue from orofacial area - Pathology

Special study work is required to successfully complete the course: (E.g. field exercises, medical case analysis, test preparation, etc.)
None

Requirements for participation in classes and the possibility to make up for absences:

At least 90% participation is obligatory of the practices, according to the Study and Examination Regulations. Participation in the sessions is confirmed by the signature of both the student and the instructor on the attendance sheet.

It is possible to make up the practices with the same language groups or during other practice's educational breaks or during on-call/duty hours on weekends, according to prior arrangement. The absence from the practice can be confirmed with a medical certificate or other valid document.

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

During the short modules of the education, there will be no mid-term test. All through the interactive practices and consultations, it is enabled to assess the students' knowledge.

Requirements for signature:

At least 90% participation

Type of examination:

Written test exam on E-learning interface.

Requirements of the examination:

(In case of a theoretical examination, please provide the topic list; in case of a practical exam, specify the topics and the method of the exam)

Students will take an online seminar on Friday between 8.00 and 13.00 for summarizing what they have learned during the week. The students take a written exam on the E-learning platform between 14.00 and 15.00 in the afternoon. It is possible to repeat/replace the exam by previous arrangement, following the rules of Study and Examination Regulations.

The questions of the written exam are made from the seminar materials. The study materials of practices are available for students on the E-learning interface. The tests are opened on the E-learning Platform in the afternoon of the exam. During the exam, students must answer 50 test questions (simple choice, choose one correct answer from 4 options) in 60 minutes.

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)

The grade is determined based on the results of the test, in accordance with the following point limits:

45-50 points Excellent, 40-44 points Good, 35-39 points, Average, 30-34 points Fair, 0-29 points Unsatisfactory

How to register for the examination?

On Neptun system

Possibilities for exam retake:

By previous arrangement, following the rules of Study and Examination Regulations

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material: The study materials are available for students on E-learning interface: <https://itc.semmelweis.hu/moodle/>. Students can find more study materials, additional resources, notes, textbooks and literature links on the website of clinics and departments participated in education.

Recommended literature:

1. Michael Miloro, G. E. Ghali, Peter E. Larsen, Peter Waite, Peterson's Principles of Oral and Maxillofacial Surgery Springer, 2022
2. James R. Hupp, Myron R. Tucker, Ellis, Edward, III, DDS, MS, Contemporary Oral and Maxillofacial Surgery, Elsevier Books, 2018
3. Peter A. Brennan (Author), Henning Prof Dr Schliephake (Author), G.E. Dr. Ghali DDS MD FACS (Author), Maxillofacial Surgery, 3rd Edition, Churchill Livingstone 2017

OTORHINOLARYNGOLOGY

Tutor: Dr. Beáta Bencsik

Lecture (14 hours/block)	Practice (28 hours/block)
Ear I.	Clinical ENT examinations. (2 hours)
Ear II.	Shadowing (4 hours)
Audiology	Ear diseases (2 hours)
Benign neck tumors	Audiology (2 hours)
Otoneurology	Otoneurology (2 hours)
Rhinology I.	Rhinology (2 hours)
Rhinology II.	Pharynx diseases (2 hours)
Pharynx infections	Shadowing (5 hours)
Phoniatry	larynx diseases, phoniatry (2 hours)
Oncology I.	Oncology (2 hours)
Oncology II.	Consultation/medical emerging (2 hours)
Oncology III.	
Sleep apnoe	
ENT emergency	

PHYSICAL EDUCATION VII-VIII.

Practice: 1 hour per week

Credit value: 0

Number of lessons per week: 1

Practical course: 14

Subject type: obligatory course

Name of the course leader: Várszegi Kornélia

Objectives of the subject, its place in the medical curriculum:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Gymnasium, Artificial football court, Artificial tennis court
University's Physical Education and Sportcenter, 1107 Budapest
Zágrábi utca 14.

Successful completion of the subject results in the acquisition of the following competencies:

Upon completion of the course the student will be able to carry out regular physical activity.

After completing the „beginner swimming” course, one will acquire water-confident swimming skills.

Detailed curriculum:

*(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments!
Always attach a CV for guest lecturers!)*

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Physical Education and Sportcenter (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.
1107 Bp, Zágrábi utca 14.

1x60 min./week sessions:

Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, advanced Yoga, male football, salsa, step aerobics, badminton, beginner ultimate frisbee, advanced ultimate frisbee, zumba

1 x 90 mins./week sessions:

women's football, ice hockey, beginner tennis, beginner tennis 2,

4 x 3 hrs. and 1x 2 hrs. session packages:

Hiking 1, Hiking 2.

2x90 mins./week sport training (competitive sport, for qualified only):

cheerdance, cheerleader, men's football, handball, basketball, volleyball

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

P.E. Teachers:

Doharné Buczkó Anikó
Farkas Dominika
Kalmus Dániel
Lehel Zsolt
Sótonyiné Hrehuss Nóra
Várszegi Kornélia
Weisz Miklós

Requirements for participation in classes and the possibility to make up for absences:

The number of active participations for physical education classes is 10, regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days, after registration in the Neptun system. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

There is no mandatory control during the term.

Requirements for signature:

Active participation in practice classes 10 times under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate
2. does sports regularly and submits a certificate of association and federation

until the last study day in the 4th week of the semester. On the basis of the submitted application and its annexes, the TVB decides on the exemption of both the Hungarian and foreign students.

PULMONOLOGY AND THORACIC SURGERY

Department of Pulmonology

Tömő str. 25-29., Budapest, Hungary 1083
<http://semmelweis.hu/pulmonologia/english/>

Course director: Prof. Dr. Veronika Muller

Course tutor: Dr. Gabor Horvath

Credits: 4

Hours: 56 hours/3-week course

Lectures (18 hours)

- Lung cancer
- Chronic obstructive pulmonary disease
- Interstitial lung diseases
- Pneumonia. Tuberculosis
- Respiratory insufficiency. Non-invasive mechanical ventilation
- Bronchial asthma
- Pulmonary rehabilitation. Smoking cessation
- Lung transplantation. Cystic fibrosis
- Pulmonary embolism
- Sleep related breathing disorders
- Thoracic surgery: lung cancer, pneumothorax, pleural effusion, lung transplantation

Practices (29 hours)

Practical demonstrations/laboratory visits (8x45') Topics: · Lung function measurement laboratory techniques (2x) · Pulmonary diagnostics (2x) · Non-invasive ventilation methods · Oxygen therapy methods · Inhalation therapy methods · Pulmonary hypertension – Interactive demonstrations/skill development (9x45') Topics: · Lung function labor · Bronchology/skill laboratory examinations (2x) · Non-invasive ventilation patient care (2x) · Allergology tests · Sleep

laboratory tools/methods · Pulmonary rehabilitation procedures · Chest drainage – General/specific patient examinations: · Pulmonary dept. · Pulmonary-oncology dept · Non-invasive ventilation dept. · Infectology

Attendance: lectures and practices are obligatory. Absence hours less than 10% of total are accepted.

Exam type: oral

Exam sign up: Neptun system

Textbooks:

Bourke SJ, Burns GP: Lecture Note: Respiratory Medicine. 9th ed. 2015. ISBN 978-1-118-65232-9

Palange P, Rohde G: ERS Handbook of Respiratory Medicine. 3rd Edition. 2019. ISBN 978-1-84984-079-8

SUMMER PRACTICE - SURGERY

Credit point: 2

Total hours: practical: 160

Type of course: obligatory

Responsible for course: Dr. Szijártó Attila

Workplace, contact details:

1st Department of Surgery, phone: +36-1-333-5343

Position: university professor, director

Date and number of habilitation: 2015.06

Aim of the course, its position in the medical curriculum:

The main aim of the fourth semester surgery practical is introduction to the general symptomology, diagnostics, and specifics of therapeutic decisions of surgical conditions. In addition to the basics of surgery, students learn about surgical conditions of the organ systems, their diagnosis and surgical treatment. Our primary task is to teach an approach of cooperation with accompanying specialities, we guide students through the process of outpatient specialist treatment through surgery to postoperative care.

Acquired competences after successfully completing the course:

Education of surgery starts in the 4th year, and it embraces the whole curriculum until the 4th year comprehensive surgery exam, providing the framework of clinical training. During this time our main goal is to blend the knowledge provided by theoretical courses and accompanying clinical specialities with the surgical approach and decision making.

Prerequisite(s) for admission to the course:

- According to the Study and Examination Policy.
- Student enrolment requirements (minimum, maximum), method of student selection:
- Based on registration in the Neptun system.

How to apply for course:

In Neptun system

Detailed syllabus:

The surgery summer practical, based on "block" syllabus education for the 4th year, provides practical knowledge involving students in daily patient care.

Recommended practical activities:

- Examination of acute surgical patient
- Examination of elective surgical patient
- Wound care
- Participation in the work of the surgical outpatient clinic
- Surgery assistance
- Surgery administration
- Postoperative care, medication

Cross-border issues of the given course related to other courses (obligatory and elective). Possible overlaps in curriculum:

- internal medicine – gastroenterology, endocrinology
- oncology
- anaesthesiology and intensive therapy
- radiology

Special study work required to complete the course: none

Requirements for participation in classes and opportunities to make up for absences:

There is an attendance register for the practical.

According to Chapter 3, Section 17 § 7 of the Organisational and Operational Rules of the Semmelweis University, attendance at min. 75-75% of lectures and practices is obligatory

Further general information on attendance at lectures and practical can be found in the Studies and Exams Code (Section 17 § 7; 8) of the Semmelweis University.

Examination of acquired knowledge during term:

There is no intermediate exam during the short practical time. The interactive features of the practical and consultations provide an opportunity to continuously assess students' knowledge.

The criteria for end-of-term signatures:

Attendance at min. 75% of classes.

Type of exam:

Practical exam based on previously defined syllabus

Exam requirements:

Practical exam items: Knowledge of the below exam items will be tested based on information acquired from literature and practical:

1. What is vital indication?
2. How can free abdominal air be detected by means of percussion?
3. What are the most common complications of thyroid surgery?
4. What is a fundoplication?
5. What can cause dysphagia?
6. With what tissue can the oesophagus be replaced?
7. Draw the Billroth's gastric resections.
8. List the blood supplying vessels of the stomach.
9. Draw/describe the Calot's triangle.
10. What are the 3 main signs of cholangitis, what is the name of the triad?
11. What are the surgical indications of a benign liver tumour?
12. What are the blood supplying vessels of the liver?
13. What imaging diagnostic(s) is necessary to diagnose a liver tumour?
14. What are the pillars of the diagnosis of acute pancreatitis?
15. Name the typical symptoms of chronic pancreatitis.
16. Which laboratory parameter indicates obstructive jaundice?
17. What is the Courvoisier sign? What is the Murphy sign?
18. With which surgical process can a caecal tumour be removed?
19. Why is "short" bowel resection the aim in case of a Morbus Crohn?
20. When is a rectum extirpation performed?
21. What is an indirect inguinal hernia?
22. Which is the most common benign breast tumour?
23. What is a sentinel lymph node?
24. What is a Hartmann surgery?
25. What is an R0 resection?
26. Name 3 precancerous signs in surgery.
27. What is a neoadjuvant therapy?
28. What is pseudomembranous colitis?
29. When is nasojejunal feeding applied?
30. Where is the McBurney's point?
31. What are the indirect signs of acute appendicitis?
32. List the conditions of wound healing.
33. Define the phases of wound healing in chronological order.
34. How can nosocomial infections be prevented?
35. What is the difference between an abscess and a phlegmon?
36. List the inflammatory conditions (min. 3) of the skin and cutaneous annexes.
37. What is a relative indication?
38. What is the difference between a curable and a resectable case/tumour?
39. How is a bite wound and a gunshot wound to be treated?
40. What is the LES?
41. What is diastasis recti?
42. What are (surgical) complications of peptic ulcers?
43. What is the surgical relevance of a Meckel's diverticulum?
44. What are surgical indications in inflammatory bowel diseases?
45. Which perianal diseases are emergency surgical conditions?
46. What vaccination is necessary in case of a planned splenectomy?
47. What causes haematemesis?
48. What causes haematochezia?
49. What are the 3 groups of ileuses based on aetiology?
50. Which is more critical, urgent: ileus of the small or large intestine?

Method and type of class marks:

Practical test of one exam item

How to apply for the exam:

In Neptun system

Opportunity to repeat the exam:

As described in the Study and Examination Policy

The list of printed, electronic and online notes, textbooks, study aids and literature to be used to learn the curriculum (in case of online sources, html address):

Sebészeti Horváth, Örs Péter - Oláh, Attila (editors)

Sebészeti (10th edition) Gaál, Csaba (editor)

Sebészeti műtét Boros, Mihály (editor)

Littmann Sebészeti műtét Horváth, Örs Péter - Kiss, János

SURGERY I-II.

Department of Surgery, Transplantation and Gastroenterology

Tutors: Dr. Vass Tamás

The subject is taught in as part of the block system. During a 4-week block, students 11 days. Have to be present on 11 days at the clinic for the theoretical and practical sessions. The final exams take place during the last week. As several different topics are covered during the block, the students are taught on a weekly basis in a rotating system, so that fewer students deal with one subspecialty at the same time. These students are further divided into smaller groups for bedside practice.

Schedule:

Lectures (14 hours per week)

- Definitions, indications and types of surgery, surgical techniques, perioperative treatment
- Emergency surgery
- Surgical Site Infection
- Hernias
- HPB surgery (liver-biliary tract)
- HPB surgery (pancreas I-II)
- Endocrine surgery
- Breast surgery

- IBD, Diverticulitis
- Proctology
- Minimal Invasive Surgery
- Malignant diseases of the small- and large intestine
- Surgery of the Upper GI
- Transplantation

After all the lectures we have a case report/case discussion about a real case at the department. (11x)

Practice (14 hours per week)

All in wards (bedside practice) and the operation theatre:

- Investigate of surgical patients
- Method of physical examinations.
- Evaluation of the findings.
- Visiting the operation theatre.
- Visiting the intensive care unit
- Wound treatment, dressings
- Participation in the work of the surgical ambulance
- Surgical administration
- Postoperative treatment, medication
- Endoscopy

Form of EXAM:

Oral exam

TRAUMATOLOGY AND ORTHOPEDICS

Department of Traumatology and Department of Orthopedics

Type of subject: Obligatory

credit points: 5

Head of Department: Tamás Bodzay MD

Traumatology as a specialty deals with the treatment of injured patients, independent of the injured organ, patient's age or previous diseases. In developed countries, the 4-5th leading cause of death is injury, while in the actively working population, the rate of death is even higher. Morbidity in children and in the elderly is also high. Traumatology treatment for the most part deals with extremity surgery in correlation to orthopedics, however cranial, thoracic, abdominal, spinal and pelvic injuries as well as the treatment of polytraumatized patients also belong to the field of trauma care.

Orthopedics is an integral part of the limb surgery branch of the surgical curriculum. Practitioners of almost any discipline encounter orthopedic issues, making it essential to understand the diagnosis and treatment options for fundamental conditions. Equally important is the timely recognition of specific, urgent, or potentially surgically treatable conditions. The field of orthopedics intertwines with and organically integrates knowledge from other disciplines, requiring above-average "lateral thinking" skills and synthetic thinking from students. This is what we aim to focus on.

Traumatology lectures are available on Semmelweis University's E-learning portal (Moodle)

Lectures

Traumatology lectures are available on Semmelweis University's E-learning portal (Moodle)

Monday

1. Introduction to Traumatology Soft tissue injuries, wound healing, and bone healing
2. Polytrauma - Chest, rib fractures, abdominal trauma - Neurotrauma
3. Pelvic and femur fractures - Lower leg and ankle fractures - Upper and lower ankle joint and foot injuries

Tuesday

4. Shoulder, upper arm, and elbow injuries - Forearm and wrist injuries - Hand injuries
5. Pediatric Trauma
6. Open fractures, septic and non-septic complications

2 theoretical day, 3 practical days, and 1 practical exam day.

The Traumatology Department reserves the right to make changes in the lecture schedule and practical lessons schedule during the academic year.

Orthopedics Orthopedics e-learning material is available on Semmelweis University's e-learning portal (Moodle system).

- General Orthopedics
- Metabolic Bone Diseases
- Diseases of the Spine
- Diseases of the Shoulder Girdle
- Diseases of the Wrist and Hand
- Hip Joint Diseases in Adulthood
- Diseases of the Knee Joint
- Diseases of the Foot
- Developmental Abnormalities of the Skeletal System
- Neuromuscular Diseases
- Pediatric Orthopedics
- Tumors of the Musculoskeletal System

4 mixed theoretical and practical days, and 1 practical exam day.

Further information can be found on the website of the Department of Traumatology.

<https://semmelweis.hu/traumatologia/>

DISASTER MEDICINE

Department of Defense, Disaster Management and Law Enforcement Medicine

Course coordinator: Dr. János Gál, Head of Department

Objective of instruction and its place in the curriculum:

The aim of the course is to provide students with comprehensive knowledge of their role in health crisis management throughout their medical careers. These competencies are applicable in their future roles as practicing junior doctors, as leaders, and as professionals in healthcare administration. Students will become familiar with the leadership and organizational tasks, as well as with the principles and procedures of so-called “compromise medicine” and safe intervention in various types of health-related crises (e.g., earthquakes, major storms, pandemics, mass casualty incidents, cyberattacks, etc.). In addition, they will learn the basics of international cooperation. The course is embedded in the clinical phase of medical education, during which students have already gained practical experience with patients and colleagues in clinical settings. Disasters are mostly unexpected events that severely damage or endanger lives, living conditions, material assets, or the natural environment. In everyday peaceful life, such events often seem distant to laypeople—and even to practicing doctors. However, statistical data regularly disproves this optimism. In addition to natural disasters, the 21st century poses major challenges in the field of anthropogenic disasters as well—such as armed conflicts, terrorism, and global chemical and nuclear safety.

Disaster medicine is a relatively young subdiscipline that emerged from the integration of general disaster management and emergency medicine. Several branches of medicine—such as military medicine, emergency medicine, and intensive care—form the foundation of this interdisciplinary field. The core principles and the overall professional framework of disaster medicine are still undergoing continuous development.

The components of this field are “hidden” within the source materials of related disciplines. One of the main tasks is to collect and synthesize this content. Since this process often requires a scientific approach, it is appropriate for this discipline to be represented at the university level. Due to the fundamental characteristics of emergencies, disaster response is essentially a matter of teamwork. Cooperation with a wide range of disciplines is necessary — ranging from communication, transportation, and engineering sciences to the challenges of mass accommodation, public order, and securing material and other resources.

Competencies acquired through completion of course:

The student will be able to distinguish between the requirements of healthcare in normal operating conditions and the procedures applicable in emergencies or health crises. They will learn about the health and disaster management systems and the tasks that arise at various levels of healthcare delivery.

Through practical exercises, students will participate in staff leadership tasks, becoming familiar not only with the conceptual framework of crisis management but also with its practical implementation.

They will acquire knowledge of fundamental principles of hierarchy and chain of command, as well as the basics and tools of targeted communication during emergencies. In addition, they will gain insight into disaster management both in prehospital and clinical settings.

Detailed course syllabus

Monday:

- 2 x 45 min lecture – Prehospital aspects of disaster medicine – On-site management
Methodological foundations of mass casualty care, command and organization at the scene, task allocation.
- 1 x 45 min lecture – Hospital aspects of disaster medicine – Introduction to HMIMMS (Hospital Major Incident Medical Management and Support)
Organizational tasks and system of in-hospital care during extraordinary events.
- 2 x 45 min lecture – Case study analysis
Analysis of complex health crisis scenarios using visual and audio materials. Students work in groups to evaluate good and bad practices, execution methods and time standards, leadership, and communication based on lecture content.
- 2 x 45 min lecture – Special operational environments – CBRN
Presentation of hazards and incidents related to the production, processing, transport, and storage of dangerous substances. Theoretical and practical foundations of the identification and mitigation of chemical, biological, radiological, and nuclear (CBRN) threats. International and regional cooperation. Countermeasures against transport- and industry-related incidents involving hazardous materials. Overview of Hungary's nuclear accident response procedures and technical systems. Characteristics and mitigation of typical CBRN events, tools used, and safety considerations in intervention, rescue, and assistance.
- 2 x 45 min practical – Basics of international disaster assistance – INSARAG
Introduction to international disaster relief in the UN system, including the structure and operations of OCHA, UNDAC, OSSOC, and INSARAG. Presentation of the INSARAG Guidelines and Methodology. Overview of Hungarian SAR teams (HUNOR and HUSZÁR), their formation, preparation, mission, and operational capabilities, including deployment, damage mitigation, and repatriation processes.

Tuesday (for Group I) / Thursday (for Group II):

- 2 x 45 min practical – Staff leadership task: prehospital mass casualty management
Simulation of a complex prehospital disaster scenario with mass casualties. Students manage the situation in teams based on assigned roles, practicing inter-agency cooperation and decision-making in reconnaissance, intervention, rescue, and civil protection.
- 2 x 45 min practical – Staff leadership task: hospital damage and overload scenario
Based on real events, this scenario involves storm damage to a facility in Budapest and mass casualty influx while maintaining healthcare services. The situation escalates with new information, and students take on institutional roles from medical and nursing coordination to the operational staff and disaster management leadership.
- 2 x 45 min practical – Staff leadership task: pandemic scenario and overload
Team-based solution of a hospital-based pandemic-like disaster using tabletop simulation, based on real-life events.

Requirements for the successful completion of the course:

A minimum of 75% attendance and active participation in both lectures and practical sessions within the block are required to obtain the semester signature.

OPTIONAL SUBJECTS

Detailed programs see in the 5th year Study Program of Medicine!

ONCOLOGY AND RECONSTRUCTIVE ONCOPLASTIC SURGERY

Department of Oncology and Department of Clinical Oncology

Credits: 3

Total number of hours: 40 **lecture:** 14 **practice:** 26 **seminar:** 0

Course type: obligatory

Academic year: 2020/21 1st semester

Name of the person in charge of the subject: Prof. Dr. Polgár Csaba

The aim and place of the teaching of the subject in the curriculum of medical education: To get acquainted with the epidemiology, etiology, biological properties, prevention (primary and secondary prevention), diagnostics and multidisciplinary therapy of cancer diseases, to acquire the complex oncological approach. To get acquainted with the modern treatment of the most common solid tumours (surgical, radiation, chemo-, hormone, immunological and biological therapy) and their results. Understanding the possibilities of oncological reconstructive and oncoplastic surgeries. Early and late side effects of oncology treatments, their possible prevention and treatment. Palliative treatment, analgesia, somatic and mental rehabilitation of oncology patients. Oncological emergencies and their treatment. Defining the role of the practitioner in the prevention, early detection of tumours and in the care and care of cancer patients.

Place of teaching the subject (address of lecture hall, seminar room, etc.):

Semmelweis University Department of Oncology, National Institute of Oncology, Budapest, 1122 Ráth György u. 7-9. Semmelweis University Department of Internal Medicine and Oncology, Oncology Department

Successful completion of the subject results in the acquisition of competencies: Acquisition of general oncological knowledge in 4th year medical students, based on preliminary studies, knowledge of the main etiological factors, epidemiology, early detection, diagnosis and 3 main therapeutic modalities of tumours (tumour surgery, radiotherapy, drug treatments) and the main solid tumour type treatment and rehabilitation, including mastering the basics of oncoplastic surgical solutions.

Prerequisite (s) required for the admission or acquisition of the subject: Pharmacology II., Pathology II., Basic Surgical Techniques

Student headcount conditions for starting the course (minimum, maximum), method of selecting students: Based on registration in the NEPTUN system, it is 1/8 of the class

How to apply for the course: In the NEPTUN system

Detailed topics of the subject:

Classroom lectures (14 hours):

Block Day 1:

1. Etiology, epidemiology and biology of tumours, methods of prevention and screening. Principles of complex oncotherapy (45 minutes) (Cs. Polgár, J. Lövey, Z. Takácsi-Nagy)
2. Imaging diagnostics of tumours (45 minutes) (D. Tárnoki, Á-Tárnoki M. Gódeny)
3. Histological and molecular pathological diagnosis of tumours (Szöke J./Tóth E.)
4. Principles of tumour surgery, surgical reconstruction, oncoplastic options, and oncological rehabilitation options (Á. Sávolt, T. Mersich)
5. Basics of radiotherapy and radiochemotherapy of tumours (Cs. Polgár, J. Lövey, Z. Takácsi-Nagy)

6. Basics of oncological drug treatments (chemo-, hormone, biological and immunotherapy) (Dank M., Rubovszky G.)

Block Day 2:

7. Oncotherapy of head and neck tumours (Takácsi Nagy Z.)
8. Oncotherapy of gastrointestinal tumours (Lövey J.)

Block Day 3:

9. Oncotherapy of gynecological tumours (Polgár Cs., Vízkeleti J.)
10. Complex treatment of breast tumours (Cs. Polgár, N. Mészáros)

Block Day 4:

11. Complex treatment of lung tumours (Lövey J.)
12. Oncotherapy of urological tumours (Ágoston P., Jorgo K.)

Block Day 5:

13. Treatment of central nervous system / bone and soft tissue tumours (Lövey J./Ágoston P.)
14. Oncological emergencies / Oncological rehabilitation and follow-up (G. Rubovszky, Dank M.)

Block practices (26 hours):

Block Day 1:

Tumour Diagnosis I: Cytological, Histological, Molecular Pathology Practice (2x45 minutes)

Block Day 2:

Tumour Diagnosis II: Imaging Diagnostic Practice 1. (4x45 minutes; 1 hour mammography / UH, 1 hour CT, 1 hour MRI, 1 hour PET-CT)
Tumour Radiation I: Treatment Planning Practice (2x45 minutes)

Block Day 3:

Tumour surgery (surgical practice) (4x45 minutes)
Oncoteam practice (2x45 minutes)

Block Day 4:

Systemic treatment of tumours I: Chemotherapy, hormone therapy (2x45 minutes)
Systemic treatment of tumours II: Targeted biological and immunotherapy (2x45 minutes)
Systemic treatment of tumours III: Supportation, treatment of side effects (2x45 minutes)

Block Day 5:

Radiation Treatment of Tumours II: Practice of External Radiation Treatment (2x45 minutes)
Tumour radiotherapy III: Brachytherapy practice (2x45 minutes)
Consultation (2x45 minutes)

Other subjects concerning the border issues of the given subject (both obligatory and optional subjects!).

Possible overlaps of themes:

Urology: diagnosis and surgical treatment of urological tumours

Clinical genetics: hereditary tumours

Special study work required for successful completion of the course:

There is no such

Requirements for participation in classes and the possibility to make up for absences:

According to the study and exam regulations, 75% of the classes are obligatory

How to check the acquired knowledge during the diligence period:

During the short period of education available to us, there is no intermediate, formal examination. However, the interactive nature of the practices and consultations allow teachers to test the students' knowledge and how they use the information available to them. At least 75% participation in classes. Checking each session by keeping a catalogue.

Type of exam:

Oral exam based on a pre-issued line of items.

Exam requirements:

General oncology and radiotherapy line items

1. Etiology of cancer
2. Epidemiology of cancer
3. Screening and early detection of tumours
4. Imaging methods and their role in the treatment of tumours
5. Imaging diagnostics of major tumour groups
6. Histological diagnosis of tumours
7. Molecular pathological diagnosis of tumours
8. Methods of treatment of tumours - surgery
9. Methods of treatment of tumours - radiation therapy
10. Methods of treating tumours - medication
11. Physical, chemical and biological bases of radiation therapy
12. Basic concepts of dosimetry
13. Computer treatment planning, significant volumes in radiation therapy
14. Structure and operating principle of teletherapeutic devices
15. Structure and operating principle of brachytherapy devices
16. Brachytherapy applicators
17. Brachytherapy planning system, imaging devices
18. Interstitial brachytherapy
19. Image Guided Radiation
20. Intensity Modulated Radiation Therapy
21. Stereotaxic Radiotherapy and Radiosurgery
22. Basics of chemotherapy
23. Side effects of chemotherapy
24. Basics of simultaneous radio-chemotherapy
25. Basics of targeted, biological therapy
26. Side effects of targeted, biological therapy
27. Basics of immunotherapy
28. Side effects of immunotherapy
29. Basic elements of oncopharmacology
30. Clinical pharmacology studies in cancer
31. Evaluation of objective clinical response and general condition

Detailed line of oncology and radiotherapy items

1. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of head and neck tumours.
2. Radiation therapy, surgical and pharmacological treatment of head and neck tumours.
3. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of oesophageal tumours.
4. Radiation therapy, surgery and systemic treatment of oesophageal tumours.
5. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of gastric tumours.
6. Radiation therapy, surgical and pharmacological treatment of gastric tumours.
7. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of colorectal tumours.
8. Surgical and pharmacological treatment of colorectal tumours.
9. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of rectal tumours.
10. Radiation therapy, surgery and systemic treatment for rectal tumours.
11. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of pancreatic tumours.
12. Radiation therapy, surgical and pharmacological treatment of pancreatic tumours.
13. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of liver tumours.
14. Radiation therapy, surgery and systemic treatment for liver tumours.
15. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of cervical tumours.

16. Radiation therapy, surgery and systemic treatment for cervical tumours.
17. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of uterine tumours.
18. Radiation therapy, surgery and systemic treatment for uterine tumours.
19. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of vulvar, vaginal and ovarian tumours.
20. Radiation therapy, surgery and systemic treatments for tumours of the vulva, vagina and ovaries.
21. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of penis, testis and kidney tumours.
22. Radiation therapy, surgery and systemic treatment for penile, testicular and kidney tumours.
23. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of prostate and bladder tumours.
24. Radiation therapy for prostate and bladder tumours.
25. Surgical and pharmacological treatment of prostate and bladder tumours.
26. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of lung tumours.
27. Radiation therapy of lung tumours.
28. Surgical and pharmacological treatment of lung tumours.
29. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of breast tumours.
30. Radiation therapy of breast tumours.
31. Surgical and pharmacological treatment of breast tumours.
32. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of central nervous system tumours.
33. Radiation therapy of central nervous system tumours.
34. Surgical and pharmacological treatment of central nervous system tumours.
35. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of bone tumours.
36. Radiation therapy, surgical and pharmacological treatment of bone tumours.
37. Epidemiology, etiology, histology, staging, symptoms and pre-treatment examination of soft tissue tumours.
38. Radiation therapy, surgery and medication for soft tissue tumours.
39. Oncological emergencies.
40. Radiation treatment of distant metastases and oncological rehabilitation.
41. Principles of the possibilities of reconstructive plastic surgery.
42. Oncoplastic surgery for head and neck tumours.
43. Oncoplastic surgery for breast tumours.

Method and type of rating:

oral exam (100%)

Marks: Excellent above 90%, good 80-89%, satisfactory 70-79%, pass 60-69%, fail 60%

How to apply for the exam:

Students apply for the exam exclusively with the help of the NEPTUN unified study system according to the regulations described in the TVSZ (Study and Examination Regulations-SER).

Options for retaking the exam:

According to the Study and Examination Regulations (SER)

Printed, electronic and online notes, textbooks, aids and literature (html title in case of online material) can be used to acquire the study material:

Curriculum: University Note on Oncology and Radiation Therapy (Ed.: Csaba Polgár):

- in Hungarian, English and German in the form of an electronic note
- in Hungarian in print (Semmelweis Publishing House, Budapest, 2018)

Recommended reading:

Basics of oncology (Ed.: Miklós Kásler), university textbook (2nd edition Medicina Könyvkiadó Zrt., Budapest, 2018)

For updated information please contact the department.

Tutor: Dr. Gergely Holnapy

Lectures

- Subject of Orthopedic Education. Organization.
- Orthopedic care in Hungary. Possibilities of prophylaxis.
- Inflammatory diseases in orthopaedics.
- Anatomy and biomechanics of the spine. Mai posture.
- Scheuermann's disease. Vertebra plana, Calve.
- Scoliosis. Theories concerning the etiology of various kinds of scoliosis. Pathological, clinical and radiological symptoms and appearance. Symptomatology and therapy of the functional scoliosis. Symptoms and therapy of scoliosis with recognized etiology (congenital, paralytic, rachitic).
- Degenerative diseases of the spine. Etiology of low back pain, clinical symptoms, therapy. Low back of disc origin. Significance of the intervertebral discs under normal and pathological conditions. Symptomatology of the ischias syndrome and its therapy.
- Spondylolysis and spondylolisthesis. Lumbalization and Sacralization.
- Deformities and diseases of the neck and the upper extremity.
- Congenital torticollis, Klippel-Feil deformity. Cervical rib. Sprengel deformity.
- Obstetricalisparalysis. Recurrent dislocation of the shoulder. Cervicobrachial syndrome.
- Periarthritis of the shoulder. Dupuytren contracture. Kienbock disease. Tennis elbow.
- Madelung deformity. Sudeck dystrophy of the upper extremity.
- Osteoarthritis of the hip. Etiology, pathology, clinical and radiological symptoms.
- Methods of conservative and operative Treatment.
- Diseases of the child's hip. Legg-Perthes-Calve disease. Slipped capital femoral
- epiphysis. Acute and chronic arthritis of the hip.
- Congenital dislocation of the hip. Anatomy and development of the hip joint. Concept of dysplasia. Subluxation and luxation. Pathology. Early and late clinical and X-ray signs. Early and late conservative therapy. Various methods of operative treatment. Palliative operation.
- Diseases of the knee. Recurrent dislocation of the patella.
- Osteochondritis of the tibial tubercle (Osgood-Schlatter disease). Osteochondrosis of the tibia. Varus, valgus and hyperextension deformity. Osteoarthritis. Chondromalacia of the patella. Meniscus lesions.
- Diseases of the foot. Congenital clubfoot. Tarsal synostosis. Hallux valgus. Aseptic
- necrosis of the bones of the foot. Osteoarthritis of the joints of the foot. Flatfoot.
- Neuromuscular diseases. Classification and treatment. Infantile cerebral palsy. Disturbances of the development of the vertebral body and neural arch. Muscular defects. Progressive muscular dystrophy and other diseases of the muscles.
- Primary tumors of bones and their classification. Benign bone tumors. Osteoid osteoma. Semimalignant and malignant tumors (giant cell tumor, chondroma, osteosarcoma, chondrosarcoma, multiple myeloma, Ewing sarcoma). Main pathologic features.
- Bone disorders. Osteoporosis, osteomalacia, osteogenesis imperfecta, Paget disease.
- Developmental anomalies. Congenital anomalies of the extremities.

Consultation

For updated information please contact the department.

Practices

- Instruction of correct behaviour in the Hospital and during practicals. Introduction to the Hospital. Therapeutic aims of Orthopedics. Methods of the clinical practicals.
- Methodology of learning Orthopedics.
- Diagnostic and therapeutic methods of Orthopedics. Anamnesis. Inspection, palpation, examination of motions.
- Basics of radiological examination of the musculoskeletal system. Normal Roentgen anatomy of the bones and joints. Form and function. Methods of examination of limb shortening and alterations of the forms. Contracture. Limping.
- Fixation, relief of weight bearing, plaster splints, plaster bandages. Examination of patients. Examination of the diseases and deformities of the spine, malposture (Calves deformity, spondylarthrosis).
- Preparation of plaster splints, bandages. Examination of patients with lumbago, ischias syndrome, spondylolysis, spondylolisthesis. Demonstration of Roentgenograms.
- Examination of scoliotic patients. Preparation of plaster and other corsets.
- Examination of patients. Tuberculous spondylitis. Demonstration of Roentgenograms.
- Preparation of plaster beds.
- Examination of patients with congenital dislocation of the hip. Early and late symptoms of this disease. Demonstration of Roentgenograms.
- Examination of patients with congenital dislocation of the hip. Demonstration of the means and methods of therapy and their application.
- Examination of patients with juvenile osteochondritis of the hip. Epiphyseolysis.
- Infantile coxa vara. Demonstration of Roentgenograms and methods of treatment.
- Preparation of hip spica.
- Examination of patients with osteoarthritis of the hip. Examination of contractures of the hip. Demonstration of Roentgenograms.
- Examination of patients with recurrent dislocation of the patella, Osteoarthritis, tuberculous arthritis of the knee. Punction of the knee joint. Methods of fixation of this joint, preparation of plaster bandage.
- Examination of patients with diseases and deformations of the neck, upper extremity. Torticollis, cervicobrachial syndrome, periarthritis of the shoulder, tuberculosis of the shoulder joint. Demonstration of Roentgenograms. Application of the methods of hand and arm fixation.
- Examination of patients with congenital clubfoot and flatfoot. Therapy. Application of the methods of foot and lower leg fixation.
- Demonstration of the methods of gymnastics and physiotherapy.
- The maximum number of absences in a semester is 3. More than 3 absences invalidate the semester.
- Exam: Practical exam at the time of last practice.
- Semester Closing exam registration has to be done through the NEPTUN system for the days set by the department up to the limits.
- Students have to fill -during semester- the trial test on Semmelweis University's e-learning system. Modifying of exam dates through the NEPTUN system, as it allows.
- Semester Closing exam is a written test. The material for examination is based on the lectures.
- Test results of exam are available within one day.



Faculty of Medicine

5th year

FACULTY OF MEDICINE

CLINICAL MODULE

STUDY PROGRAMME

Fifth year in the 2025/2026 academic year

Teaching is done in “clean” blocks: Theory + Practice + Exam. (Practices are taught by “shadowing”)
The time span of each block depends on the credit value of the subjects: 1 to 5 weeks

For example: based on a subject of 2 credits:

- 2 credits × 14 lessons = 28 lessons (1 semester consists of 14 weeks. The number of credits are equal with the lessons in a week)
- Education is provided as 8 lessons in a day: 4 days × 8 lessons = 32 lessons
- the training and the exam must be completed in 2 weeks
- approx. 40 students will be trained by providing 4 days of training and 2 days of exams within 10 working days.

9th–10th Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
OBLIGATORY COURSES										
Clinical Genetics	AOKGRI966_1A	0			20		8	2	Pharmacology II, Pathology II, Translational Medicine and Pathophysiology II, Genetics and Genomics	examination
Forensic Medicine	AOKPIB1002_1A	0			16		16	2	Pathology II, Pharmacology II, Genetics and Genomics OR Medical Genetics and Immunology II	examination
Intensive Therapy and Anaesthesiology	AOKANE759_1A	1.5		2.5				4	Cardiology, Heart Surgery, Angiology, Vascular Surgery, Clinical Pharmacology, Emergency Medicine and Oxyology	examination
Internal Medicine II (Hematology, Infectology, Immunology, Rheumatology, Laboratory Medicine)	AOKBHK1118_2A or AOKBOK1119_2A	2		5				7	Internal Medicine I, Laboratory Medicine, Medical Imaging	examination
Medical Rehabilitation	AOKREH1020_1A	0			32			2	Cardiology, Heart Surgery, Angiology, Vascular Surgery, Traumatology and Orthopedics	examination
Neurology and Neurosurgery	AOKNEU963_1A		24		48		24	6	Internal Medicine I, Medical Imaging	examination
Obstetrics and Gynaecology	AOKNO1755_1A	2		4				6	Pharmacology II, Medical Imaging, Surgery	examination
Oncology	AOKKON1122_1A	1		3				4	Pharmacology II, Basic Surgical Techniques, Pathology II	examination
Pediatrics	AOKGY11120_1A vagy AOKGY21121_1A	0			5		2	7	Internal Medicine I, Laboratory Medicine, Medical Imaging	examination
Physical Education IX	AOKTSI009_9A	0		1				0	Physical Education (PE) VII *	signature
Physical Education X	AOKTSI009_10A	0		1				0	Physical Education (PE) VIII *	signature
Psychiatry and Psychotherapy	AOKPSI1019_1A		38		60			6	Pharmacology II	examination
Public Health	AOKNEI1123_1A	2		4				6	Cardiology, Heart Surgery, Angiology, Vascular Surgery, Medical Statistics, Informatics and Telemedicine	examination
Sports Medicine	AOKSPR763_1A	0		2				2	Cardiology, Heart Surgery, Angiology, Vascular Surgery, Internal Medicine I	examination
Urology	AOKURO060_1A	1		2				3	Pharmacology II, Surgery, Internal Medicine I AND Medical Imaging	examination

LIST OF TEXTBOOKS (The list may change!)

- 1 Nelson Essentials Pediatrics 9th Edition
- 2 Lecture Notes of Forensic Medicine Ed. by Péter Sótónyi, Éva Keller, Semmelweis Publisher, 2008.
- 3 Knight's Forensic Pathology. 3rd ed. 2004. Arnold.
- 4 Hacker N.F-Moore J.G-Gambone J.C.: Essentials of Obstetrics and Gynecology. 4th ed. W.B. Saunders Co. ISBN 0-721601790 Paperback
- 5 Smith's General Urology. E.A.Tanagho, J.W. McAninch (ed.) Appleton & Lange. 15th ed. McGraw-Hill Professional Publ. 2000. ISBN 0-83-858607-4
- 6 P. Nyirády, I. Romics (ed.): Textbook of Urology, Semmelweis Publisher, Budapest, 2009.
- 7 Arányi Zs., Kamondi A., Kovács T., Szirmai I.: Investigation of neurological patients.
- 8 Adams and Victor's Principles of Neurology, Eleventh Edition, McGraw-Hill ISBN 978-0-07-184261-7
- 9 Lindsay, Bone, Callender: Neurology and Neurosurgery Illustrated. Churchill Livingstone
- 10 Marini J.J.-Wheeler A.P.: Critical Care Medicine – The Essentials. Williams and Wilkins. Baltimore, 2nd ed. 1997. ISBN 0-683-05555-0
- 11 The New Public Health: An Introduction for the 21st Century. By: T. Tulchinsky, E.A. Varavikova. 2000. ISBN 03350-5 Note: The list of the textbooks in Public Health, please find after its syllabus!
- 12 Textbook of Medicine 10th Ed. (Weatherall, Ledingham, Warrel, 2017). Harrison's Principles of Internal Medicine 20th Ed. (McGraw-Hill, 2018).
- 13 Bates' Guide to Physical Examination and History Taking. 12th Ed. (Wolters Kluwer, 2016).

Recommended textbooks:

- 1 [T.E.OH](#): Intensive Care Manual.
- 2 Basic Ophthalmology for Medical Students and Primary Care Residents. [Ed.by](#): C. A. Bradford.
3. Lang, G.K.: Ophthalmology. A Pocket Textbook Atlas. Thieme Flexibook
- 4 John F. Salmon: Kanski's Clinical Ophthalmology, 10th Edition, 2024.
- 5 Oxford Handbook of Paediatrics
- 6 Silver, Kempe Bryn and Fulginiti's Handbook of Pediatrics. Appleton and Lange. ISSN 0440-192
- 7 Mecleod's: Clinical Examination. J.Munro. CRW Edards Churchill Livingstone Ed.
- 8 Papp Z.: Obstetric Genetics. Bp. Akadémiai K. 1990. ISBN 963-05-5689-8
- 9 Papp Z.: Atlas of Fetal Diagnosis. Elsevier, London, 1992. ISBN 0-444-98675-8
- 10 Knight B.: Simpson's Forensic Medicine. E.Arnold Co. London. 1991.
- 11 Marsden, Fowler: Clinical Neurology. Raven Press
- 12 Duus: Topical Diagnosis in Neurology. Thieme Medical Publishers
- 13 Gilroy: Basic Neurology. Pergamon Press
- 14 Weiner- Lewitt: Neurology of House Officer. Williams and Wilkins
- 15 Bannister: Brain an Bannister's Clinical Neurology. Oxford University Press
- 16 Mumenthaler: Neurology. Georg Thieme Verlag.
- 17 Manual of Emergency Medicine. 5th ed. Jon L.Jenkins, G.R.Braen. 2004. Lippincott Williams and Wilkins. [Prod.Nr.](#) 479531-1019

CLINICAL GENETICS

Institute: Institute of Genomic Medicine and Rare Disorders

Location: Semmelweis University Central Patient-Care Unit (Korányi Tömb, Központi Betegellátó Épület) 1082 Budapest Üllői Str. 78/B Building „A” (Radiology Wing) 4th floor

Course lecturer: *Prof. Dr. Mária Judit Molnár*

Course tutor: *Dr. Viktor Molnár*

Exam type: multiple choice test

Participation: min. 75% is obligatory

Aim of the subject and its place in the curriculum:

The Clinical Genetics course introduces medical students to the clinical significance of human genetic variations, covering the principles of diagnosis and treatment of rare diseases, mainly through the presentation of cases, clinical situations and demonstrating correct communication. In addition to diagnosis of monogenic diseases and chromosomal abnormalities, genetic tests are now used to predict susceptibility to certain diseases or the efficacy and side effects of certain therapeutic options (pharmacogenomics) or delineate disease prognosis. The role of the physician in the management of hereditary diseases and the practice of good decision making will also be addressed. The discipline is one of the most rapidly developing field and it is presumably going to be an important component of the future medicine.

Competencies gained upon the successful completion of the subject:

- Students meet the typical clinical scenarios requiring genetic-genomic knowledge for diagnostic, predictive, preventive and pharmacogenomic questions, as well as they are introduced into most common diagnostic, therapeutic decision-making, management and ethical dilemmas of the field.
- Students gain insight into practice how to elicit, document, and act on relevant family history pertinent to the patient's clinical status, how to choose the right genetic or genomic testing to guide patient management and how to use genomic information to make treatment decisions.
- Through problems represented by several real and synthetic/

standardized clinical cases and through getting involved into the patient flow of in- and outpatient units, they will learn

- how to gather information from appropriate information resources,
- how to employ artificial intelligence-based decision-making systems for phenotype pattern recognition a problem-based manner.
- how to communicate with the patients and families with hereditary diseases by playing the role of a counselee (genetic counseling), and
- how to work together as a team if they are encountered with real-world diagnostic challenges.

Overview of the blocked course with thematic learning modules (2×45 minutes each):

Seminars:

- Clinical genetics in medicine
- The significance and diagnostic potential of congenital genetic disorders
- Genetic disorders of public health significance
- Personalised medicine
- Small group work:
- Case presentation part 1
- Case presentation part 2
- Bedside practice: inpatient department
- Bedside practice: neurogenetic clinic
- Team competition (decision-making simulation)

Workshops:

- Web-based search methods in clinical genetics
- Developing genetic diagnostic skills
- Management of patients with a rare disease
- Genetic counselling
- Ethical problems, pre-exam consultation

FORENSIC MEDICINE

Semmelweis University, Faculty of Medicine

Name of the managing institute (and any contributing institutes):
Department of Pathology, Forensic-, and Insurance Medicine

Name of the subject: Forensic Medicine

Credit value: 2

Total number of lessons: 28 **lecture:** 0 **practical course:** 10 **seminar:** 18

Subject type: obligatory course

Academic year: 2024/2025

Name of the course leader: Dr. Kiss András

His/her workplace, phone number: Department of Pathology, Forensic and Insurance Medicine, phone: 061-215-6921

Position: director

Date and registration number of their habilitation: 30th May 2007, reg. number: 248

Objectives of the subject, its place in the medical curriculum:

Forensic medicine is a science forming a bridge between medicine and law, aiming to communicate medical findings in order to aid jurisdiction. In our course we go beyond morphology and diagnoses, and try to reveal the underlying causes of the current state of a body, through providing a foundation for the understanding of changes, injuries and disease states at the molecular, cellular, tissue, organ, and organism levels.

The purpose of the subject is to achieve the qualities of a medical doctor, within the framework of forensic medicine, and for the students to become (a) independent, (b) critically thinking, (c) able to make decisions, and (d) take further necessary actions, (e) recognize emergency situations and (f) respects the boundaries of their competency.

During this course our goal is to pass over the knowledge substantial in everyday clinical practice, making the main objective of this subject to help acquire the following practical skills:

- I. Attain the skillset of on-scene inspection of cadavers, and familiarize with the procedure of processing cases of the deceased.
- II. Examining injuries, and injury-patterns in the clinical practice, with the ability to individually evaluate, and professionally document them.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Hegedűs Gyula Room, Autopsy Room

All premises above are located under our main address, at 93. Üllői street 1091 Budapest.

Successful completion of the subject results in the acquisition of the following competencies:

Successfully completing the subject will result in the attainment of the following practical skills and knowledge:

Sufficient data about basic disease reactions and organ specific reactions so that you can:

- Interpret signs and symptoms appearing in a patient's history and create a differential diagnosis.
- Sufficient knowledge of forensic pathology and histopathology at large so that you can:
- Interpret findings at autopsy
- Interpret reports of forensic pathology
- Intelligently review forensic pathology slides and images with a consulting forensic pathologist

Awareness of the role of autopsy in medicine.

Course prerequisites:

Pathology, Genetics, Pharmacology

Number of students required for the course (minimum, maximum) and method of selecting students:

The announcement of the courses is based upon the orders of the Dean's Office of General Medicine.

Maximum headcount of the course: 28

Minimum headcount of the course: 10

How to apply for the course:

Applying for the course takes place via the NEPTUN system, regarding the instructions of the Study and Exam Committee (TVSZ) and the Dean's Office of General Medicine.

Detailed curriculum:

The course is organized in the block-based education system, throughout 40 weeks, in blocks of 2 weeks. Practical classes are preceded by short theoretical preparation sessions, followed by a gradual introduction to the clinically oriented practices, emphasizing the importance of examination of cadavers for every student. During the sessions we organize the students into small groups, challenging them to examine and process cases, while the theoretical preparation classes are held in bigger groups. Regular oral and written contribution of the students (case reports, and independent documentation) is substantial during the course. All sessions are required to contain feedback elements. At the end of the course an oral exam is conducted on the second week (see details below).

Detailed schedule

Week A

MONDAY (A/I)

- Introduction to Forensic medicine. Violent death and post mortem changes (2 periods – Dr. Almádi Zsófia)
- Types and patterns of injuries (2 periods – Dr. Törő Klára)
- Electrical fatalities, burns and scalds (1 periods – Dr. Németi Balázs)
- DNA analysis (1 periods – Dr. Németi Balázs, Dr. Lászik András)
- Sudden death (number of classes: 1 period – Dr. Bokor János)
- Head trauma (1 period – Dr. Misnyovszki Péter, Dr. Almádi Zsófia)

TUESDAY (A/II)

- Autopsy room practice (2 periods – Dr. Marcsa Boglárka, Dr. Almádi Zsófia, Dr. Varga Balázs)
- Examination on the scene of death (1 period – Dr. Marcsa Boglárka)
- General toxicology (1 period – Szabó-Kócs Tamara, Dr. Vannai Mariann)
- Documentation of injuries (2 periods – Dr. Almádi Zsófia)
- The role of histopathology in forensic medicine (1 period – Dr. Hegedüs Panna, Dr. Danics Krisztina)
- Asphyxia and drowning (1 period – Dr. Hegedüs Panna, Dr. Törő Klára)

WEDNESDAY (A/III)

- Autopsy room practice (2 periods – Dr. Bokor János, Dr. Németi Balázs, Dr. Misnyovszki Péter)
- Medico-legal aspects of traffic accidents (1 period – Dr. Misnyovszki Péter, Dr. Almádi Zsófia)
- Firearm injuries (1 period – Dr. Misnyovszki Péter, Dr. Almádi Zsófia)
- Identification (2 periods – Dr. Magyar Lóránt)
- External examination practice (2 periods – Dr. Magyar Lóránt,

Dr. Marcsa Boglárka, Dr. Németi Balázs, Dr. Misnyovszki Péter, Dr. Hegedüs Panna)

FRIDAY (A/IV)

- Autopsy room practice (2 periods – Dr. Magyar Lóránt, Dr. Csellár Lilla, Dr. Danics Krisztina)
- Consultation (Dr. Németi Balázs)
- Summary (Dr. Almádi Zsófia)

The names of tutors listed above is given for information purposes only, the actual roster of tutors may change in accordance with the rules for substituting tutors on classes.

Week B

WEDNESDAY

- Oral exam

FRIDAY

- Oral exam

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

- Neurology – head injuries
- Traumatology – injuries of bones and soft tissues
- General practice – examination of cadavers
- Radiology – radiological results as proof
- Gynecology – sexual offences
- Internal medicine – toxicology

Special study work required to successfully complete the course:

Successfully completing the subject does not require additional instructional occupation.

Requirements for participation in classes and the possibility to make up for absences:

Students are required to be present on 75% of all classes, and thus allowed to miss 7x45 minutes of education, provided that they attend at least one autopsy room practice during their rotation. The names of students listed on the attendance sheet or make up sheet of practices, signed by the appointed instructor of the class classifies as a proof of their verified presence on the session.

Making up for absences can be done by joining other, subsequent groups in which case missed classes must be made up for in accordance with their original topics. Attending another group has to be arranged with the resident educational advisor of the department in advance!

The make-up classes have to be registered and presented to the secretary of the department by 2 days before the exam at latest. Presenting a written certificate of the makeup classes is the responsibility of the students attending the course! If the number of missed classes exceeds 7, and the make-up classes have not been verified, the subject cannot be completed.

The rules above may vary in accordance with rules and regulations due to the pandemic situation.

Methods to assess knowledge acquisition during term time:

No mid-term examination takes place, and homework is not given. Assigned groups all take their exams on the B week of their periods, on the given specific days provided above.

Requirements for signature:

Attendance will be monitored on each class of the course individually and registered on the attendance sheet at the beginning or end of classes. Taking attendance is the responsibility of the tutor. Students with the required amount of attendances (see segment *Requirements for participation in classes and the possibility to make up for absences* for more information) will be given signature by the end of the first week of their rotation.

Type of examination:

The subject concludes with an **oral exam**. Students are required to pick two randomly chosen topics from the list below and talk about them after a brief preparation time.

The preparation time only applies if the exam is held in person.

Requirements of the examination:

List of topics

1. Definition of death. Post mortem changes.
2. The early post-mortem interval.
3. The late post-mortem interval. Estimation of post-mortem interval.
4. Estimating the time of death.
5. Determining the cause of death. Medico-legal investigation of death.
6. The autopsy.
7. Methods of identification. Identification of decomposed or skeletonized remains.
8. Sudden death of cardiovascular disorders.
9. Sudden death of respiratory and gastrointestinal disorders.
10. Sudden infant death.
11. Child abuse. Safeguarding children.
12. Terminology of injuries. Types of injuries.
13. Self-inflicted injury.
14. Injury patterns. Documentation of injuries and marks of injury.
15. Head and neck injuries.
16. Spinal, chest and abdominal injuries.
17. Gunshot injuries.
18. Differentiation of accident, suicide or murder in gunshot injuries.
19. Sexual assault: examination requirements, evidential samples and documentation.
20. Transportation under influence. Drink and drive problems. Widmark's formula.
21. Road traffic injuries.
22. Railway injuries, aircraft fatalities.
23. Classification of asphyxia. Signs of asphyxia.
24. Types of mechanical asphyxial mechanism.
25. Immersion deaths: evidence of immersion. Post-mortem artefact and immersion.

26. Pathological diagnosis of drowning. The role of alcohol in drowning.
27. Injury caused by heat. Cold injury, hypothermia.
28. Electrical injury.
29. Principles of toxicology.
30. Commonly misused drugs and drug related death.
31. Carbon-monoxide poisoning. Arsenic, cyanide, lead and methanol poisoning.
32. Scene examination and evidence recovery. Examination on the scene
33. Forensic DNA analysis.

Method and type of evaluation:

Students are being evaluated based on their presentation of their assigned topic, and on their answers to the follow-up questions. The students will then be graded on a scale of 1-5, with a 1 resulting in a fail.

How to register for the examination:

Via the NEPTUN system, according to the general rules of the Study and Exam Regulations (TVSZ).

Possibilities for exam retake:

Via the NEPTUN system, according to the general rules of the Study and Exam Regulations (TVSZ).

Successful exams may be repeated up to 1 time.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

- Lecture notes of forensic medicine. Semmelweis Publisher. 2008.
- Simpson's Forensic Medicine. 13th edition. Hodder Arnold Publishing. 2011.
- www.forensicmed.co.uk edited by: Richard Jones

INTENSIVE THERAPY AND ANESTHESIOLOGY (ITO)

Tutor: **Dr András Kállai**
Dr Dóra Konczig

Lectures:

1. Introduction

Basics of intensive therapy and anesthesiology. Diseases requiring intensive therapy. Patient safety. Psychological methods (hypnosis, suggestive communication) in anesthesiology and intensive therapy

2. Acid-base balance. Fluid - electrolyte homeostasis. Metabolic disorders in diabetes mellitus

3. Disorders of salt - water homeostasis. Disorders of electrolyte homeostasis, hypokalaemia and hyperkalaemia. Enteral and parenteral nutrition

4. Basics of respiratory failure. Obstructive pulmonary diseases. ARDS: definition, classification, diagnosis and therapy

5. Principles of ventilatory support. Postoperative respiratory failure. Weaning

6. Shock states: pathophysiology, classification, diagnosis and therapy

7. SIRS, sepsis and septic shock

8. Volume therapy: crystalloids and colloids. Haemostasis management. Massive haemorrhage protocols

9. Cardiopulmonary resuscitation (CPR, BLS, ALS), the periarrest period and the Post Cardiac Arrest Syndrome (PCAS). Chain of survival. In-hospital BLS and ABCDE-approach. Managing ALS (defibrillation, 4H-4T, iv./io., drugs) and PCAS. Importance of non-technical skills (task management, team work, situation awareness, decision making, communication). Organizing CPR. CPR on CPR-Bas and CPR-Sim practices

10. Pulmonary embolism. Stroke. Disseminated intravascular coagulation (DIC)

11. Polytrauma: Emergency and Intensive care management

12. Preoperative risk stratification, preconditioning, premedication. Cardiopulmonary protection. Perioperative approach of heart and lung transplantation

13. General anaesthesia using intravenous and/or volatile anaesthetics. Airway management. Analgesics. Muscle relaxants. Antidotes

14. Regional (spinal and epidural) anaesthesia: anatomy, techniques, indications, practice and complications. Local anaesthetics. Pain management

Lecture attendance:

Recommended. Attendance will not be taken.

Practices:

ICU bed side practices:

1. Introduction, ABCDE-approach (BEV)
2. Respiratory intensive care practice 1 (Resplnt 1)
3. Respiratory intensive care practice 2 (Resplnt 1)
4. Shock practice 1 (Shock 1)
5. Shock practice 1 (Shock 1)
6. Gastrointestinal bleeding and metabolic disorders (GIVMET)
7. Anesthesiology practice (ANE)
8. Anesthesiology and intensive care of trauma patients (TraumaIA)

Simulation practices:

9. CPR-Basic
10. ABC-skills
11. ALS-Sim1 (CPR Simulation 1)
12. ALS-Sim2 (CPR Simulation 2)
13. HiFi-Sim (High Fidelity Simulation)

Problem based learning practices:

14. Perioperative care
15. Pain management
16. Homeostasis
17. Case report
18. Consultation

Attendance criteria and absences:

In order to complete Intensive Therapy and Anesthesiology you need to be present **on 13 out of the first 17 practices**. Also you need to pass a practical exam in In-Hospital Basic Life Support (CPR)) and ABC-skills.

Bed-side practices will be held at the Intensive Care Unit of the new building "Központi Betegellátó Épület" (Klinikák metro station, Bp. 1082 Üllői út 78., building section "B", 4th Floor). TraumaIA practices will be at the Trauma-ICU (1081. Budapest, Fiumei út 17., 7th floor). Simulation practices will take place at Simulation Center (Bp. IX. Ernő u. 7.). The PBL practices will be held via Zoom. Practice schedule will be uploaded in Moodle.

Keep in mind that before the HiFi-sim and CPR-sim practices you need to pass a 5-minute "pre-practice test" in order to attend.

For bed-side practices we kindly ask you to have a stethoscope on you. For changing clothes please use the wardrobe located under the escalator at the entrance of the 2nd Dept. of Gyne/Obs. (In the case of TraumaIA practices our colleagues on the 7th floor will give you coats for the practice.)

In case of a missed practice you have two options. You can find another group (on a different week) in Moodle with the same theme as the practice you have missed and join them (please note that the group limit is 7 students). Or at the end of the semester you can join the extra practices we will hold, but please note that the capacity of these practices will be limited to 7 person just like the ones during the semester.

Grading:

1. Written (multiple choice test)
2. Retaking of the written exam is also possible. Repeating of the examination can be taken in the form of oral exam.

Type of exam: written (multiple choice test)

Make-up exam: written or oral

Exam requirements:

The knowledge of the given textbook, lecture and practice material.

If there is anything we can help you with feel free to contact us via int.ane.edu@gmail.com.

INTERNAL MEDICINE II (Hematology, Infectology, Immunology, Rheumatology, Laboratory Medicine)

Department of Internal Medicine and Hematology

Tutor: **Katalin Keltai, MD**

Lecture: 2 hours per week

Practice: 5,5 hours per week

Credit: 7.5

The primary objective of the course in internal medicine for fifth-year students is the symptom-based and patient-oriented education of haematology, immunology, rheumatology, and infectology. Students become familiar with the diagnostics and treatment of the most common disorders of the above disciplines.

Besides the above mentioned, integrative medicine, the holistic approach to medicine is also taught. This means the presentation of the coordinated patient care between internal medicine subspecialties and other related professionals and the illustration of the complexity of real life cases. Differential diagnosis also requires utilization of knowledge acquired from different specialties in the diagnostic phase of a case. With this complex program we emphasize the practical importance of internal medical approach and pursuit and teach its application in the real world.

Internal Medicine II. is taught in a block system. During the 5-week block, students spend 14 days (8 hours/day) in the Department. Theoretical and practical (bedside) classes are taught. Students are assigned into groups for bedside practices, case discussions and consultations that are held in rotation resulting in fewer students learning about a given topic at a time.

According to the topics below, classes are taught also dependent on the available patients.

Hematology

Topic list of the lectures:

1. Cellular therapies
2. Blood count evaluation
3. White blood cell abnormalities
4. B signs, lymphadenopathies
5. Acute myeloid leukemias
6. Myelodysplastic syndromes
7. Thrombocytopenias and thrombocytopathy. Haemophilias. Increased coagulation (thrombophylia). Coagulopathies.

Topic list of the practices:

8. Neutropenic fever
9. Palliative and curative treatment of acute leukaemia
10. NHL low-grade / NHL high-grade
11. Patient with anaemia. Transfusion.
12. Bone marrow sampling. Presentation of sampling
13. Complex cases at bedside

Topic list of the consultations:

14. Ph negative myeloproliferative diseases
15. Myeloma
16. Anaemia – case based discussion
17. CML
18. Hemophilia/DIC
19. AIHA/ITP
20. Hodgkin

Infectology

Topic list of the lectures:

1. Emergencies in infectology
2. HIV/AIDS, tropical diseases in Hungary
3. Invasive mycosis
4. Primary immunodeficiencies
5. Vaccination
6. Multiresistant pathogens, infection control and antimicrobial stewardship

Topic list of the practices:

1. Urinary tract infections
2. Airway tract infections
3. Skin and soft tissue infections
4. Infectological situations in practice (sepsis, meningitis, Lyme, pharyngitis)

Topic list of the consultations:

1. Introduction to infectology
2. FUO
3. Sepsis
4. Infective endocarditis
5. Antibiotics, microbiological sampling, assessment of the culture results

Immunology

Topic list of the lectures:

6. Autoimmunity
7. Vasculitides of the great vessels
8. HANO
9. Autoimmune myopathies
10. Sjögren's syndrome – progressive systemic sclerosis

Topic list of the practices:

1. SLE
2. Therapy of autoimmune diseases. Side effects of steroid therapy
3. Small vessel (ANCA-associated) vasculitis
4. Primary and secondary immunodeficiency
5. Rheumatoid arthritis
6. Spondylarthropathies
7. Gout, arthrosis
8. Complex immune cases

Topic list of the consultations:

1. Allergic diseases

Each course is concluded by a practical skill oriented oral exam. During the exam the students are required to answer questions based on the knowledge acquired during practical sessions and by reading the obligatory chapters of the theoretical curriculum, by elaborating on 3 themes of the titles below.:

Hematology

1. Investigation of an anemic patient
2. Iron-deficiency anemia
3. Macrocytic anemia
4. Anaemia associated to chronic diseases
5. Hemolytic anemia 6. Aplastic anemia
7. Checking of the coagulation system
8. Evaluation of thrombosis
9. Acquired thrombophylia
10. Antiphospholipid syndrome
11. Hereditary hemophylia (Hemophylia A and B)
12. Von Willebrand disease
13. Anticoagulant therapy (indications, implementations)
14. DIC
15. Investigation of a thrombocytopenic patient
16. Thrombocytosis
17. TTP/HUS
18. ITP
19. Symptomatology of the lymphoproliferative diseases
20. Evaluation of lymphadenopathy
21. Non-Hodgkin lymphomas
22. Follicular lymphoma
23. Diffuse large B-cell lymphoma
24. Chronic lymphocytic leukemia/ Small lymphocytic lymphoma
25. Myeloma multiplex
26. Hodgkin-lymphoma

27. Symptomatology of myeloproliferative diseases
28. Acute myeloid leukemia
29. Acute lymphoid leukemia
30. Ph-negative myeloproliferative neoplasia (PV, ET, MF)
31. Chronic myeloid leukemia
32. Myelodysplasia syndrome
33. Autologous stem cell transplantation
34. Allogeneic stem cell transplantation

Infectology

1. Basic principles of infectology and antimicrobial therapy (infectious disease anamnesis history and physical examination, targeted, empirical and prophylactic therapy, importance of source control, blood stream infections)
2. Common antibiotics, groups of antibiotics and their clinical use (penicillins, cephalosporins, carbapenems, glycopeptides, metronidazole; bacteriostatic and bactericidal antibiotics, expected susceptibility – natural resistance; important factors: host, pharmacokinetics, mechanism of action) penicillins, cephalosporins, Semmelweis University Dept of Internal Medicine and Hematology Topic list for Internal Medicine II. (5th year) 2020/21
3. Common antibiotics, groups of antibiotics and their clinical use (lincosamides, macrolides, rifampin, tetracyclins, fosfomycin, nitrofurantoin, fluoroquinolones: bacteriostatic and bactericidal antibiotics, expected susceptibility – natural resistance; important factors: host, pharmacokinetics, mechanism of action)
4. FUO – fever of unknown origin
5. Upper respiratory tract infections (sore throat, pharyngitis, otitis media, sinusitis, acute bronchitis)
6. Mononucleosis syndrome
7. Community acquired pneumonia
8. Nosocomial pneumonia
9. UTI (asymptomatic bacteriuria, cystitis, prostatitis)
10. UTI (pyelonephritis, catheter associated UTI)
11. Sepsis, septic shock

12. Intraabdominal infections (cholangitis/cholecystitis, abdominal abscess [liver, spleen, psoas], diverticulitis, peritonitis)
13. Endocarditis.
14. Lyme
15. Acute bacterial meningitis, brain abscess, neurotropic viral infections
16. Erysipelas, cellulitis, fasciitis necroticans, toxic shock syndrome, infectious arthritis, osteomyelitis
17. Neutropenic fever, systemic mycosis, infections of the immunosuppressed patient
18. Infective diarrhoea (bacterial, viral, C.diff.), food poisoning
19. HIV. AIDS and AIDS related diseases
20. Vaccines for adults and their importance. The flu.
21. Antimicrobial resistance, resistant microorganisms and their clinical importance; antimicrobial stewardship.

Immunology/rheumatology

1. SLE clinical picture
2. SLE diagnostics and treatment
3. Rheumatoid arthritis clinical picture
4. Rheumatoid arthritis diagnostics and treatment
5. Seronegative spondylarthritides
6. Gout
7. Vasculitides of the small arteries
8. Vasculitides of the middle and great arteries
9. Polyarteritis nodosa
10. Sjögren's syndrome
11. Autoimmune myopathies
12. Progressive systemic sclerosis
13. Primary and secondary immunodeficiencies
14. Allergy
15. Differential diagnosis of arthritis

MEDICAL REHABILITATION

Institute: Department of Physical Medicine and Rehabilitation

Location: Rehabilitation Clinic, 1121 Budapest, Szanatórium utca

19. Tel: +36 1 391 19 03.

Course director: Dr Zoltán Dénes

Tutors: Dr Orsolya Masát, Dr Mihály Fórián Szabó

Coordinator: Gabriella Tápay

practical training: 32 hours

Aim of the subject and its place in the curriculum:

Special medical knowledge required for recognizing and managing disabilities is summarized in the field of Rehabilitation Medicine. According to WHO about 10 % of the world's population lives with some form of disability. All medical students need to gain a basic knowledge of Rehabilitation Medicine for completion of the graduate program and to practice later as a physician. For this purpose, two theoretical lectures (one in Neurology and one in Traumatology) and one practical seminar in Orthopedics are held during the graduate years on the topic. According to the new curriculum, fifth year students will participate in a one-week clinical rotation in Rehabilitation Medicine.

Detailed thematic of the course:

The course will be one week long and consist of lectures on basics followed by clinical practice. Students will participate in daily clinical activities, such as bedside visits and multidisciplinary team meeting.

Moreover, they will perform patient assessment, physical examination and write medical reports under supervision. Getting familiar with basic rehabilitation methods is part of the course: physiotherapy, physical and other treatment modalities, occupational therapy, psychotherapy, speech therapy, neuropsychology, sport therapy, hydro therapy. Students will also gain experience in ambulatory care.

Detailed schedule:

1. Rehabilitation Medicine (RM): core competencies, the field of RM, definition, philosophy, objectives and methods, concept of ICF, quality of life.
2. Clinical and functional assessment in RM.
3. Interventions in RM: medical treatments, physical and other treatment modalities, therapeutic exercises, orthoses and prostheses.
4. Musculoskeletal and orthopedic rehabilitation: upper limb dysfunctions (including hand- and nerve injuries), lower limb dysfunctions (including nerve injuries and amputation).
5. Neurorehabilitation: stroke, brain injury, spinal cord injury.
6. Rehabilitation in other disabling conditions: geriatric-, pediatric-, cardiovascular- and pulmonary rehabilitation and rehabilitation in malignancy.

Recommended literature: https://archive.uems-prm.eu/resources/Physical_Rehabilitation_Medicine_for_medical_students.pdf

NEUROLOGY AND NEUROSURGERY

General information

Tutor: **Dr. Róbert Debreczeni**

Tel.: 210-0330, Fax: 210-1368

Office hours at the Department of Neurology:

Monday 13,00-14,00 Friday 10,00-12,00

Responsible Secretary: Andrea Kovács (Andi)

Official textbooks for 5th year:

1. Arányi Zs., Kamondi A., Kovács T., Szirmai I.: Investigation of neurological patients.
2. Lindsay, Bone, Callender: Neurology and Neurosurgery Illustrated. Churchill Livingstone

Other suggested books:

1. Marsden, Fowler: Clinical Neurology. Raven Press
2. Duus: Topical Diagnosis in Neurology. Thieme Medical Publishers
3. Gilroy: Basic Neurology. Pergamon Press
4. Weiner-Lewitt: Neurology of House Officer. Williams and Wilkins
5. Bannister: Brain and Bannister's Clinical Neurology. Oxford University Press
6. Mumenthaler: Neurology. Georg Thieme Verlag.
7. Adams and Victor's Principles of Neurology, Eleventh Edition, McGraw-Hill ISBN 978-0-07-184261-7

Hours per week: The two-semester curriculum for fifth-year neurology education is given in 4-week block training. For the first three weeks of the block, there is one day off a week to prepare. There are 32 practical lessons in the first week, 26 practical and 6 theoretical lessons in the second week, 24 practical lessons and 8 theoretical lessons in the third week. In the fourth week of the block, you will have to take both practical and theoretical exams. The detailed schedule will be given to students on the first day of the block.

Form of tuition: lecture, bedside practice

Lecture title

- Basic principles of neurological diagnosis. The anamnesis. The connection between symptoms, localization and causes of neurological diseases.
- Patient examination I. Cranial Nerves (part 1).
- Patient examination III. Motor system (part 1)
- Patient examination IV. Motor system (part 2)
- Patient examination II. Cranial Nerves (part 2)
- Patient examination V. The sensory system
- The spinal cord. The peripheral nervous system.
- The brainstem. The thalamus
- The cerebellum
- Altered states of consciousness
- Organization of speech, language
- The temporal and the parietal lobe
- Control of behaviour. Memory and related structures
- Neuroradiology (CT, MRI, angiography)
- Classification and treatment of cerebrovascular disorders
- Tumors of the central nervous system
- Dementias
- Movement disorders
- Diagnosis and treatment of epilepsy
- Neurological Emergencies
- Neurosurgical aspects of Neurology
- Neuromuscular disorders. Myopathies. Neuropathies
- Motoneuron diseases.
- Multiple sclerosis
- Neurological consequences of craniospinal traumas
- Alcohol related nervous system disorders
- Headaches and neuralgias
- Inflammatory neurological disorders. AIDS.

Block Practice

- Signs of meningeal irritation.
- Examination of the I. and II. Cranial nerve. The visual fields.
- Examination of the III., IV., VI. Cranial nerves. The eye movements. Gaze disorders.
- The V cranial nerve. The facial nerve palsy. The nystagmus. Dizziness and vertigo. The vestibular system.
- Motor functions of cranial nerves. Bulbar, pseudobulbar and suprabulbar paresis.
- Assessment of the paresis. Examination of muscle tone and trophic.
- The mono- and polysynaptic reflexes. The pyramidal signs. The upper and lower motoneuron lesion.

- Examination of the sensory system. Examination of the spine and spinal cord. The vegetative functions.
- The coordination. The cerebellar functions (neo-, paleo-, and archicerebellum).
- The reticular activating system. Examination of speech and higher cerebral functions
- Examination of patients suffering from Cerebrovascular Disorders
- Movement Disorders, Hyperkinesias
- Hypnoid and non-hypnoid unconsciousness. Epilepsy
- Multiple Sclerosis, Neuropathies
- Dementias and cognitive functions

Neurology Examination Question List for 5th year Students**I. Neuroanatomical, physiological and biochemical basis of neurology**

1. The visual system
2. Innervation of extraocular muscles. The oculomotor nuclei.
3. Gaze control. Gaze disturbances
4. Pupillary reflex arcs. Disturbances of pupillary reflexes.
5. Trigeminal nerve
6. Facial nerve
7. The vestibular system
8. Hearing
9. Glossopharyngeal, vagus, accessory and hypoglossal nerves
10. Organization of motor control
11. Sensory systems
12. Gross anatomy of the hemispheres
13. Basal ganglia and the thalamus
14. The limbic system
15. The cerebellum
16. Blood supply of the hemispheres. Cerebral metabolism
17. Blood supply of the brainstem, cerebellum and the spinal cord
18. The cerebrospinal fluid

II. Basic Neurology

1. Classification of reflexes (stretch, superficial, abnormal and primitive reflexes)
2. Characteristics of upper and lower motoneuron lesion
3. Paresis syndromes according to the site of lesion
4. Symptoms of spinal cord damage
5. Medulla oblongata (bulbar) syndromes caused by circulatory disorders
6. Pontine syndromes caused by circulatory disorders
7. Mesencephalic syndromes caused by circulatory disorders
8. Muscle tone control
9. Nystagmus
10. Vertigo and dizziness; peripheral and central vestibular syndromes
11. Symptoms of cerebellar lesions
12. Symptoms of frontal lobe damage
13. Symptoms of temporal and occipital lobe damage
14. Symptoms of parietal lobe damage

15. Symptoms of occipital lobe damage
16. Thalamic syndromes
17. Clinical examination and types of aphasia
18. Structural basis and types of unconsciousness
19. Physical examination of the unconscious patient
20. Increased intracranial pressure, brain herniations, hydrocephalus
21. Hyperkinesia
22. Gait disturbances
23. Bladder and bowel dysfunction
24. Symptoms of intervertebral disc herniation
25. Lesions of the peripheral nerves of the upper extremity. Tunnel syndromes on the upper limb.
26. Lesions of the peripheral nerves of the lower extremity.

III. Neurological Disorders

1. Classification of ischaemic cerebrovascular disorders
2. Intracranial bleedings, subarachnoidal hemorrhage
3. Symptomatology of Parkinson's disease
4. Classification of headaches. Trigeminal neuralgia
5. Focal epilepsies
6. Generalized epilepsies
7. Meningitis. Examination of the CSF in inflammatory neurological diseases
8. Encephalitis
9. Diagnosis of polyneuropathies
10. Emergency in neurology
11. Traumatic CNS diseases
12. Diagnosis of dementia
13. Multiple sclerosis: signs and diagnosis
14. Intracranial tumors
15. Spinal tumors
16. Disorders of the nervous system due to alcoholism
17. Myasthenia gravis
18. Guillain-Barre syndrome
19. Encephalopathies
20. The motor neuron diseases
21. Muscular dystrophies

OBSTETRICS AND GYNECOLOGY

Dept. of Obstetrics and Gynecology

Tutor: **Dr. Gyula Richárd Nagy**

Lectures and Practices in blocks

- Introduction. General information. The menstrual cycle. Conception. Normal pregnancy.
- Normal labor and delivery. Obstetrical examinations.
- Changes in maternal anatomy and physiology during pregnancy.
- Prenatal care. Symptoms and signs of pregnancy.
- Spontaneous abortion. Ectopic pregnancy. Basic knowledge of ultrasonography.
- Maternal diseases complicating pregnancy. Gestational diabetes.
- Abnormalities of pregnancy.
- Abnormalities of labor and delivery.
- Monitoring of the fetus.
- Hypertensive disorders in pregnancy.
- Premature delivery. Intrauterine growth retardation (IUGR).
- Neonatology.
- Twin pregnancy. Operative delivery.
- Normal and abnormal puerperium.
- Major issues in current obstetrics.
- Gynecological endocrinology. Menstrual disorders.
- Inflammatory diseases in obstetrics and gynecology.
- Sterility, infertility. Assisted reproduction.
- Cervical cancer.
- Tumors of the ovary.
- Tumors of the vulva, vagina and corpus uteri.
- Principles of cancer therapy.
- Endometriosis. Polycystic ovary syndrome (PCOS).
- Genetic Counseling.
- Prenatal genetic diagnosis.
- Fetal anomalies. Dysmorphology.
- Perimenopausa.
- Genital prolapse. Urogynecology.
- Vital statistics. Medical legal problems in obstetrics and gynecology.
- Occasionally the topics are interchangeable.

Department of Medical Oncology

Course coordinator: Dr. Magdolna Dank

Objective of instruction and its place in the curriculum:

- The aim of the Clinical Oncology course is to provide students with modern, up-to-date, and comprehensive knowledge on the recognition, diagnosis, and treatment of malignant diseases.
- During the course, students will become familiar with the most important etiological and epidemiological factors of cancer, the possibilities for early detection, and the fundamentals of oncological diagnostics. Special emphasis is placed on modern oncological therapies, including the principles, indications, and side effects of chemotherapy, targeted therapy, and immunotherapy. Students will learn about multidisciplinary and personalized treatment strategies for solid tumors, as well as opportunities for rehabilitation and long-term follow-up.
- The course also offers insight into the operation of multidisciplinary tumor boards and the practice of precision medicine, enabling students to competently engage in the complex decision-making processes of oncological patient care. The training aims to provide a solid foundation for the development of clinical oncological thinking and for future practical medical work.

Radiotherapy Day

- the objective of this section of the course is for students to acquire knowledge on:
- the physical and chemical principles and biological effects of radiotherapy,
- external beam radiotherapy and brachytherapy,
- radiotherapy treatment planning,
- the basic principles of radiotherapy equipment operation,
- the role of radiotherapy in the treatment of malignant tumors,
- current radiotherapeutic approaches for the most common solid tumors, including radiochemotherapy and radiobiotherapy,
- early and late side effects of radiotherapy and their possible prevention and management,
- palliative irradiation and the use of radiotherapy in oncological emergencies.

Competencies acquired through completion of course:

- Acquisition of modern oncological core knowledge:
- Comprehensive understanding of the epidemiology, etiology, early detection, diagnostics, and therapy of malignant diseases.
- Application of the fundamentals of precision medicine:
- Clinical interpretation of molecular diagnostic methods and biomarkers in therapeutic decision-making.
- Practical knowledge of medical oncology treatments:
- Recognition of indications, application, and adverse effects of chemotherapy, targeted therapy, immunotherapy, and biological treatments.
- Understanding of multidisciplinary, tumor board-based decision-making:
- Mastery of the logic and function of multidisciplinary patient management.
- Development of communication and psycho-oncological skills:
- Empathetic physician-patient communication, managing difficult situations, and delivering bad news.
- Palliative care approach and basic rehabilitation knowledge:
- Fundamentals of comprehensive, holistic cancer patient management.
- Use of digital tools and artificial intelligence in oncology:
- Interpretation of digital data and familiarity with AI-based decision support systems.

Lectures (12 hours)

Block 1

1. Etiology and epidemiology of tumors, methods of prevention and screening (45 min) (Prof. Dr. Magdolna Dank/ Dr. Zsófia Küronya)
2. Imaging diagnostics of tumors (45 min) (Dr. Ádám Tárnoki/ Dr. Dávid Tárnoki/ Dr. Mátyás Ujlaki)
3. Histological and molecular pathological diagnosis of tumors (45 min) (Dr. Erika Tóth/ Dr. János Szőke)

4. Basics of oncological surgery. Surgical considerations in tumor board discussions (45 min) (Dr. Tamás Mersich/ Dr. Dániel Horányi/ Dr. Zsolt Dubóczi)
5. Oncological surgical reconstruction, palliation, and interventions in the era of technological advancement (45 min) (Dr. Dániel Horányi/ Dr. Tamás Mersich)
6. Clinical drug trials and experimental oncological therapies (45 min) (Dr. habil. Erika Hitre)

Block 2

7. Chemotherapy, biological, and endocrine treatments (45 min) (Dr. Gábor Rubovszky/ Dr. Zsófia Küronya)
8. Immunological treatments in oncology (45 min) (Dr. Zsófia Küronya/ Dr. habil. Erika Hitre)

Block 3:

9. Clinical psycho-oncology – Dr. Péter Kovács

Block 4 – Radiotherapy:

10. Principles of radiotherapy and radiochemotherapy in the treatment of tumors (45 min) (Prof. Dr. Csaba Polgár, Dr. habil. Zoltán Takácsi-Nagy)

Block 5:

11. Artificial intelligence in oncology (45 min) (Dr. Norbert Mészáros/Dr. Kliton Jorgo)
12. Oncological emergencies/ Rehabilitation and follow-up in oncology (45 min) (Prof. Dr. Magdolna Dank/ Dr. Gyöngyvér Szentmártoni/ Dr. Zsófia Küronya)

Practical sessions (21 hours)

Block 1

- Tumor diagnostics I: Cytological, histological, molecular pathology practical (2×45 min)

Block 2

- Systemic treatment of tumors I: Oncology in practice – outpatient clinic with real patients, small group experience (2×45 min)
- Systemic treatment of tumors II: First encounter with the oncology patient, bedside practice (2×45 min)
- Systemic treatment of tumors III: The role of early palliative care in oncology (1×45 min)
- Systemic treatment from a pharmacist's perspective (1×45 min)

Block 3:

- Tumor diagnostics II: Imaging diagnostics practical (4×45 min; mammography/ultrasound 45 min, CT 45 min, MRI 45 min, PET-CT 45 min)
- Psycho-oncology practical (2×45 min)
- Consultation

Block 4 – Radiotherapy:

- Tumor radiotherapy I: Treatment planning practical (2×45 min)
- Tumor radiotherapy II: Practice of external beam radiotherapy (2×45 min)
- Tumor radiotherapy III: Brachytherapy practical (2×45 min)
- Written test (1×45 min)

Block 5:

- Tumor surgery (operating theatre practice) (4×45 min)
- Tumor board practice (2×45 min)

Assessment methods during semester:

- Throughout the course, students' knowledge is assessed not through formal examinations, but by using modern, interactive tools. At the end of each lecture, a digital Quizlet questionnaire - accessible via QR code - is used to evaluate whether students have mastered the key "take-away" messages of that session. This method enables immediate feedback and helps reinforce the material, while also supporting active participation and deeper understanding.

Requirements for the successful completion of the course:

- Attendance of at least 90% of all lectures and practical sessions. Attendance is checked at every class via a roll call.

PEDIATRICS

Pediatric Center, Bókay street Department

Tutor: **Dr. Dóra Krikovszky, Dr. Zita Laura Boczkó**

Pediatric Center, Tűzoltó street Department

Tutor: **Dr. Klára Horváth**

Credits: 7

Total duration: 98 hours, seminars: 28 hours, practices: 70 hours

Prerequisites: Internal Medicine I., Laboratory Medicine, Medical Imaging

Aims: To introduce students to the most common diseases of the pediatric population.

Curriculum:

The 5th year Pediatric course is organized in the framework of the new block structure. Students spend 3.5 weeks in our department, 1.5 weeks are reserved for home study and the oral exam.

SEMINARS IN PEDIATRICS FOR 5th GRADE MEDICAL STUDENTS

Location:

Pediatric Center, Bókay street Department, Budapest VIII, Bókay J. u. 54. I. floor

1. Introduction to Pediatrics, Growth and development
2. Development, screening, immunisation
3. Pediatric emergencies
4. Pulmonology
5. Neonatology // Cardiology
6. Infectious diseases
7. Gastroenterology, hepatology
8. Nephrology
9. Radiology
10. Endocrinology
11. Surgery
12. Dermatology
13. Psychiatry
14. Cardiology

Pediatric Center, Tűzoltó street Department, Budapest IX, Tűzoltó u. 7-9.

- Fluid therapy
- Fever, febrile seizures
- Drug administration
- ABCDE examination and vital parameters
- Pulmonology
- Communication skills
- Neurology
- Gastroenterology
- Cardiology
- Radiology
- ECG in emergency care
- Infectology (at Bókay Street)
- Nephrology (at Bókay Street)
- Endocrinology (at Bókay Street)
- Immunology
- Rheumatology
- Hematology
- Oncology
- Surgery

Practices

Pediatric Center, Bókay street Department, Budapest VIII, Bókay J. u. 54. I. floor

Pediatric Center, Tűzoltó street Department, Budapest IX, Tűzoltó u. 7-9.

Practices at: Pediatric Center, Bókay street Department:

- Physical examination of children
- Communication with families
- Cardiology
- Diabetology
- Emergency
- Gastroenterology
- Hepatology
- Hematology (at Tűzoltó street Department)
- Infancy
- Infectology
- Neonatal Intensive Care Unit
- Neonatal surgery
- Nephrology
- Pulmonology
- SKILL (Pediatric Basic Life Support)
- Surgery

Practices at: Pediatric Center Tűzoltó street Department

- Physical examination of children
- Pediatric Basic Life Support
- Rheumatology
- Neurology
- Hematology
- Cardiology
- Gastroenterology
- Oncology
- Surgery
- NICU (at the Pediatric Center, Bókay street Department and at the Obstetrics and Gynecology Departments)

Requirements (Pediatric Center, Bókay street Department):

Attendance: according to Semmelweis University regulations, students may not miss more than 10% of their scheduled sessions (including practices, seminars). Students will be provided an opportunity to make up missed sessions at the end of the semester. Students should bring their own gown and stethoscopes to the practices.

Examination (Pediatric Center, Bókay street Department):

Practical exam will be scheduled at the end of the pediatric blocks. Practical exams are not graded. Grades will be given based on the result of the oral exam.

Requirements (Pediatric Center, Tűzoltó street Department):

Students should bring their own stethoscopes to the practices. Attendance: students have to attend 75% of the practices and 75% of the consultations and seminars.

Examination (Pediatric Center, Tűzoltó street Department): The final grade consists of the average grade of the practical and the oral exams (50-50%), students should pass both parts with a minimum grade of 2. The practical exam is organized to the last day of the block. If the final average is between two grades, we round the final grade towards the mark of the oral exam.

Type of exam: Bedside practical exam and oral exam.

5th year semifinal topic list

1. Definitions in perinatology, gestational and mortality data, birth related concepts
2. Aspects of newborn care, Apgar scoring system
3. Physiologic growth, anthropometric features, normal development from newborn to school age
4. Nutrition and feeding of a healthy infant and child, nutrition and feeding of premature babies, energy needs. Physiologic growth of a healthy infant
5. Newborn and genetic screening, prevention
6. Chromosomal abnormalities
7. Neonatal respiratory adaptation disorders and lung disease
8. Neonatal infections
9. Neonatal jaundice
10. Complications of prematurity (BPD, ROP, NEC, IVH)
11. Sudden infant death syndrome (SIDS), infant mortality, demographic data
12. Neonatal and infant CPR (cardiopulmonary resuscitation)
13. Meconium ileus, intestinal atresia, pyloric stenosis, diaphragmatic hernia
14. Ileus, intussusception, volvulus, incarcerated hernia, appendicitis.
15. Obstipation. Hirschsprung disease.
16. Testicular and ovarian torsion. Cryptorchism.
17. Coagulopathies
18. Anaemia: signs and symptoms and evaluation
19. Leukaemia.
20. Prevention of infectious diseases. Vaccination
21. Signs of sepsis. Management of sepsis in the first few hours
22. Herpes virus infections
23. Measles, rubella, scarlet fever
24. Systemic autoimmune disease
25. Allergic disease in infancy and childhood. Definition of atopy
26. Diseases affecting the ear
27. Rhinitis, adenoiditis, tonsillitis, bronchitis.
28. Pneumonia. Age related most common pathogens
29. Cystic fibrosis.
30. Obstructive bronchitis, asthma bronchiale, acute subglottic laryngitis
31. Alarming signs of CNS diseases. Necessary examinations. Lumbar puncture
32. Inflammatory disease of the nervous system
33. Facial nerve palsy
34. Seizures in childhood. Febrile seizure
35. Diabetes mellitus. Treatment of diabetic ketoacidosis
36. Congenital adrenal hyperplasia
37. Disease of the thyroid gland
38. Endocrine disorders of calcium and phosphate metabolism. Rickets.
39. Growth disorders (short stature, tall stature)
40. Disorders of pubertal growth and sexual maturation
41. Henoch-Schönlein purpura
42. Kawasaki syndrome, MISC.
43. Urinary tract infection. (localization, course of the disease, treatment, complications)
44. Congenital disorders of the kidney and urinary tract
45. Glomerular kidney disease
46. Nephrosis syndrome
47. Cyanotic congenital heart disease
48. Acyanotic congenital heart disease
49. Malabsorption. Celiac disease
50. Cholestatic liver disease in childhood
51. Hepatitis in childhood
52. Most common infectious enteritis
53. Inflammatory bowel disease: ulcerative colitis, Crohn's disease
54. Alarming signs of abdominal diseases
55. Enuresis. Polyuria and polydipsia
56. Oedema
57. Acid-base homeostasis, treatment of acid-base balance disorders
58. Fever, management of fever, antipyretics

Note concerning the 6th year's rotations: Only legibly, completely and accurately filled out, institutionally sealed, original acceptance letters are recognized!

PHYSICAL EDUCATION IX-X.

Physical Education and Sportcenter

Subject: Physical Education IX.

Type of Subject: Obligatory

Credit: 0

Name of the Lecturer: Várszegi Kornélia

Physical Education and Sportcenter

Subject: Physical Education X.

Type of Subject: Obligatory

Code of Subject: AOKTSI009_10A

Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

The syllabus (preferably a week and numbered):

You can register for the "independent sports activity" course as part of the Physical Education course in the Neptune system.

Every week, a questionnaire is sent to the students through the Neptune system:

- The questionnaire can be filled in from Monday to Sunday in a semester (no entries can be made in advance or afterwards).
- Students must assure themselves that they have completed the questionnaire truthfully.
- It is a minimum requirement for the signature that a training of 1 x 60 minutes per week is completed (to be 10 times responses) and this is recorded in the questionnaire.

Other way, Free of charge:

2x90 mins./week sport training (competitive sport, for qualified only): cheerleader, female's football, men's football, handball, basketball, volleyball, waterpolo

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

The student who completes the independent sport activity course is also supposed to attend 10 classes and record their participation in the weekly sent UniPoll questionnaire.. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

How to prove absence regarding the exam:

Absence must be retaken!

PSYCHIATRY AND PSYCHOTHERAPY

Semmelweis University, Faculty of General Medicine

Name(s) of the Institute(s) teaching the subject: Department of Psychiatry and Psychotherapy

Name of the subject: Psychiatry, Psychotherapy

Credits: 7 (two semesters)

Total number of hours: 140 (two semesters)

lectures: 42 practices: 98 seminars: none

Type of the course (mandatory/elective): Mandatory (obligatory)

Academic year: 2023-2024

Course director (tutor): Prof. János Réthelyi MD, PhD

Contact details: Department of Psychiatry and Psychotherapy 1083 Budapest Balassa u. 6.

Tel.: 061 210 0336

Position: Head of the department

Date of habilitation and reference number: 24 June 2015, registration number: 05/2015.

Aim of the subject and its place in the curriculum:

The aims of the subject of Psychiatry I-II. is to acquire in-depth knowledge about the diagnostics, symptoms and treatment of psychiatric disorders at the level of a general medical practice. It is expected from students to be able to identify the basic elements of psychopathology and the conditions requiring emergency psychiatric interventions. Furthermore, students' communication skills are developed in order to be able to examine patients and explore psychiatric conditions independently.

Psychiatry I-II. is taught in the semesters of 9-10 within the curriculum.

Location of the course (lecture hall, practice room, etc.):

The location of Psychiatry lectures and practice session are within the premises of the Department of Psychiatry and Psychotherapy (i.e. Lecture hall and rooms for education)

Competencies gained upon the successful completion of the subject:

- Recording the patient's history (general, somatic, psychiatric, pharmacological and family history)
- Complex psychiatric examination (assessing the consciousness, perception, orientation, thought, intellect; emotional and memory functions; mood, and psychomotor functions of the patient; assessment of attitude towards examiner, motivation system and personality functions)
- Suicide risk assessment
- Family consultation to uncover the patient's problems
- Exploration of patients after suicide attempts or in crisis situations.
- Interpretation of the Mini Mental State Examination results
- Indication of psychiatric inpatient treatment
- First steps of emergency psychiatry care
- Identification of different intoxications
- Recognition of somatic disorders underlying psychiatric symptoms
- Management of immediately dangerous behaviours
- Psychoeducation (regarding the disorder, therapy, prodromal signs, patient care)
- Differential diagnosis of psychiatric disorders; making a diagnosis

Prerequisite(s) for admission to the subject:

For Psychiatry, Psychotherapy: Pharmacology and Pharmacotherapy II., Neurology I.

Minimum and maximum number of students registering for the course: We instruct the entire fifth year, therefore, there is no limit on number of subscribing students in the Neptun System.

Student selection method in case of oversubscription:

How to register for the course:

Registration for the course is possible in the Neptun system within the rotations of the block practice system.

Potential overlap(s) with other subjects:

Behavioural sciences, Medical communication, Medical anthropology, Medical sociology, Psychotherapy in medical practice, Pharmacology and pharmacotherapy, Neurology

Special training activities required³:

None.

Policy regarding the attendance and making up absences:

Similar to other subjects, the course is considered to be completed if the absences do not exceed 20% of practice sessions each semester. Practice teachers record absences on an attendance sheet at each practice occasion together with the following data: the ID number of the group, topic of the practice sessions, the demonstrated diagnosis. It is not possible to certify absences. Therefore, making up missing practice time is obligatory either by coming to practice sessions with a different group or performing extra tasks such as writing a case report that is examined and signed by one of our practice teachers. In the case of mass absences because of exceptional cases (i.e. grave disease) the permission of the head of the department is necessary.

Means of assessing the students' progress during the semester⁴:

There are not any mid-semester tests or oral reports in Psychiatry but on the last day of the first week of the practice (Thursday) there are three specific questions to be answered in writing during the block practice session.

Requirement for acknowledging the semester (signature):

The semester is acknowledged if the student has actively participated at the practice sessions which cover the theory and practice of examining a patient and case discussions attached to demonstrations. The sheet entitled *The Register of Psychiatric Conditions* must be downloaded from our website in the fifth year and submitted with the required signatures certifying the observed psychiatric disorders. This sheet of paper must be submitted at the final exam of Psychiatry in the sixth year.

Type of the examination:

At the end of the first semester there is a semi-final exam, while a practice mark must be acquired at the end of the second semester. The semi-final exam is a written exam containing 50 multiple choice questions. Some of them are related to case vignettes within the body of the test paper.

Exam requirements⁵:

The material should be acquired by regular patient examinations during the practice sessions, by studying the e-learning material available also on our website and by studying from the designated text books. Preparation for the semi-final exam includes presence at the lectures, text books and the drafts and PowerPoint presentations of lectures made available for students on the website of the Department of Psychiatry and Psychotherapy.

Type and method of grading⁶:

In the first semester, the semi-final exam can be passed by answering a written test of 50 items. An oral semi-final exam is only allowed by permission from the head of the department in the case of subsequently failing two written exams in Psychiatry. In the second semester, a practice mark can be gained by considering the following factors: the students' performance exhibited within the semester during the practice sessions, the quality of their written case report submitted to their own practice teacher and the oral performance related to the topics of practice sessions.

How to register for the exam:

Exam registrations can be made in the Neptun system within the time limits permitted by the Rule Book of Study and Exams of Semmelweis University.

Opportunities to retake the exam:

Retake of the semi-final exam are permitted within the boundaries set by the Book of Study and Exams of Semmelweis University. There are two occasions of passing attempts in the form of a written exam. The third attempt to correct the failed exams can be oral.

Literature, i.e. printed, electronic and online notes, textbooks, tutorials (URL for online material):

Text books and lecture materials available on the website should be consulted while preparing for examination:

Textbook: Rebecca McKnight, Jonathan Price, John Geddes. Psychiatry 5th edition. Oxford University Press, 2019. Oxford, United Kingdom.

Detailed thematic of the course²:**Lectures**

Title of the lecture	Lecturer	Mode
1st week MONDAY		
Introductory lecture: What we teach in psychiatry, curriculum, objectives, exams. The history of psychiatry. Psychiatric epidemiology.	Professor János Réthelyi	in person
Lecture: Psychopathology. Mental status examination. Transcultural psychiatry. Gene-environment interactions in psychiatry.	Professor János Réthelyi	in person
1st week TUESDAY		
Lecture: Classification of mental disorders.	György Szekeres	in person
Lecture: Anxiety disorders: diagnosis and treatment. Eating disorders: diagnosis and treatment. Sexual disorders.	Szilárd Hamvas	in person
1st week WEDNESDAY		
Lecture: Schizophrenia and other psychotic disorders	Professor János Réthelyi/Professor István Bitter	in person
Lecture: Affective disorders: diagnosis and treatment	Professor Zoltán Rihmer	in person
1st week FRIDAY		
Lecture: Neurocognitive disorders disorders: diagnosis and treatment. Geriatric Psychiatry	Zoltán Hidasi / Máté Fullajtár	in person
Lecture: Emergency psychiatry. Legal and ethical issues in psychiatry . Suicide	Brigitta Baran / Ferenc Ádám Szabó	in person
2d week MONDAY		
Lecture: Introduction to psychotherapy. Definition, indications, effects, main trends, basic competencies of psychotherapy	Professor Zsolt Unoka	in person
Lecture: Stages of motivational interview and behaviour change: addictions, eating disorders, lifestyle changes required due to chronic diseases, management of compliance problems. Sleep disorders: diagnosis and treatment	Professor György Purebl	in person
Lecture: The cognitive model: anxiety disorders, depression, somatization, sleep disorders, psychotherapeutic approach to sexual disorders	Professor Dóra Perczel-Forintos	recorded
Lecture: Suicide prevention, crisis intervention, aggressive, psychotic, psychotherapeutic approach for patients with personality disorders	Bálint Hajduska-Dér	recorded
2d week TUESDAY (second part of the rotation)		
Lecture: Neuropsychology, Clinical Psychology (Theoretical Introduction)	Éva Jekkel / Xénia Gonda	in person
2d week WEDNESDAY		
Lecture: Pharmacotherapy in psychiatry	Professor István Bitter / Gábor Csukly	in person
Transcultural psychiatry	Gyöngyi Szilágyi	in person
Consultation lecture of the online learning material	lecturer will be appointed later	in person
Lecture: Posttraumatic stress disorder. Somatoform disorders, Somatization and Conversion disorders, Hypochondriasis	Professor János Réthelyi	recorded
Lecture: EEG and event related potentials in psychiatry	Pál Czobor	recorded

PUBLIC HEALTH

Institute: Institute of Preventive Medicine and Public Health
Location: NET building, 1089 Budapest, Nagyváradi tér 4., 13th floor.
NET 13th floor, room 1307
Phone: 061 210-2930, extension 56313
E-mail: horvath.ferenc@semmelweis.hu

Course lecturer: Dr. Zoltán Ungvári

Course tutor: Dr. Horváth Ferenc

Location of the course (lecture hall, practice room, etc.):

Semmelweis University, NET building
1089 Budapest, Nagyváradi tér 4.

How to register for the course: via Neptun system

Detailed thematic of the course

- Health promotion programs – basics, situation mapping, identification of needs, action plan
- Mental health / Prevention. Illegal drugs use and their prevention
- Handicapped population / public health programs for the vulnerable groups
- Aging population / gerohygiene. The elderly as a vulnerable group. Social situation of the elderly. Role play with ability tools
- Epidemiology: basic statistics, morbidity measurements. Types of epidemiologic studies. Clinical decision making.
- Interventional studies, screening. Epidemiology test.

- Epidemiology of communicable diseases. Epidemiologic measures in outbreak investigation
- Infection control / epidemiology of communicable diseases
- Critical reading, evaluation of scientific articles (STROBE / PRISMA / CONSORT statement)
- Evaluation of nutritional status. Lifestyle advice for nutrition, brief intervention. Food safety.
- Alcohol use, public health significance. Brief intervention for alcohol use. Role play studying
- Environmental medicine. Air / soil / water hygiene. Climate change. Chemical safety.
- Occupational medicine, work risk assessment
- Smoking. Brief intervention for smoking cessation. Role play studying.
- Physical activity, possible therapies. Brief intervention for sports, role play studying
- Structure of healthcare, healthcare financing.
- Quality assurance in healthcare

Policy regarding the attendance and making up absences:
10 % of the classes.

Requirement for acknowledging the semester (signature):
participation on practicals and lectures and finishing the e-learning material

Type of the examination:
Colloquium

SPORTS MEDICINE

Lecture: Sports Physiology, Sports Surgery, Sports Nutrition

Practice: ECG, Spiroergometry, Echocardiography, MRT, Patient examination, Sport surgery- operating room, ambulance, rehabilitation, physiotherapy

Credit: 2

Examination:

The aim of sports medicine education is to provide a wide range of up-to-date, usable basic knowledge of sports medicine and to account for the future generation of doctors within the framework of general medical education. Students interested in sports medicine should be provided with advanced training.

Detailed topics:

1. Physiological bases and energy sources of muscle function.
2. Motion control, motion learning. Warming up, dead center, fatigue, muscle fever.
3. Energy turnover, daily energy balance. Sports nutrition. Legal performance enhancers, procedures. Doping.
4. The composition of the blood, its role in sports. Sports adaptation processes of circulation and respiration. Sporty.
5. Strength, speed, endurance. Age characteristics in acute and chronic sports adaptation. Checking the condition. Exercise physiology studies in improving sports performance.
6. Medical history, physical examination, urine examination: sports medicine specialties. Guidelines for Sports Medicine Fitness and Periodic Examination. Indications for refusal / revocation of a sports medical license.

7. The role of physical activity in the primary and secondary prevention and treatment of internal medicine diseases. Obesity, hypertension, diabetes and sports.
8. Electrocardiography in sports medicine screening. Arrhythmias and their treatment in athletes.
9. Imaging procedures in sports-related cardiac remodeling.
10. The importance of sports cardiology screening. Sudden cardiac death in athletes.
11. The concept, division, etymology, prevention and diagnosis of sports injuries. General principles for the treatment of acute and overload sports injuries. One head, one neck, one chest and one have sports injuries.
12. Typical sports injuries and injuries of the upper limb.
13. Typical sports injuries and injuries of the lower limb.
14. Rehabilitation, movement therapy, scientific methods in the conservative treatment of sports injuries. The aim of sports medicine education is to provide a wide range of up-to-date, usable basic knowledge of sports medicine and to account for the future generation of doctors within the framework of general medical education. Students interested in sports medicine should be provided with advanced training.

Tutor: **Dr. András Horváth**

UROLOGY

Head of Department: **Prof. Dr. Péter Nyirády**

Tutor: **Dr. András Horváth**

Aim of education: Our aim is to teach our students for a basic knowledge in urology (the most important differential diagnostic steps, urological physical examination, imaging techniques, different treatment options) and also to educate them to perform the most important, minor urological procedures (like urethral and suprapubic catheterization).

Syllabus:

- Embryology of the urological tract
- History of urology, Symptoms, Diagnostic Measures
- Urolithiasis. Diagnosis and Treatment
- Incontinency, Neurogenic Bladder
- Benign Prostatic Hyperplasia
- Prostate Cancer
- Renal Tumours
- Tumours of the Urinary Bladder
- Injuries to the GU Tract
- Testicular and Penile Tumours
- Male Infertility
- Endoscopic Urology (Endourology)
- Emergency in Urology
- Paediatric Urology
- Nonspecific Infections of the GU Tract

Attendance

Lectures: 14 lectures during 2 weeks course

Practice: 2 weeks course in rotation system at the Department of Urology.

During practices all parts of urology are covered and as many as possible physical examinations and procedures are shown.

Absence from practice: In accordance with the educational and examination rules of the university. Only official medical certificate is accepted.

Exam: oral exam, topics are available at our website.

The mark depends on the practice score given by the tutor of the student and also on the oral exam result.

Absence from the exam: Only an official medical certificate is accepted.

Exam sign up: Through the Neptun system.

For updated information please contact the department.

OPTIONAL COURSES

The courses listed can be taken in or after the semester indicated in the first column, also taking the prerequisite(s) into consideration. If there is no specification, the course can be taken at any stage of the studies.

Semester	Course name	Neptun code	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination	prerequisite(s)	examination
–	Advanced laparoscopic techniques	AOSKMI807_1A		1		13			1	Basic Surgical Techniques, Intermediate knotting and suturing techniques	
–	Advanced suturing techniques	AOSKMI808_1A		3		11			1	Basic Surgical Techniques, Intermediate knotting and suturing techniques	
2	Anatomic dissection in the practice	AOSANT809_1A			2				2	Macroscopic Anatomy and Embryology II	
–	Art of Learning	AOSMAG1036_1A		16		12			2		
3	Artificial Intelligence in Diagnostics and Surgery Planning	AOSTRA882_1A					1		1	Internal Medicine II (Hematology, Infectology, Immunology, Rheumatology), Obstetrics and Gynaecology, Pediatrics	
–	Artificial Intelligence in Healthcare: social, ethical and legal aspects	AOSMAG1072_1A			2				2		project work
–	Bridge	AOSANT908_1A			2				2		
5	Cardiopulmonary clinical physiology and rehabilitation - Practical aspects	AOSPUL989_1A		14		14			2	Medical Physiology II, Molecular Cell Biology II, Medical Microbiology I	
6	Cardiorespiratoric and neurophysiological measuring methods (II. Laboratory practices)	AOSTLM770_2A			2				2	Cardiorespiratoric and neurophysical measuring techniques, Medical Physiology II	
5	Cardiorespiratoric and neurophysical measuring techniques	AOSTLM770_1A	2						2	Medical Physiology II	
5	Clinical Embryology	AOSNO1830_1A	1,5		0,5				2	Molecular Cell Biology II, Medical Physiology II	
7	Clinical Hungarian	AOSLEK340_1A			4				2	Medical Hungarian IV.	
5	Clinical practice		0		1				2+		practical examination
5	Clinical practice, Advanced Level		0		1				1+		practical mark
11-12	Complementary elective internship practice	AOSANG852_SA				200			5		practical mark
5	Course on human lactation and breastfeeding - theory, support and promotion	AOSNNT884_1A	2						2	Medical Physiology II	
–	Disruptive Technologies in Medicine	AOSGRI374_1A	2						1		
5	Genetics in Pediatrics	AOSGY1876_1A	1						1	Genetics and Genomics	
9	Genetics of endocrine diseases	AOSED869_1A	2						2		
4	Highlights on Mental Health and Mental Treatment (Culture in Medicine II.)	AOSMAG507_2A	2						2		
–	History of the medical professionalism	AOSNEI562_1A	2						2		
–	Human Intelligence	AOSMAG983_1A	2						2		

Semester	Course name	Neptun code	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination	prerequisite(s)	examination
–	Intercultural Healthcare Integrated Course	AOSMAG877_1A					2		2		
–	Intermediate knotting and suturing techniques	AOSKMI814_1A		3		11			1	Basic Surgical Techniques	
–	Introduction to French for Medical Purposes I.	AOSNYE943_1A					2		2		
–	Introduction to French for Medical Purposes II.	AOSNYE943_2A					2		2		
–	Introduction to German for Medical Purposes I.	AOSNYE944_1A					2		2		
–	Introduction to German for Medical Purposes II.	AOSNYE944_2A					2		2		
–	Introduction to Italian for Medical Purposes I.	AOSNYE945_1A					2		2		
–	Introduction to Italian for Medical Purposes II.	AOSNYE945_2A					2		2		
–	Introduction to pharmacological research	AOSFRM1037_1A	2						2	Medical Biophysics II, Immunology	practical mark
3	Introduction to principles of students' scientific research	AOSSB1802_1A	1						2	Medical Chemistry, Medical Biophysics I, Macroscopic Anatomy and Embryology I	
–	Introduction to Russian for Medical Purposes I.	AOSNYE946_1A					2		2		
–	Introduction to Russian for Medical Purposes II.	AOSNYE946_2A					2		2		
–	Introduction to Spanish for Medical Purposes I.	AOSNYE947_1A					2		2		
–	Introduction to Spanish for Medical Purposes II.	AOSNYE947_2A					2		2		
6	Introduction to the clinical biostatistics	AOSFIZ872_1A		21		28			3	Medical Statistics, Informatics and Telemedicine	
2	Introduction to yoga	AOSANT986_1A	2						2	Macroscopic Anatomy and Embryology I	
–	Jewish Medical Ethics I.	AOSMAG139_1A	2						2		
2	Jewish Medical Ethics II.	AOSMAG139_2A	2						2	Jewish Medical Ethics I	
5	Medic Orchestra	SEFPKZOMZ_1	0		2				1		signature
2	Medical Humanities	AOSMAG818_1A					2		2		
2	Medical-biophysical aspect of radiological accidents	AOSFIZ1050_1A	2						2	Medical Biophysics I	
5	Mentoring programme	AOSMAG1041eIm		2		26			2	Medical Physiology II, Molecular Cell Biology II, Medical Psychology	
2	Methods in Molecular Biology	AOSMBT798_1A	1						1	Medical Chemistry	
2	Molecular Medicine Research	AOSMBT799_1A	1						1	Medical Biochemistry I	
–	Networks	AOSMBT796_1A	2						2		
5	Obstetrics genetics, prenatal diagnostics	AOSNO11052_1A	2		2				2	Medical Physiology II	
7	Occupational medicine	AOSNEI875_1A			0,5		1,5		2		
–	Practise Course for Instrumental Improvisation	AOSMAG1031_2A	1		1				2		

Semester	Course name	Neptun code	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination	prerequisite(s)	examination
2	Present and Future prospects in Medicine: Data-Driven Health and AI in Health Care	SEEMKJJGAEMI		14		14			2		practical examination
5	Semmelweis University Choir	SEPAKHTISEK_01	0		2				1		signature
4	Sleep and Chronobiology	AOSMAG868_1A	2						2	Microscopic Anatomy and Embryology II, Medical Physiology II, Medical Psychology	
–	Systems Neuroscience I. Systems Biology: Neuronal genomics and proteomics	AOSANT560_1A		25		3			2	Genetics and Genomics, Molecular Cell Biology II	practical mark
–	Systems Neuroscience II. Computational models in systems neuroscience	AOSANT560_2A		25		3			2	Medical Physiology II, Macroscopic Anatomy and Embryology II, Microscopic Anatomy and Embryology II	practical mark
–	Systems Neuroscience III. Neurodynamics: from single neurons to motifs	AOSANT560_3A		25		3			2	Medical Biophysics II, Medical Statistics, Informatics and Telemedicine, Medical Physiology II	practical mark
–	Systems Neuroscience IV. Neocortex: from structure to function	AOSANT560_4A		25		3			2	Medical Biophysics II, Medical Statistics, Informatics and Telemedicine	practical mark
–	Systems Neuroscience V. Learning and Navigation	AOSANT560_5A		25		3			2	Medical Biophysics II, Medical Statistics, Informatics and Telemedicine, Medical Physiology II	practical mark
–	Systems Neuroscience VI. Neural rhythms: normal and pathological. Brain imaging: from normal to pathological	AOSANT560_6A		25		3			2	Medical Biophysics II, Medical Statistics, Informatics and Telemedicine, Medical Physiology II	practical mark
–	Systems Neuroscience VII. Statistics of the brain	AOSANT560_7A		25		3			2	Medical Biophysics II, Medical Statistics, Informatics and Telemedicine, Medical Physiology II	practical mark
5	Teaching assistance (Demonstrator)								1	Macroscopic Anatomy and Embryology II	practical mark
–	The Scalpel and the Paragraph: Special Issues of Medical Practice in Light of the Law	AOVMAG1185_1A					2		2		
5	Traditional Chinese Medicine	AOSMMS174_1A	2						2	Macroscopic Anatomy II	
5	Work within the Union of Research Students (TDK)		1		0				1+		practical mark on a three-grade rating scale

ANATOMIC DISSECTION IN THE PRACTICE – optional course^e

Department of Anatomy, Histology and Embryology

Credit: 2

1×90 min practical course

Course prerequisites: Macroscopic Anatomy and Embryology II.

Held in both semesters.

Objectives of the subject, its place in the medical curriculum:

The technique of anatomical dissection dates back many centuries. Dissecting of fixed specimens gives students the opportunity to acquire practical knowledge that is essential, especially for those who are planning to choose manual field. Fine dissection of small structures requires extra time and appropriate infrastructural conditions. Our practical course creates this unique opportunity under the guidance of expert instructors. The specimens will get into the high quality demonstration specimen pool to be used in the education.

Successful completion of the subject results in the acquisition of the following competencies:

By completing the course, students will master the technique of fine anatomical dissection. Working with fine quality instrumental tools gives the opportunity to get to know better anatomical layers and structures in more details. This type of work gives a good base of knowledge what can be developed further in manual fields.

Detailed curriculum:

Practices:

1. Introduction. Handout of specimens. Removal of the skin.
2. Dissection of cutaneous nerves and superficial veins I. (demonstration and practice)
3. Dissection of cutaneous nerves and superficial veins II. (demonstration and practice)
4. Dissection of muscles I. (demonstration and practice)
5. Dissection of muscles II. (demonstration and practice)
6. Dissection of arteries and nerves I. (demonstration and practice)
7. Dissection of arteries and nerves II. (demonstration and practice)
8. Dissection of the viscera I. (demonstration and practice)
9. Dissection of the viscera II. (demonstration and practice)
10. Working with bone I. (demonstration and practice)
11. Working with bone II. (demonstration and practice)
12. Dissection of the brain I. (demonstration and practice)
13. Dissection of the brain II. (demonstration and practice)
14. Exam and demonstration of the dissected specimens.

Teachers (depending on the number of the registered students):

Dr. Alán Alpár professor – professional tutor

Dr. Tamás Ruttkay senior lecturer – lecturer, practice leader

Dr. Bálint Fábián assistant lecturer – practice leader

Special study work required to successfully complete the course:

Anatomical dissection on the practices. There is no midterm-check.

Requirements for participation in classes and the possibility to make up for absences:

Participation in the practices is verified by signing an attendance sheet. Absence up to 25% of the classes is allowed within a semester. Due to the nature of the course, it is not possible to make up for absences.

Methods to assess knowledge acquisition during term time:

There is no mid-term check. Requirements for signature: Attendance at least 75% of the classes.

Type of examination:

The semester ends with a practical exam, during which the student presents and hands over the specimen dissected by him/her to the practice leader.

Requirements of the examination:

During the last practice of the semester, the student summarizes the topic of the dissected specimen and displays it. The practice leader evaluates the semester preparatory work based on the criteria detailed below.

Method and type of evaluation:

The finished specimen is evaluated according to the following criteria:

1. The degree of preparation of the topic recorded at the beginning of the course.
2. Quality of the prepared anatomical structures.
3. Presentation of the specimen in a practical exam (theoretical, regional anatomical presentation).

The student's knowledge will be evaluated using a scale of 1 to 5 mark.

Possibilities for exam retake:

It is not possible to replace an unfinished specimen. In case of justified absence from the practical exam, the presentation of the dissected specimen and the formation of the grade will take place at an additional time.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

T. Tömböl: Regional Anatomy. Medicina, Budapest, 2008.

CARDIOPULMONARY CLINICAL PHYSIOLOGY AND REHABILITATION - PRACTICAL ASPECTS

Department of Pulmonology

Tömő str. 25-29., Budapest, Hungary 1083

Course coordinator name: Prof. Dr. Varga János Tamás

E-mail: varga.janos.tamas@semmelweis.hu

T.: +36-20-808-1088

Credit: 2

1x per week for 7 weeks

Exam: test

Lecture (14 hours):

- Rehabilitation of Interstitial Lung Patients
- Exercise training for athletes
- Cardiopulmonary exercise testing
- Pathophysiology of the pulmonary circulation and therapeutic options for pulmonary hypertension
- Cardiac comorbidities associated with chronic lung disease in cardiopulmonary rehabilitation.
- Rehabilitation of heart failure
- Effects of respiratory pathological processes on respiratory technique and circulatory physiology

Practice (14 hours):

- Chest physiotherapy and training techniques for the rehabilitation of interstitial lung diseases
- Exercise training for athletes, airway provocation tests
- Walking tests to measure maximal exercise capacity, cardiopulmonary exercise testing, activity monitoring, assessment methods
- used in cardiopulmonary rehabilitation
- Characterisation of the physiological and pathophysiological processes of the circulation of the small blood vessels.
- Evaluation and therapy of cardiac comorbidities associated with chronic lung diseases during cardiopulmonary rehabilitation
- Training programmes for heart failure
- Application of specific training programmes in pathological respiratory mechanics condition

Prof. Dr. János Tamás Varga, Prof. Dr. Veronika Müller, Dr. Györgyi Csósza, Dr. Zsuzsanna Jáky-Kováts, Dr. Kristóf Karlócai, Dr. Zsombor Matics, Dr. Erik Palmer, Dr. Zsolt Rozgonyi, Dr. Attila Simon, Ádám Géczi, Gergő Szűcs,

CLINICAL CARDIOVASCULAR PHYSIOLOGY

Institute of Translational Medicine

Credit value: 2

Number of lessons per week: lecture: 2 seminar: 2

Subject type: optional course

Academic year: 2021/2022

Name of the course leader: Dr. Zoltán Benyó

Position: professor, head of department

Objectives of the subject, its place in the medical curriculum:

To refresh and extend – in selected topics – the basic knowledge related to normal and pathological functions of the human circulatory system.

To integrate the latest scientific results related to different organization levels – from molecular mechanisms to system physiology – of the cardiovascular system.

To discuss and demonstrate measurement principles and techniques, as well as physiological and pathophysiological mechanisms related to the application of state of the art non-invasive cardiovascular diagnostic procedures in the clinical practice.

Researchers as well as skilled clinical practitioners have also been included among the lecturers to provide a translational point of view and help the transition of the students' theoretical knowledge to modern clinical cardiovascular medicine.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Centre of Theoretical Medicine

Successful completion of the subject results in the acquisition of the following competencies:

After completion of the subject, students will deepen their knowledge of the physiology and pathophysiology of the cardiovascular system, better understand the pathological processes that occur during the most common cardiovascular diseases and the potential therapeutic options. Completion of the course thus helps and establishes the acquisition of cardiovascular pharmacology, cardiology-angiology and cardiovascular surgery with sufficient detail.

Course prerequisites:

Completion of Physiology II.

Number of students required for the course (minimum, maximum) and method of selecting students:

Min: 5 students

Max: 80 students (in case of more applicants, the first 80)

How to apply for the course:

In the Neptune system.

Detailed curriculum:

- Hemodynamic background of normal and pathological cardiovascular functions; "hemodynamic exercise" and prevention of diseases (Dr. Anna Monori-Kiss)
- Modern methods for measuring and monitoring arterial blood pressure (Dr. Ákos Jobbágy), Cardiovascular effects of hypersensitivity reactions (CARPA) (Dr. László Dézsi)
- Biomechanical properties of cerebral aneurysms, their computer modeling (Dr. István Nyáry, Dr. Róbert Nagy)
- Physiological mechanisms supporting venous return of blood; orthostatic tolerance, Pathophysiology of chronic venous insufficiency (Dr. Anna Monori-Kiss)
- Investigation of blood pressure regulation by use of transgenic technologies (Dr. Zoltán Benyó)
- Cardiovascular implications of the healthy and the diseased kidney (Dr. Péter Hamar)
- Age related changes in the vascular system, role of sexual hormones. Interventional radiological procedures on arteries and veins (Dr. György Nádasy, Dr. Viktor Bérczi)
- Ultrasonic investigation of the human heart: theoretical background; 2D-, M-, Doppler-mode, color Doppler imaging, echocardiography; diagnostics of valve insufficiency and coronary diseases. Duplex ultrasonic investigation of large vessel function: measurement of vessel wall elasticity, Doppler-indexes (Dr. Domonkos Cseh, Dr. Adrienn Sárközi)
- Coronary circulation. Physiological background of the treatment of myocardial ischemia (Dr. Tamás Ivanics, Dr. Gergely Szabó)

- The cardiovascular risk and the protection of menopausal women. Alterations of the cardiovascular system in pregnancy and polycystic ovary syndrome (Dr. Gabriella Masszi, Dr. Szabolcs Várbíró)
- Role of endothelial mechanisms in clinical symptoms (Dr. Zsolt Pécsvárad)
- Visit to the MRI Cardiovascular Diagnostic Unit of the Semmelweis University Heart Center (Dr. Attila Tóth)
- Vascular cognitive impairment (Dr. Zoltán Ungvári)
- Written examination

(Guest lecturers are underlined)

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

- Cardiology
- Medical Imaging
- Obstetrics and Gynecology
- Vascular Medicine
- Pathophysiology

Requirements for participation in classes and the possibility to make up for absences:

It is obligatory to attend the seminars. Students are not allowed to miss more than 3 seminars (6 lessons), otherwise the semester cannot be accepted.

Methods to assess knowledge acquisition during term time:

Theoretical knowledge will be assessed by a written test on the 14th week.

Requirements for signature:

Regular attendance (max. 3 missed seminars) of classes and successful written exam. No more than three absences from seminars are allowed; otherwise the course will not be credited.

Type of examination:

The semester performance is assessed by the result of the written test (10-15 questions based on the material of the seminars) on the 14th week.

Requirements of the examination:

The question pool for the written test is available for the registered students. The question pool contains 2 short assay-type questions and 5-10 multiple choice questions per seminar.

Method and type of evaluation:

The grade is based on the result of the test written on the 14th week. The written test will be evaluated as follows:

- 90-100% – honor (5)
- 80 – 89 % – good (4)
- 70 – 79 % – fair (3)
- 51 – 69% – pass (2)
- < 51% – fail (1)

How to register for the examination:

There is no exam in the exam period.

The exam is organized on the last seminar of the semester.

Possibilities for exam retake:

For students who cannot attend the exam for reasonable excuses, we provide extra occasions to make up for the practical exam.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Guyton and Hall Textbook of Medical Physiology 13th edition (Elsevier, 2015)

Emil Monos: Hemodynamics, biomechanics of the blood circulation, Second edition, Semmelweis Kiadó, 2011.

Emil Monos: Physiology of the venous system, Second edition, Semmelweis Kiadó, 2010

Material of the lectures and supplementing literature provided by the lecturers.

CLINICAL PHYSIOLOGY OF RESPIRATION AND RESPIRATORY DISEASES

Optional course for medical students in the 3rd, 4th and 5th years.

The aims of the course are to strengthen knowledge on basic physiological principles related to respiration, summarize the most important aspects of cardiorespiratory adaptation in sport activities and also its changes in respiratory diseases and to provide integrated information about the physiological and pathophysiological background of the most important respiratory disorders in light of results from cutting edge research.

Program:

1. COVID-19 from the frontline
2. COVID-19 outcome stats
3. Personalized medicine in lung cancer
4. Asthma
5. Bronchiectasis, COPD.

6. Obstructive sleep apnoea
7. Hypoventilation syndromes
8. Translational research, biomarkers, drug development, machine learning
9. Cystic fibrosis-case presentation
10. Pneumonia
11. Invasive ventilation and intensive care, ECMO, particular aspects of COVID-19
12. Chest imaging I - Screening
13. Chest imaging II- Lung Fibrosis-COVID score, Ultrasound
14. Exam

Acknowledgement of the course: regular attendance (maximum 3 absences) is required; signature in the Neptun, and 2 credit points will be provided after a successful written exam.

CARDIORESPIRATORIC AND NEUROPHYSIOLOGICAL MEASURING METHODS

Institute of Translational Medicine

Subject type: optional

Credit value: 2

Name of the course leaders:

Prof. Dr. Zoltán Benyó, Department Head,

Dr. Habil. László Dézsi, Research Associate Professor, Course Director, Semmelweis University

(Invited Lecturers: Dr. Iván Fűzes, Dipl. Electrical Engineer, Master Teacher, Semmelweis University

Prof. Dr. Ákos Jobbágy, Professor Emeritus in Electrical Engineering, Budapest University of Technology and Economics,

Dr. György L. Nádasy, Associate Professor, Semmelweis University)

Academic year: 2021/2022/1st semester

Objectives of the subject, its place in the medical curriculum:

The purpose of the course: To review the theory and practice of modern measuring methods in experimental and clinical medicine, and providing practical knowledge to medical and pharmacy students on cardiorespiratory and neurophysiological measurements. The course based on and further extends the material of the course of Medical physiology. Throughout the lectures, we put an emphasis on potential methodological errors of measurements and examinations, discussing how to avoid them.

Successful completion of the subject results in the acquisition of the following competencies:

The course offers practical knowledge to medical and pharmacy students on cardiovascular, respiratory and neurophysiological measurements based on, but further extending the course material of Medical physiology. Involving engineers into teaching, students receive real technological knowledge on a basic level. Throughout the lectures we put an emphasis on potential methodological errors of measurements and examinations, discussing how to avoid them, and so we utilize a critical approach.

Detailed curriculum:

Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks).

1. Introduction. Biomedical engineering. Design and safety requirements of biomedical equipment
2. General metrology. Basics of measurement and control theory
3. Computerized data acquisition and analysis. Telemetry systems
4. Sampling of continuous signals. Digitizing analogue signals
5. Home monitoring of cardiovascular health status. Determination of blood glucose and tissue glucose concentrations
6. Experimental study of pulmonary function. Measurements of blood gases and the acid-base balance
7. Investigating the electrical activity of the heart. Design of ECG amplifiers
8. Direct and indirect methods to determine cardiac output and peripheral blood flow
9. Neurophysiological measurements (action potentials, brain stem evoked potentials). Objective studies in audiology
10. Adaptive processes in the cardiovascular system. Investigative methods in experimental angiology
11. Measuring blood pressure in the lab and clinics (invasive and noninvasive methods)
12. Complement-related immunological and cardiopulmonary responses (CARPA)

13. Studying brain function by functional imaging systems. The linear CT method

14. Experimental methods to study pain and nociception

Requirements for participation in classes and the possibility to make up for absences:

Regular attendance is required, which will be registered. In case of absence make up of material is possible based on lecture sketches.

Methods of verification of absence from classes or the exam:

Absence can be verified by medical notice only.

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results) From the course material, no midterms are written.

Requirements for signature:

Signature will be awarded upon regular attendance of the lectures.

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)

Marks are based upon the result of the written exam. Students will be graded on a 5-grade-scale:

0-49 % - 1, 50-64 % - 2, 65-79% - 3, 80-89% - 4, 90-100% - 5.

Type of examination:

Written exam + 2 re-takes

How to register for the examination:

Personal registration by the Course Director.

How to modify the registration for the examination:

Personal notice by the Course Director.

Possibilities for exam retake:

Upon obstacles (medical notice, or parallel exam) or failure of the exam, two re-takes are possible.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

1. A.C. Guyton: Textbook of Medical Physiology W.B. Saunders Company, 2006
2. Fonyó Attila: Principles of Medical Physiology, Medicina Kiadó, 2002
in Hungarian https://regi.tankonyvtar.hu/hu/tartalom/tamop425/2011_0001_524_Elettan/index.html
3. Lecture sketches of course tutors <https://drive.google.com/drive/folders/0B5lj4aPM88ChLU9mR0xobkpOcJg>
3. Bronzino, D. Joseph The Biomedical Engineering Handbook, 3rd Ed, CRC Taylor & Francis, 2006
https://brainmaster.com/software/pubs/brain/The_Biomedical_Engineering_Handbook_.pdf

INTRODUCTION TO THE METHODOLOGY OF CLINICAL RESEARCH I.

Observational studies

Number of lessons per week: 2 **lecture:** – **practical course:** 2×45 min for 3 weeks **seminar:** 2×45 min for 11 weeks

Subject type: optional course

Academic year: 2021/2022

Name of the course leader: Dr. Zoltán Benyó

Institute of Translational Medicine, (+36-1) 210-0306

Position: professor, head of department

Goals of the course:

Nowadays most physicians will inevitably be involved in clinical research during their careers. Many of them will participate actively in clinical research programs, while others will get in contact with clinical studies via the literature or by interpreting new clinical guidelines. Therefore, at the time of graduation physicians of the 21st century must possess skills which enable them to join research programs and critically interpret scientific evidence. The ultimate goal of the course is to prepare future doctors for these challenges by offering a curriculum which helps to acquire these skills during the academic years of their gradual studies.

The course aims to give a comprehensive insight into the methodology of clinical research. The broad spectrum of methodological approaches will be presented in 2 separate courses built on each other. The course „Introduction to the Methodology of Clinical Research I.” will focus on observational studies. Accordingly, the course will: describe the types of observational studies and the pros and cons of their application

give a deep insight to clinical epidemiology

and to the ethical and legal concepts related to the planning and conduct of these studies;

describe basic concepts of biomarker and genomic research introduce the background of the application of screening tests.

Beyond these, the course will introduce the students (without showing mathematical formulae) the statistical approaches which are closely related to the analyses of observational studies:

Within the frame of seminars, we will discuss basic biostatistical terms and principles,

and the steps of basic regression model building.

Moreover, the practicums of the course will provide opportunity to apply the knowledge acquired on seminars to real-life situations. On these labs we aim to perform 2 types of practical tasks in small student groups:

Performing simple statistical analyses on simulated patient datasets using a comprehensive statistical software package under the guidance of the tutor.

Problem-based discussion of pre-released publications, critical interpretation of the published research.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Seminar: Semmelweis University, EOK, Tűzoltó street 37-47. Hári Pál auditorium

Practicum: Semmelweis University, EOK, Tűzoltó street 37-47. Department of Biophysics and Radiation Biology

Successful completion of the subject results in the acquisition of the following competencies:

After successful completion of the subject the students:

- will be able to join research projects based on observational studies (even as an undergraduate student!),
- will be able to critically comprehend scientific literature related to observational studies,
- will understand the basic aspects of study design and analysis related to observational studies
- will understand the limitations and factors influencing the validity of observational studies,
- will understand the ethical and legal aspects of observational studies,
- will have basic knowledge about the statistical methodology used to properly plan and analyse observational studies

Number of students required for the course (minimum, maximum) and method of selecting students:

Minimum number students: 5

Maximum number students: 60 (the first 60 applicants can attend the course)

How to apply for the course:

Application occurs via the Neptun system

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the seminars and practical lessons and indicate guest lecturers. Do not use attachments!

Always attach a CV for guest lecturers!)

1st week: Types of observational studies (Dr. Monori-Kiss Anna, Institute of Translational Medicine)

- Comparison of observational and experimental studies; types of observational studies, pros and cons of their application (case reports, ecological studies, cross-sectional studies, cohort studies, case-control studies)

2nd week: Introduction to biostatistics I. (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Types of variables, description of variables (mean, median, percentile, IQR); types of distribution, population vs. sample, sampling procedures, estimating the population mean, confidence intervals

3rd week: Introduction to biostatistics II. (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Power, sample size; hypothesis testing; parametric vs. non-parametric probes; revision of known biostatistical tests (t-test, ANOVA, their non-parametric counterparts; Chi square test)

4th week: Workshop seminar to introduce the biostatistical analysis software package (STATA) (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Interactive presentation of the most important commands and menu points

5th week: Introduction to epidemiology (Dr. Miklós Zsuzsanna, Institute of Translational Medicine)

- The aim of clinical epidemiology; outcome measures (ratio, odds, incidence, prevalence, incidence-ratio); parameters describing the association between outcome measures and intervention/exposition/risk factors (RR, OR, RR, RD); threats to validity and strategies to handle them (confounding, bias, chance etc.)

6th week: PRACTICUM I. (Dr. Miklós Zsuzsanna, Institute of Translational Medicine)

- Clinical epidemiology. Finding an epidemiology related research question based on a simulated patient dataset and answering the question by performing statistical analysis using STATA statistical software package.

7th week: Ethical and legal aspects of observational studies. (Dr. Szentmártoni Gyöngyvér, Department of Internal Medicine and Oncology)

8th week: Applied regression I. (Dr. Ferenci Tamás, biostatistician, invited lecturer)

- Basic concepts, linear regression

9th week: Applied regression II. (Dr. Ferenci Tamás, biostatistician, invited lecturer)

- Multivariate linear regression, steps of model building

10th week: Applied regression III. (Dr. András Ittész, biostatistician, invited lecturer)

- Logistic regression

11th week: PRACTICUM II. (Dr. Monori-Kiss Anna, Institute of Translational Medicine; Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Steps of multivariate regression model building. The students will build regression models on a simulated patient dataset using STATA statistical analysis software package. They experience how the inclusion of different variables/confounders can affect results and data interpretation.

12th week: PRACTICUM III. (Dr. Szentmártoni Gyöngyvér, Department of Internal Medicine and Oncology)

- Critical interpretation and discussion of a pre-released publication (original article)

13th week: Biomarker research, genomics. (Dr. Tóthfalusi László, Department of Pharmacodynamics) Screening tests. (Dr. Terebessy András, Institute of Preventive Medicine and Public Health)

14th week: Test exam.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

Medical statistics, informatics and telemedicine (basic terms in biostatistics – partial overlap)

Medical ethics, bioethics (7th week seminar – partial overlap)

Special study work required to successfully complete the course: (E.g. field exercises, medical case analysis, test preparation, etc.)

Requirements for participation in classes and the possibility to make up for absences:

Students are required to participate on 70 % of the seminars and on all practices.

We offer several occasions during the semester to make up for the missed practices.

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

Students must arrive well-prepared for the practices. Completion of the prespecified tasks will be checked by the practice tutors.

We will provide opportunities to make up for the missed practices several times during the semester.

Requirements for signature:

Students are required to participate on 70 % of the seminars and on all practices.

Type of examination:

Practical exam in the form of a written test at the end of the semester

Requirements of the examination:

(In case of a theoretical examination, please provide the topic list; in case of a practical exam, specify the topics and the method of the exam)

Written practical exam test taken via the e-learning site (Moodle) of the university.

Students are eligible to take the exam if they have obtained the signature.

The written test will be compiled from problem-oriented multiple choice questions which are based on the on-line available seminar material (digests, slide shows, scripts) and the practical knowledge acquired on lab practices. We will provide sample test questions during the semester.

The test will be graded as follows:

90-100% – (5)

80 – 89 % – (4)

70 – 79 % – (3)

60 – 69% – (2)

< 60 % – (1)

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)

The final mark will be a 5-grade practical mark obtained on the practical exam test organized in the last week of the semester.

How to register for the examination?:

There is no exam in the exam period.

The practical exam is organized on the last seminar of the semester.

Possibilities for exam retake:

For students who cannot attend the practical exam for reasonable excuses, we provide extra occasions to make up for the practical exam.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Obligatory:

1. On-line uploaded material (digests, practicum descriptions, scripts, slide shows).

Recommended:

1. Bernard Rosner. Fundamentals of Biostatistics. Cengage Learning Inc. (2010)
2. Kenneth J. Rothman Epidemiology - An Introduction. Oxford (2012)

INTRODUCTION TO THE METHODOLOGY OF CLINICAL RESEARCH II.

– Experimental studies

Credit value: 2

Number of lessons per week: 2 **lecture:** – **practical course:** 2 × 45 min for 3 weeks **seminar:** 2 × 45 min for 11 weeks

Subject type: optional course

Academic year: 2024/2025

Name of the course leader: Dr. Zoltán Benyó

Goals of the course:

Nowadays most physicians will inevitably be involved in clinical research during their careers. Many of them will participate actively in clinical research programs, while others will get in contact with clinical studies via the literature or by interpreting new clinical guidelines. Therefore, at the time of graduation physicians of the 21st century must possess skills which enable them to join research programs and critically interpret scientific evidence. The ultimate goal of the course is to prepare future doctors for these challenges by offering a curriculum which helps to acquire these skills during the academic years of their gradual studies.

The course aims to give a comprehensive insight into the methodology of clinical research. The broad spectrum of methodological approaches will be presented in 2 separate courses built on each other.

The course „**Introduction to the Methodology of Clinical Research II.**” will focus on experimental studies. Accordingly, the course will:

- describe the types of experimental studies and the pros and cons of their application;
- discuss the scientific, statistical and economic aspects of experimental study designs;
- discuss the ethical and legal concepts related to the planning and conduct of these studies;
- emphasize the role of clinical trials in the introduction of new therapies to clinical practice and
- give introduction to the background of the application of methodologies related to clinical trials (questionnaires, systematic review, metaanalysis).

Beyond these, the course will introduce the students (without showing mathematical formulae) the statistical approaches which are closely related to the analyses of experimental studies:

- We will emphasize the utilization of basic biostatistical terms and principles we learnt on the first course in clinical trials
- and discuss the principles of survival analysis and analysis of longitudinal studies.

Moreover, the practicums of the course will provide opportunity to apply the knowledge acquired on seminars to real-life situations. On these labs we aim to perform 2 types of practical tasks in small student groups:

- Performing simple statistical analyses on simulated patient datasets using a comprehensive statistical software package under the guidance of the tutor.

Problem-based discussion of informed consent forms and critical interpretation of published research.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Seminar: Semmelweis University, EOK, Tűzoltó street 37-47. Hári Pál auditorium

Practicum: Semmelweis University, EOK, Tűzoltó street 37-47. Department of Biophysics and Radiation Biology

Successful completion of the subject results in the acquisition of the following competencies:

After successful completion of the subject the students:

- will be able to join research projects based on experimental studies (**even as an undergraduate student!**),
- will be able to critically comprehend scientific literature related to experimental studies,
- will understand the basic aspects of study design and analysis related to experimental studies
- will understand the limitations and factors influencing the validity of experimental studies,

- will understand the ethical and legal aspects of experimental studies,
- will have basic knowledge about the statistical methodology used to properly plan and analyse experimental studies
- will be able to perform simple survival analyses and will understand the problematics of correlated outcomes

Course prerequisites:

Successful completion of Introduction to the Methodology of Clinical Research I. – Observational studies (AOVKIK553_1A)

Number of students required for the course (minimum, maximum) and method of selecting students:

Minimum number students: 5

Maximum number students: 60 (the first 60 applicants can attend the course)

How to apply for the course:

Application occurs via the Neptun system

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments! Always attach a CV for guest lecturers!)

1st week: Experimental studies (Dr. Miklós Zsuzsanna, Institute of Translational Medicine)

- comparison of observational and experimental studies; types of experimental studies, pros and cons of their application, the methods of randomization

2nd week: Ethical aspects of clinical trials. (Dr. Szentmártoni Gyöngyvér, Department of Internal Medicine and Oncology)

- ethical issues, ethical approval, the informed consent

3rd week: Issues related to study design and implementation. (Dr. Szentmártoni Gyöngyvér, Department of Internal Medicine and Oncology, Dr. Monori-Kiss Anna, Institute of Translational Medicine)

- elements and importance of the research protocol, factors influencing the study design

4th week: PRACTICUM I. (Dr. Szentmártoni Gyöngyvér, Department of Internal Medicine and Oncology)

- critical interpretation of the informed consent process using sample forms

5th week: Correlated outcomes I. (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- The problematics of correlated outcomes, characteristics of longitudinal data

6th week: Correlated outcomes II. (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Analysis of correlated outcomes with LME models

7th week: PRACTICUM II. (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Analysis of simulated longitudinal datasets with correlated outcomes using STATA statistical software package.

8th week: Survival analysis. (Dr. Veres Dániel, Department of Biophysics and Radiation Biology)

- Clinical application of survival analysis. Statistical methods related to survival analysis (log rank test, hazard ratios, Cox regression)

9th week: PRACTICUM III. (Dr. Miklós Zsuzsanna, Institute of Translational Medicine)

- Construction of Kaplan-Meier survival curves, log rank analysis and Cox regression analysis on simulated patient datasets using Stata statistical software package

10th week: Supplementary methodologies. Big data (Dr. Monori-Kiss Anna, Institute of Translational Medicine)

- How to make a perfect questionnaire. The features and analysis of Big Data.

11th week: The clinical phase of drug development (Dr. Tóthfalusi László, Department of Pharmacodynamics)

- Phase I-IV studies. Aims, methods, implementation.

12th week: Economic exploitation of scientific results. (Dr. Lacza Zsombor, Institute of Translational Medicine)

- patents, introduction to the market

13th week: From data to evidence. (Dr. Ferenci Tamás, biostatistician, invited lecturer)

- metaanalysis, systemic review

14th week: Test exam.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

Introduction to the Methodology of Clinical Research I. – Observational studies (prerequisite – some basic concepts are revised)

Medical statistics, informatics and telemedicine (basic terms in biostatistics – partial overlap)

Medical ethics, bioethics (7th week seminar – partial overlap)

Special study work required to successfully complete the course: (E.g. field exercises, medical case analysis, test preparation, etc.)

Requirements for participation in classes and the possibility to make up for absences:

Students are required to participate on 70 % of the seminars and on all practices.

We offer several occasions during the semester to make up for the missed practices.

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

Students must arrive well-prepared for the practices. Completion of the prespecified tasks will be checked by the practice tutors.

We will provide opportunities to make up for the missed practices several times during the semester

Requirements for signature:

Students are required to participate on 70 % of the seminars and on all practices.

Type of examination:

Practical exam in the form of a written test at the end of the semester

Written practical exam test taken via the e-learning site (Moodle) of the university.

Students are eligible to take the exam if they have obtained the signature.

The written test will be compiled from problem-oriented multiple choice questions which are based on the on-line available seminar material (seminar digests, slide shows, scripts) and the practical knowledge acquired on lab practices. We will provide sample test questions during the semester.

The test will be graded as follows:

90-100% - (5)

80 – 89 % - (4)

70 – 79 % - (3)

60 – 69% - (2)

< 60 % - (1)

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)

The final mark will be a 5-grade practical mark obtained on the practical exam test organized in the last week of the semester.

How to register for the examination?:

There is no exam in the exam period.

The practical exam is organized on the last seminar of the semester.

Possibilities for exam retake:

For students who cannot attend the practical exam for reasonable excuses, we provide extra occasions to make up for the practical exam.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Obligatory:

1. On-line uploaded material (seminar digests, practicum descriptions, scripts, slide shows).

Recommended:

1. Bernard Rosner. Fundamentals of Biostatistics. Cengage Learning Inc. (2010)
2. Kenneth J. Rothman Epidemiology - An Introduction. Oxford (2012)

CLIMATE CHANGE AND HEALTH IN SOCIOLOGICAL PERSPECTIVES

Institute of Behavioural Sciences

Lecturer: László Antal Z.

Credit: 2

Thematics:

- 1. week: The history of climate change science
- 2. week: Climate change and society, sociological perspectives
- 3. week: Animal and plant health impacts of climate change
- 4. week: Human health impacts of climate change

- 5. week: Consumer society and environmental boundaries
- 6. week: Demographic processes and environmental boundaries
- 7. week: Climate change and health care
- 8. week: Adaptation to climate change
- 9. week: Adaptation to heat waves and to UV radiation
- 10. week: Adaptation to climate change at local level
- 11. week: Civil society, social movement and climate change
- 12. week: Climate communication
- 13. week: Climate change and the social values

ULTRASONOGRAPHY IN OBSTETRICS AND GYNECOLOGY

(obligatory optional course – 6th semester)

Course director: Prof. Dr. János Rigó

Lecturer: Dr. Gábor Szabó PhD

Department: First Department of Obstetrics and Gynecology

Study time: In every second week 2×45 minutes. Advised Semester: between 6. und 12. Semester

Exam: Oral exam

Credit: 1

Minimal/maximal participants: (1/5 person)

Application deadline: 1. December

Prerequisite: Completion of second year

The knowledge gained in theoretical basic subjects (anatomy, physiology) can be used by medical students as practical knowledge in the clinic. As a result of more than four decades of experience, ultrasound examination has a fundamental role in modern obstetrical and gynecological diagnostic. The course helps you to acquire skill in this field. Performing obstetrical-gynecological ultrasound tests and assessment of findings can only be learned through appropriate training. This non-invasive procedure is also safe for patients. The modern ultrasound equipment of the Department and the wide range of patients and diseases provide the opportunity for learning. Not only obstetricians and gynecologists, but also other associate colleagues such as clinical genetics, radiologists, gynecological cancer surgeons, anesthetists, and intensive therapists can utilize the knowledge provided by the subject.

Themes:

Physical basics of ultrasound examination. Parts of the ultrasound device. Application modes (amplitude, motion, brightness, Doppler). Gynecological ultrasound examination. Early pregnancy tests. Ectopic pregnancy. Standard planes of the first ultrasound screening during the 11-13th week of pregnancy. Neurosonography and fetal echocardiography. Standard planes of the second ultrasound screening during the 18-22th week of pregnancy. Ultrasound examinations in the third trimester. Amniotic fluid index and fetal Doppler examinations. 3-4-dimensional ultrasound examinations and their practical application.

THE SCALPEL AND THE PARAGRAPH: SPECIAL ISSUES OF MEDICAL PRACTICE IN LIGHT OF THE LAW

optional subject

Lecturer: Prof. Dr. József Kovács

Department of Behavioural Sciences

1st semester

2 hours / week

Within the framework of the course the participants, who have an affinity for Bioethics and Law, will gain insight into the special characteristics of the legal domain and certain fundamental legal concepts and methods that are relevant for a practicing physician, but cannot be sufficiently investigated into within the framework of other obligatory courses. The course considers the general part of medical law governing the legal relationship between medical practitioners and their patients, first by distinguishing between civil law and criminal law and explaining their respective characteristics. The legal position, the customary rights and obligations of physicians and patients are examined, together with the issues of informed consent. Topics will also include the civil and criminal liability of physicians and the issue of malpractice. Selected medico-legal issues over human life are also examined; these will include foetal rights, modern reproductive technologies, various aspects of human genetic research, and certain end-of-life issues such as advance directives and euthanasia. The foregoing topics will be discussed from the perspective of comparative law, by presenting various court cases from the countries of the European Union and the United States of America as well. Attending students will gain the ability to recognise and analyse legal health care issues by engaging in interactive discussions and informative research.

Attending students will gain insight into the special characteristics of the legal way of thinking, the basic concepts of civil and criminal law, and also the approach to the most controversial medico-legal issues in the European Union and the United States.

Students intending to practice in any field of medicine may find the course profitable.

Minimum number of participants: 10

Maximum number of participants: 20; applications are accepted through the „Neptun” system.

Students are to register through the „Neptun” system. No special achievement/prior completion of other course(s) is required.

Thematics:

1. Introduction: Aims and objectives of the course; presentation of the interdisciplinary method (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).
2. The concept of „law”; the branches of law particularly relevant for medical practice (civil/private law; criminal law) (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).
3. The human being and the law. Legal personhood and capacity to act. Man as a subject to fundamental human rights. (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).
4. The parties to a medical legal relationship: doctor and patient. The legal position of the physician and the patient; their principal rights and obligations in the various legal systems (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).
5. Creating a doctor-patient relationship: informed consent in the member countries of the European Union and in the USA (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).
6. Various legal models of the doctor-patient relationship (mandate agreement, service agreement, treatment agreement etc.) (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).

7. The physician and civil liability: malpractice/liability for damages in the member countries of the European Union and in the USA (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).
8. The physician and criminal liability: specific criminal offences that can be committed by a physician/health care specialist (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).
9. The beginnings of human life and the law: legal position of the human foetus in the various legal systems (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).
10. The beginnings of human life and the law: surrogacy and the legal issues generated by the recent developments in assisted human reproduction in Europe and in the world (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).
11. The issues of medical research on humans: the framework set up by law (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).
12. End-of-life decisions and the law: the “living will” and other forms of advance directives in the various legal systems; the refusal of lifesaving treatments (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).
13. End-of-life decisions and the law: euthanasia in the member countries of the European Union and in the USA (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).
14. Review of the semester; suggestions, observations and proposals (instructor: dr.iur. Orsolya Marta Peter PhD, Lecturer).

Participants will meet weekly (2 hours/week) as a discussion/seminary group.

Participating students are required to prepare and hold an oral presentation (15-20 mins) about a preferred medical legal issue, to be previously approved by the instructor. A suitable schedule for such presentations will be worked out together with the students.

Students are required to attend at least 75% of the meetings; a maximum of 4 (four) absences is acceptable. Attendance will be verified at the beginning of each meeting. In the event of more than 4 (four) absences an additional oral presentation or an essay will be required, provided such excessive absence is unjustified.

No medical certificate/other proof is required up to the maximum number (4) of excused absences. In the event of more than 4 (four) absences an authentic proof of justifiable absence is accepted.

„Aláírás” (the instructor’s „signature” indicating the fulfilment of the term requirements) will be granted as follows:

1. Preparation and actual holding of an oral presentation.
2. Proper attendance (max. 4 absences; proper justification or additional work in the event of more than 4 absences)

The performance of participating students will be graded as follows:

1. Excellent (5): less than four absences; active and constructive participation in group discussions; an oral presentation of outstanding quality.
2. Satisfactory (3): regular attendance; an oral presentation of good quality.
3. Insufficient (1): more than four absences without proper justification; no presentation or presentation of an inferior quality.

Participants will be given a „gyakorlati jegy” (term mark) at the end of the semester; no further examination is required.

Recommended reading materials:

Kuhse – Singer: A Companion to Bioethics, 2nd Edition (Wiley-Blackwell)

Kuhse – Singer: Bioethics. An Anthology, 2nd Edition (Blackwell)

See also the extensive bibliography in Kuhse-Singer

ANTIBIOTIC THERAPY AND INFECTOLOGY

Held in both semesters.

Lectures: 2 hours/week

Credits: 2

Exam type: multiple choice test

Participation: min. 70% is obligatory

Obligatory elective subject for medical students already trained in microbiology, pharmacology and basic clinical subjects.

The subject gives an overview on the basic principles and practice of antimicrobial therapy. The antibiotics represent one of the most important classes of drugs that are prescribed practically in all branches of clinical medicine. It seems easy to use them and that is why we abuse them. Discussing the most important clinical features of the frequent infections, the subject shows the optimal approach to patients with infectious diseases and antimicrobial treatment.

The first two lessons discuss the specific features of antimicrobial therapy, the basic principles of empiric treatment and the pharmacokinetic/pharmacodynamic concept that substantiates the application of antimicrobials in term of choice, dosage and combination. The following seven lectures deal with the specific features of the most important infections, such as respiratory tract infections, urinary tract and intraabdominal infections, endocarditis, meningitis, sepsis. Obviously, the lecturers bring into focus the considerations concerning antibiotic therapy. In the second half of the course, some of the nosocomial infections, infections of immunocompromised hosts and zoonoses are discussed, followed by the problems of antibiotic prophylaxis and antibiotic policy.

The course is organized only in the first semester

Course director: Prof. Dr. Endre Ludwig.

The venue of course: *Szent László Hospital*

1097 Budapest, Gyáli út 5-7. Building N. 19 Lecture Room

Textbooks:

1. E. Ludwig: Antibiotic therapy, Medintel, Budapest, 2003.
2. A. Szalka, L. Tímár, E. Ludwig, Zs. Mészner: Infectology, Medicina, Budapest, 2005.
3. Reese and Betts: A practical approach to infectious diseases. Lippincott Williams and Wilkins 2003.
4. Material of the lectures online availability

Lectures:

- Basic principles of antimicrobial therapy. Microbiological diagnosis, as the basis of antimicrobial therapy. The concept of "drug of choice"
- Diagnosis of infectious diseases: clinical relevance of the various diagnostic tests
- Optimisation of antimicrobial therapy. The pk/pd approach, correlation of dosage and clinical efficacy.
- Infectious diseases with exanthemas
- Upper respiratory tract infections (common cold, acute and chronic rhinosinusitis, acute otitis, tonsillitis, pharyngitis). Epidemiology, the influence of age. Theoretical considerations and practice.
- Community acquired pneumonia. Epidemiology, the difficulties of etiological diagnosis. The impact of emerging bacterial resistance on the clinical efficacy of antibiotics. The modern approach and practice based on it
- The nosocomial infections. Nosocomial pneumonia, difficulties of etiological diagnosis. Antimicrobial treatment. Iv catheter-associated infections.
- Intraabdominal infections (primary and secondary peritonitis, cholecystitis). Urinary tract infections.
- Central nervous system infections. Meningitis, etiological diagnosis, antimicrobial treatment.
- Infections of the immunocompromised hosts. Diagnosis, and the principles of treatment. Invasive fungal infections. Colonisation and infection. Treatment of Candida and aspergillus infections.
- Tropical diseases. HIV and AIDS.
- The modern concept of sepsis. The basis of antimicrobial therapy. Indication of antibiotic combinations. The toxic shock syndrome.

Important note:

Attendance at 70% of the lectures is obligatory. The end semester grade is the result of the multiple choice test.

Recommended textbooks:

1. **Ludwig E.** (szerk): Antibiotikum terápia 2003 Medintel, Budapest, 2003.
2. Szalka A., Tímár L., **Ludwig E.**, Mészner Zs. (Szerk.): Infektológia. Medicina, Budapest, 2005.
3. Reese and Betts: A practical approach to infectious diseases. Lippincott Williams and Wilkins 2003.
4. Figures of the lectures are available electronically

VALUE OF ULTRASONOGRAPHY IN THE CLINICAL DIAGNOSTICS

(Lecturer: **Dr. Ágnes Szebeni** M.D., D. Sc.)

1.
 - a) Basic physics of medical ultrasound
 - b) Demonstration of the ultrasound laboratory; technique of ultrasound scanning.
2.
 - a) Sonography of the liver, the spleen, the gallbladder and the bile ducts.
 - b) Patient demonstrations and training
3.
 - a) Sonography of the pancreas and the pancreas and the lymph nodes.
 - b) Patient demonstrations and training
4.
 - a) Invasive sonography (US guided biopsies and punctions, endosonography, intraoperative sonography).
 - b) Videodemonstrations.
5.
 - a) Urogenital sonography.
 - b) Patient demonstrations and training
6.
 - a) Small part scanning.
 - b) Patient demonstrations and training
7.
 - a) Vascular sonography
 - b) Patient demonstrations and training

INTRODUCTORY LECTURES OF TRADITIONAL CHINESE MEDICINE

The topics:

1. Chinese way of thinking about medicine – Introductory lecture
2. Basic principles in Chinese anatomy and physiology (Yin-yang, Chi, meridian, points, cun, etc.)
– 1 lecture
3. The twelve meridians and their points (locations and indications) – 6 lectures
4. The rules of the point selections – 2 lectures
5. The five- element theory, future trends in research and in the clinical use – 1 lecture

Lecturer: Péter Szluka - Central Library
Institute: Semmelweis University Central Library, 1088 Budapest
Duration: One semester, 30×45 minutes (10×3 lessons), Place of the course: distance learning (via Zoom)

SUGGESTED SEMESTER 5-10.

Type of assessment: Practical mark
Credit-value: 3 credit-points
Minimum/maximum group-size 10/150
Registration in Neptun system
Technical background: Zoom application, Internet (university IP address/VPN access for students)

The aim of the subject:
Teaching students how to use/search in literature sources of medicine, analyse the result of their work supporting the proper competencies.

Assistant lecturer: Dr. Lívias Vasas PhD, Anna Berhidi, Edit Csajbók

Student records officer: Tamásné Gere, Anna Berhidi
Application deadline: Third week of Fall/Spring Study Period
Precondition: Medical Physiology II.

Method of instruction:
digital e-learning - (guided) search exercises in databases, scientific, electronic, literature sources with VPN connection; scheduled consultation appointments during the course

Competencies acquired through the completion of course:
After completing the course, the students will be competent to search for literature sources and assess their reliability. They will learn the basic types of publications, the different indicators of journals and the basics of evidence-based medicine (EBM). They will learn the citation practices expected in autonomous scientific works, the applications that help to edit and organize references quickly and flexibly.

Detailed course syllabus:

Module 1/3rd week: Introduction, Central Library’s website, VPN, general introduction of databases

- Introduction, requirements
- VPN access, technical details, usage of mobile devices
- **Homepage:** <https://lib.semmelweis.hu/> and its facilities
- Structure, function and critical approach of databases
- Criteria for a scientific journal; Types of publication, structure of scientific publication, content compliance, peer-review

Module 2/4th week: AI tools, Plagiarism, Copyright, Scientific publications

- Using AI tools in scientific papers.
- The concept of plagiarism, its different approaches
- Using previously published content for copyright purposes
- How to publish a paper, authors’ instructions.
- Characterization of journals

Module 3/5th week: Open Science, Open Access

- The evolution of Open Access (OA) publishing
- Different types of OA publishing and their descriptions
- Introduction of DOAJ, Open Policy Finder databases
- Risks associated with OA publishing, critical analysis of OA sources
- OA publishing at Semmelweis University

Module 4/6th week: PubMed; Web of Science, Scopus

- Basics of literature search
- National Library Medicine, Entrez- databases, PubMed, PMC, MeSH, PubChem
- Bibliographic item analysis
- Multidisciplinary bibliographic databases: Web of Science platform, Scopus – general search

Module 5/7th week: Evidence Based Medicine

- Introduction of EMBASE, Cochrane Library, UpToDate, TRIP databases

Module 6/8th week: Specific databases; prestige of journals

- EBSCO: CINAHL with Full Text, PsycINFO; EBSCO Discovery Service
- ProQuest Central
- Dissertation databases
- Quality/prestige of journals: Clarivate Analytics InCites JCR, SCImago (SJR), Scopus Sources (CiteScore)

Module 7/9th week: Reference managers I.

- EndNote online, EndNote desktop

Module 8/10th week: Reference managers II.

- Mendeley, Zotero
- Practice of reference managers’ word processor toolbar and Word, formatting

Module 9/11th week: Consultation on request

Module 10/12th week: Consultation, final test to improve the grade

Requirements for attendance: Participation in the program is not compulsory, but highly recommended in order to master the practice. The completion of post-module tests is recommended.

Assessment methods during semester: Post-module practical search exercises (in the form of 8 tests), at least 6 must be completed and will be graded from the total number of points at the end of the course.
There is a possibility to write the final test from the entire course material, where a minimum of 33 points is required in order to pass the course.
The scoring system indicates both the module tests and the final test:
0-32: fail (1),
33-45: pass (2),
46-57: fair (3),
58-64: good (4),
65-72: excellent (5)

The eight post-module tests (written exams) are based on the material of the given module on the day of the lecture.
The final written exam takes place on the same day as the 10th module. Topic: covers all the material studied in the entire course.

Number and type of individual assignments to be completed, submission deadlines: Completion of practical tests after each module, the deadline for submission is the 6th day after the lecture

Requirements for the successful completion of the course: Writing the post-module tests successfully (total score: min. 33 points) OR Successful completion of a test (min. 33 points) on all the material at the end of the course.

List of examination topics: The module topics correspond to the module tests and final test topics:
1. Website of Central Library, VPN
2. AI tools, Plagiarism, Copyright, Scientific publications
3. Open Science, Open Access
4. PubMed; WoS, Scopus
5. Evidence Based Medicine
6. Specific databases; Prestige of journals
7. Reference managers I.
8. Reference managers II.

Method and type of grading: After the completion of the eight post-module tests, the student receives a grade based on the total points of the post-module tests.

The scoring system indicates both the module tests and the final test:
0-32: fail (1),
33-45: pass (2),
46-57: fair (3),
58-64: good (4),
65-72: excellent (5)

Required literature:
The uploaded presentations and consultation materials for each module, which can be downloaded from the course interface in Moodle (<https://itc.semmelweis.hu/moodle/>).
SU Central Library’s homepage: <https://lib.semmelweis.hu/>
PubMed: <https://pubmed.ncbi.nlm.nih.gov/>; <https://pubmed.ncbi.nlm.nih.gov/help/>
Web of Science and related products: <https://support.clarivate.com/ScientificandAcademicResearch>
Scopus: https://service.elsevier.com/app/answers/detail/a_id/14799/supporthub/scopus/
Scimago: <https://www.scimagojr.com/>
Cochrane: <https://www.cochranelibrary.com/>
OATD: <https://oatd.org/>
EndNote: <https://support.clarivate.com/Endnote>

Recommended materials:

- Recordings of the lectures can be viewed on the Moodle interface of the course or on the Kaltura platform (<https://kaltura.semmelweis.hu/>) on the Central Library channel (SeKA login required).
- Mendeley: <https://www.mendeley.com>
- Zotero: <https://www.zotero.org/>
- Carrot2: <https://search.carrot2.org/#/search/web>
- UpToDate: <https://www.wolterskluwer.com/en/solutions/upto-date/resources>
- Google: https://support.google.com/websearch/?visit_id=638508497838069298-282292072&hl=en-HU&rd=2#topic=3378866
- Google Scholar: <https://scholar.google.com/intl/en/scholar/help.html>
- Dimensions: <https://www.dimensions.ai/why-dimensions/>

CLINICAL ANATOMY PROPEDEUTICS

Semmelweis University, Faculty of Medicine

Department of Anatomy, Histology and Embryology

Credit value : 2

Number of lessons per week: 2 lectures: 2 practical course: 0 seminars: 0

Subject type: optional course

Name of the course leader: Dr. Székely Andrea Dorottya (associate professor)

His/her workplace, phone number: Semmelweis University, Department of Anatomy, Histology and Embryology, +36-1-459-1500/53601

Position: Course Director of the English program, Associate Professor

Objectives of the subject, its place in the medical curriculum:

Detailed discussion of special anatomical topics with relevance to clinical subjects. Introduction to topographical anatomy with regards to imaging methods. The course is organised parallel or prior to the beginning of the clinical studies. Teaching is done in the form of lectures.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Department of Anatomy, Histology and Embryology
Budapest 1094, Tűzoltó utca 58.

Detailed curriculum:

REMARK:

The order of topics may change according to the availability of lecturers.

List of lectures (the exact order or topic may change upon availability of lecturers)

1. week: General introduction, surface anatomy
2. week: Anatomical aspects of radiology
3. week: Anatomical aspects of orthopedic surgery
4. week: Restorative surgery of the organs of the viscerocranium
5. week: Anatomical relevances of vascular diseases, hypertonia
6. week: *Anatomical relevances of assisted reproduction*
7. week: Anatomical aspects of general and local anaesthesia
8. week: Anatomical correlates of general surgery
9. week: Clinical anatomy of the mammary gland, lactation
10. week: Anatomy and neonatology, with special reference to pre-term birth
11. week: Anatomical aspects of peripheral nerve diseases
12. week: Anatomical background of angiology
13. week: Neuroanatomy of memory formation, drugs of abuse
14. week: Consultation, exam competition

Other subjects concerning the border issues of the given subject (both obligatory and optional courses). Possible overlaps of themes:

Morphological subjects including: Macroscopic Anatomy I-II., Microscopic Anatomy and Embryology I-II.; Physiology

Requirements for participation in classes and the possibility to make up for absences:

Weekly lectures are held regularly; lecture notes should be downloaded from Moodle. Missed classes cannot be made up for at a different time.

Type of examination:

A practical mark is earned from a written examination, topics: subject matter of the semester.

Requirements of the examination:

The examination is composed of theoretical questions on the basis of the lecture topics together with the content of the study aids uploaded in Moodle. The written theoretical examination is done using an e-learning module.

Successful completion of the subject results in the acquisition of the following competencies:

Clear understanding of the macroscopical composition of the human body together with the position and topographical relation of organs. Identification of surface landmarks.

Recognition of anatomical entities during physical examination or medical/surgical interventions. Acquiring knowledge of surface features and/or sectional anatomy forming basis for clinical diagnostics (palpation, auscultation, etc.) and the use of radiological imaging methods

The deeper understanding and restoration of morphology&function in line with therapies and/or rehabilitation.

Course prerequisites:

Successful completion of Macroscopic Anatomy I-II. together with Microscopic Anatomy and Embryology I-II. (valid marks from the final examinations at the end of the 3rd semester). Good command of English.

Number of students required for the course (minimum, maximum) and method of selecting students):

Optional course, voluntary registration for students via the NEPTUN system.

Minimal headcount: 10, maximal headcount: 120 students

TOPIC LIST FOR CLINICAL ANATOMY (written test in moodle)

HYPERTENSION

- The most prevalent risk factor of global mortality
- The prevalence of high blood pressure in the Western countries
- The threshold of high blood pressure in Europe by home blood pressure monitoring
- BP variability types
- Reasons for measuring more than 20/10 mmHg BP difference between the arms
- The most frequent form of thoracic outlet syndrome
- Paget-Schroetter syndrome
- The types of non-endocrine secondary hypertension
- Renovascular stenosis

ANGIOGRAPHY

Who is the angiographic puncture technique named after?

- In case of coughing up blood, which blood supply area is the most commonly implicated?
- What is the most effective way to test bronchial arteries?
- In the case of subclavian steal, in which artery does the flow reverse?
- How is the puncture site selected for angiography?
- Which diagnostic methods can replace angiography?
- Which blood vessels are connected by the pancreaticoduodenal arcade (or lesser arc of Riordan)?
- Which vessels are connected by the (greater) arc of Riordan?

THORAX

- Landmarks on the ventral surface of the trunk
- Bony structures limiting the superior inlet to the thorax
- Planes and levels in the thorax
- Position of the nipple
- Layers to be penetrated in thoracocentesis
- Types of pneumothorax
- "Triangle of safety" in chest drain
- Separation of the two pleural cavities
- Heart sounds
- Pericardiocentesis

MAMMA

- Structures limiting the sub (retro-)mammary space
- Tissue composition changes within the mammary gland with ageing
- Montgomery glands
- Cutaneous nerves implicated in axillary block dissection

- Malignous tumor locations of the breast
- Radical mastectomies according to Halsted and Patey
- Elongation/growth of lactiferous ducts (hormones)
- Clinical (metabolical) relevance of high prolactin levels during pregnancy and breastfeeding
- Cellular procedures during involution of the mammary gland (when the breastfeeding)

DENTISTRY

- What is the difference between the anatomical and clinical crowns of a tooth?
- What does heterodontia mean?
- Which tooth has the longest root?
- What is a diastema?
- Structures present in both the peri-implant and/or peridental space
- ENT
- What innervates the tympanic membrane?
- What could decrease the width of the bony external acoustic meatus?
- Cochlear implant (placement)

DRUGS OF ABUSE

- How does drug dependence develop?
- Select the drugs of abuse
- Which dopaminergic pathway (system) is implicated in reward mechanism?
- Which of the following drugs acts via Na⁺ ion channels?

ORTHOPEDICS

- Which diseases belong to the field of Orthopedics?
- What causes club foot?
- Which muscle is implicated in congenital torticollis?
- What is the consequence of the presence of the omovertebral bridge?
- What is the positive effect of wearing the Pavlik harness in case of congenital hip dislocation?
- The most frequent secondary neuromuscular symptoms of cerebral palsy

NEONATOLOGY

- How long is the neonatal period?
- Classification of the neonates according to gestational age.
- How long is lanugo present?
- What is the vernix?
- Typical posture of a term infant (see the table/picture)
- What is the amniotic fluid?
- What causes oligohydramnios?
- What is the function of the surfactant?
- What are the clinical signs of a respiratory distress?
- How does the pulmonary perfusion change immediately after delivery?

NEUROLOGY

- Elements of the peripheral nerves
- Connective tissue layers surrounding a nerve fascicle
- The ratio of fascicles versus connective tissue elements
- Main types of peripheral nerve damage
- Main symptoms of peripheral nerve damage
- Perineurial barrier function
- Which cells play a crucial role in axon regeneration?
- Proximal and distal lesions in the peripheral nerves
- The carpal tunnel syndrome
- Terms in segmental innervation (dermatome, myotome)
- C8-Th1 segmental damage
- Segmental damage at L5

ASSISTED REPRODUCTION

- Definition for infertility
- Prevalence of infertility at 20-24 years of the age
- Etiology of female infertility
- Types of ovulatory infertility
- Reasons for anatomical infertility in females
- Pretesticular causes for male infertility
- Testicular causes for male infertility
- Histerosalpingography (HSG)
- Normal spermiogram
- Azoospermia, oligospermia, etc. (see table)
- Forms of assisted reproduction (in the broad sense)
- Source of therapeutical urogonadotropins
- Which endocrine centres/glands may be implicated in the hormonal treatment of anovulatory infertility?
- When was the 1st test tube baby born (i.e., the 1st successful IVF procedure done)?
- What does ICSI stand for?
- Indications of preimplantation genetic diagnosis
- Success rate of IVF

ANAESTHESIOLOGY

- Who was the first to perform a spinal block?
- Sites of peripheral nerve blockades
- The use of ultrasound guidance in regional anaesthesia
- The benefit of using ultrasound guided regional anaesthesia in pregnant patients
- Peripheral veins used for cannulation
- Central veins used for cannulation
- Anatomical spaces used for the cannulation central veins, venous puncture sites (pictures)
- What is the target system of general anaesthesia?
- What is the result of general anaesthesia in the body?

SURGERY

- Anastomotic connections between the superior and inferior mesenteric arteries
- Types of laparotomy
- Which gas is used for laparoscopy?
- The advantages of laparoscopy over laparotomy
- Walls of the inguinal canal
- What is the use/advantage/disadvantage of peritoneum (if it is a good friend of the surgeon...)
- Consequences of peritoneal adhesions during surgery
- Roux en Y anastomosis
- Define pneumoperitoneum
- Differential diagnosis for appendicitis

Method and type of evaluation:

The result of the examination (i.e. a practical mark) is calculated on the basis of the scores of the test using a 5 scale grading system. Passing level: 51%

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology (<http://semmelweis.hu/anatomia>) or from Moodle.

ANESTHESIOLOGY AND INTENSIVE THERAPY

Dept. of Anesthesiology and Intensive Therapy

First Semester

Lectures

1. Central venous access and other invasive procedures: indications, performance and pitfalls
2. Advanced cardiac and hemodynamic monitoring. Swan-Ganz catheter, PiCCO, measured and calculated parameters, relevancies (45')
Advanced antiarrhythmic therapy: decision between electric and pharmacological treatment (45')
3. Polytrauma, head trauma, chest trauma
4. Ultrasound: stethoscope of the 21st century (45')
Ultrasound in regional anesthesia (45')
5. Acute pancreatitis (45')
The confused patient: principles of management (45')
6. Pathophysiology of thermoregulation: malignant hyperthermia, NMS, hyper- and hypothermia syndromes, fever in the ICU (45')

- Anesthesia for one-day-surgery (45')
7. Principles of antibiotic therapy in the ICU (45')
8. Principles of antibiotic therapy in the ICU (45')
9. Difficult airway management (45')
Special respiratory therapy: high frequency and jet ventilation (45')
10. Organ transplantation. End stage organ failure, long term mechanical support, organ transplantation, donor management
11. (Respiratory) Physiotherapy in the ICU
12. CRM: aviation safety and human factors in healthcare
13. Obstetrical intensive therapy: toxemia, HELLP, Mendelson's syndrome, pulmonary embolisation, amniotic fluid embolisation (35')
Pediatric anesthesia (35')
MCQ test (obligatory!) (20')

Topics may change depending on lecturers' availability.

NEONATOLOGY

Course Director: **Prof. Dr. Istvan Seri**

Second Semester

Credits: 2

Lessons: 28

- Principles of patient care in the NICU
- Resuscitation of the newborn
- Neonatal respiratory pathology: Pathophysiology
- Neonatal respiratory pathology: Diagnosis/Treatment
- Neonatal shock: Diagnosis and treatment
- Complications of severe prematurity: P/IVH & PVL
- Perinatal asphyxia/Neonatal Follow-up
- Congenital heart disease: Diagnosis and treatment
- Surgical conditions of the neonate
- Fluid-electrolyte & acid-base homeostasis
- Neonatal imaging
- Closing Session/Exam

Aim of the subject and its place in the curriculum: The Neonatology Optional course introduces basic information on neonatal physiology, pathophysiology and the diagnosis and clinical management of the most common neonatal conditions. The course deepens the knowledgebase of the students in pediatrics in general and neonatology in particular.

Competencies gained upon the successful completion of the subject: Recognition of the most common neonatal conditions based on clinical, laboratory and imaging information and gaining a basic knowledge on neonatal resuscitation.

Prerequisite(s) for admission to the subject: Ongoing enrollment in or completed session of the pediatric curriculum.

Minimum and maximum number of students registering for the course: 8-30

Requirement for acknowledging the semester (signature): Attendance of 60% of lectures.

Type of the examination: Multiple-choice written test exam at the end of the course.

Type and method of grading: Pass (60% of questions correctly answered) or fail (<60% of questions correctly answered) at the final exam.

Literature, i.e. printed, electronic and online notes, textbooks, tutorials (URL for online material): Uploaded presentation slides on the university website following the lectures.

COURSE ON HUMAN LACTATION & BREASTFEEDING – THEORY, SUPPORT AND PROMOTION

Credits: 2

Lessons: 28

Requirement: Medical Physiology II.

Academic teachers:

Miklos Szabo MD, PhD, Med Habil Neonatologist, Chief of neonatal services

Erzsébet Várady MD Neonatologist, IBCLC

Background and importance of the topic

Optimal infant feeding is one of the most efficient interventions to improve child health and psychosocial wellbeing of mother and child. The gold standard of infant feeding is exclusive breastfeeding/human milk feeding for the first 6 months and while introducing complementary feeding at around 6 months, continuing breastfeeding at least in the first year of life, preferably until 2 years of age.

To achieve this goal, it is paramount, that *all* health professionals, regardless of their subspecialty are equipped with sufficient knowledge, competence and skills to help families in their decision on infant feeding, establishment, maintenance and support of breastfeeding and treatment of breastfeeding complications. The WHO, UNICEF and the Academy of Breastfeeding Medicine has called for action, that theory and evidence-based practice of breastfeeding should be incorporated into the medical school curricula.

Topics of the 14 session course

1. The importance of breastfeeding/human milk feeding for the child, the mother and the society. Risks of not breastfeeding and less than optimal breastfeeding. Definitions related to breastfeeding. Hungarian data on breastfeeding rates, international goals. Communication skills from the aspect of the breastfeeding mother.
2. Anatomy of the breast, physiology of breastmilk production and secretion. The effect of hormones related to breastfeeding on the mother and child. Delayed lactogenesis II. Mechanism of breastfeeding. Difference in the mechanism of breast and bottle feeding. The changing composition of breastmilk (colostrum, transitional milk, mature milk, change during the day, the breastfeeding session and the course of lactation). Biochemical and immunological properties of breastmilk. Special properties and advantages of breast milk for preterm infants.
3. Breastfeeding positions, latching on the breast, milk transfer. Signs of good latch and suckling. Breastfeeding observation. Signs, that breastfeeding is going well. Special issues about the support of mothers after caesarean section. Physiological parameters of breastmilk intake and elimination (stool, urine) during the first week of life. The normal course of breastfeeding during the first year of life. Normal weight gain of the breastfed infant. Continuing breastfeeding after the introduction of complementary feeding. Long term breastfeeding (in the second year).
4. Baby-friendly Hospital Initiative – Ten steps to successful breastfeeding. Supporting breastfeeding after hospital discharge – the role of health professionals, family, community.
5. The golden hour – skin to skin (S2S) contact between mother and infant immediately after birth. Facilitation of S2S care in the delivery room or operating room. Beneficial effects and safety issues. Observation during the golden hour. Sudden unexpected postnatal collapse (SUPC) – risk factors, prevention.
6. Responsive feeding and care – importance and practice. Rooming-in (couplet) care in birthing facilities. Safe sleeping after discharge home.
7. Consultation, in small groups and elaboration of homework mini reviews.
8. Family-friendly maternity care. International Childbirth Initiative. Non-pharmacological pain management during childbirth. Impact of intrapartum procedures and medications on breastfeeding and lactation. Support of mothers after caesarean section.
9. Biological, sociological, psychological and cultural aspects of breastfeeding. Breastfeeding protection. International Code of Marketing Breastmilk Substitutes (The Code).
10. Contraindications to breastfeeding/human milk feeding. Conditions and illnesses of concern. Breastfeeding and drugs. Evidence-based resources on drugs for the lactating mother. Caffeine, alcohol consumption, and smoking of the breastfeeding mother. Acceptable medical reasons for supplementing breastfeeding. Breastfeeding-friendly methods of supplementation. At breast supplementers. Nipple shields. Pacifiers- pros and cons.
11. Obtaining medical and feeding history. Breastfeeding-related examination of the mother and child. Common breastfeeding problems (engorgement, mastitis, flat, inverted, painful, cracked nipples, breast edema, not enough breastmilk, jaundice, etc.). Prevention and treatment.
12. Maintenance of lactation during separation (illness, returning to employment/school). Methods of breast milk expression (hand expression, using breast pump, “hands on pumping”, “power pumping”). Cleaning breast pump kits and infant feeding items. Handling and storage of breastmilk.
13. Preparing to breastfeed during pregnancy. Topics to share with the mother (individual counseling by health professional and breastfeeding class). Contraception for the breastfeeding mother. Lactation amenorrhea method – conditions of efficacy. Other methods of contraception suitable for the breastfeeding mother. Advise on interpregnancy interval. Breastfeeding during pregnancy and tandem breastfeeding.
14. Consultation, in small groups and elaboration of homework mini reviews and virtual practical session: online participation in streaming of lactation consultation with patients

Aim of the course: the student acquires the following theory and practice-based competencies:

Theory based competencies

1.	Knowledge about the basic anatomy (normal and pathological) and physiology (including hormones related to breastfeeding) of the breast and the mechanism of breast milk production and secretion.
2.	Describe contraception related to breastfeeding.
3.	Describe the mechanism of sucking on the breast and compare the mechanism of breast and bottle feeding.
4.	Understand, what is the role of breastfeeding and human milk feeding in maintaining health and prevention of illnesses in the mother and child and the potential problems related to artificial (formula) feeding.
5.	Understand, why exclusive breastfeeding is important and what is it's association with optimal health outcome.
6.	Understand the advantages of S2S contact immediately after birth. Describes preventive measures for SUPC.
7.	Knowledge about the existence and aims of the Code (International Code on Marketing Breast milk Substitutes).
8.	Knowledge about potentially adverse outcomes of the infant, mother and society in those cases, when the infant is not breastfeeding.
9.	Understand the meaning of the Baby-friendly Hospital Initiative 10 steps.
10.	Understand the possible impact of medical interventions and drugs during labor and childbirth on the outcome of breastfeeding. The student is aware of it, how to support the mother in breastfeeding after caesarean section.
11.	Understand the role of behavioural, social, cultural and environmental factors in the breastfeeding-related decision and practice.
12.	Knowledge about the evidence-based contraindications of breastfeeding/human milk feeding.

Skill based competencies

1.	Obtain detailed breastfeeding history and perform breastfeeding-related examination of the breast.
2.	Describe the effect of intrapartum interventions and drugs on breastfeeding. Advise the mother on breastfeeding after caesarean section.
3.	Facilitation and support of the golden hour.
4.	Recognize the correct position, attachment on the breast, the signs of milk transfer and can suggest corrections, if needed.
5.	Counsel mothers about establishing and maintaining lactation in case of separation (illness, returning to school/employment).
6.	Counsel mothers on the normal course of lactation and on the prevention of potential complications (not enough breast milk, painful nipple, jaundice, etc.).
7.	Discuss family planning options with the breastfeeding mother.
8.	Describe signs of adequate milk intake by the infant and guide the mother, in case she has the perception not to have enough milk.
9.	Understand the need to encourage the mother to breastfeed after introduction of complementary feeding and after one year of age.
10.	Understand the normal growth pattern of the breastfed infant.
11.	Discuss with the pregnant women the beneficial effects of breastfeeding for baby and mother, share with her information on the expected care in the birthing facility and give practical advice on breastfeeding.
12.	Explain, why is the Code protecting breastfeeding and how to follow the Code in the birthing facility.

Exam:

Written – Test

Grading:

88 % – 100 % Excellent
 76 % – 87 % Good
 64 % – 75 % Satisfactory
 51 % – 63 % Pass
 Under 51% – Fail

We intend to check the efficacy of the course with pre and posttest.

Resources:

1. Meek, J. Y., & Academy of Breastfeeding Medicine. (2019). Educational objectives and skills for the physician with respect to breastfeeding, Revised 2018. *Breastfeeding Medicine*, 14(1), 5-13.
2. WHO. (2009). Infant and young child feeding. Model Chapter for textbooks for medical students and allied health professionals.
3. Gary, A. J., Birmingham, E. E., & Jones, L. B. (2017). Improving breastfeeding medicine in undergraduate medical education: A student survey and extensive curriculum review with suggestions for improvement. *Education for Health*, 30(2), 163.
4. Wambach, K., & Riordan, J. (Eds.). (2016). *Breastfeeding and human lactation*. 5th ed. Jones & Bartlett Learning. Magyar fordításban: Szoptatás és humán laktáció, Semmelweis Kiadó, 2019

OBSTETRICS GENETICS, PRENATAL DIAGNOSIS

Second Semester

Course director, Lecturer: **Dr. Artúr Beke PhD Med. habil**

Department: First Department of Obstetrics and Gynecology

Prerequisite: Completion of second year

Subject type: optional course

Study time: In every week 2×45 minutes. Advised Semester: between 5. and 12. Semester

Exam: Oral exam

Credit: 2

Minimal/maximal participants: (5/30 person)

The knowledge acquired during the successful completion of the basic theoretical subjects (medical biology, genetics and genomics, physiology) can be applied in practice by medical students as knowledge that can be utilized in the clinical practice.

Lectures:

- Teratogenic risks and their prevention I. (biological agents - intra-uterine infections)
- Teratogenic risks and their prevention II. (physical and chemical agents - maternal disease, medication)
- Risk of fetal minor anomalies and chromosomal abnormalities; Examination of fetal chromosome abnormalities
- Genetic counseling during pregnancy
- Effectiveness of ultrasound examinations in the detection of fetal malformations I. (Craniospinal, Craniofacial, Cardiovascular, and Other Chest Disorders)
- Effectiveness of ultrasound examinations in the detection of fetal malformations II. (Abdominal and Abdominal Disorders, Urogenital Disorders, Limb Disorders, Bone Disorders)
- New opportunities and challenges in prenatal diagnostics
- Communication during obstetric genetic counseling, psychological aspects
- Ethical issues in obstetric genetic care. Consultation

Practices:

- Genetic counseling, genetic diagnostics -Supervisor: Dr. Artúr Beke

ASSISTANT REPRODUCTION

Second Semester

Course director, Lecturer: **Prof. Urbancsek János MD PhD DSc**

Department: First Department of Obstetrics and Gynecology

Prerequisite: Completion of second year

Subject type: optional course

Study time: In every second week 2×45 minutes. Advised Semester: between 5. and 12. Semester

Exam: Oral examination

Credit: 2

Minimal/maximal participants: (10/100 person)

Introduction into the field of human assisted reproduction, which is one of the most quickly and extensively developing field of medicine.

Lectures

- Introduction in the field of assisted reproduction.
- Physiology of the menstrual cycle.
- Pathophysiology of the menstrual cycle.
- Diagnosis of infertility.
- Treatment of infertility I.: Ovulation induction, intrauterine insemination, operative treatment.
- Treatment of infertility: in vitro fertilization.
- Embryological aspects of in vitro fertilization
- New and alternative methods of in vitro fertilization.

Practical lessons:

- According to the topic of the lectures with presentation of the same lecturers given above.

Second Semester

Course coordinator: Dr. Péter Fancsovits PhD Med. habil

Department: First Department of Obstetrics and Gynecology

Prerequisite: Completion of second year

Subject type: optional course

Study time: In every second week 2×45 minutes. Advised Semester: between 5. and 12. Semester

Exam: Oral exam

Credit: 2

Minimal/maximal participants: (10/80 person)

Infertility treatment have evolved extremely fast over the past 30 years. This is particularly the case regarding the improvement of the laboratory methods and new procedures to be established. The new discipline clinical embryology which includes the laboratory methods for assisted reproduction and the understanding of its biological and technical background, has been established for the purpose of ensuring the laboratory background for infertility treatment. This new scientific field has been found at the borderline between biology and medicine, therefore the subject for clinical embryology - with the objective of presenting new research findings for this theme - may be of interest to students for medicine, biology, medical biotechnology, agricultural biotechnology and bioengineering as well. The educational aim of this subject is to gain expanded competencies in the topic of reproductive biology including the processes of arising of male/female gametes, insemination, development of early embryos and implantation. Students may become familiar with the biological and laboratory background of different methods for interventions in assisted reproductive technology. They develop new knowledge about the possibilities of cryopreservation of gametes and embryos before implantation, moreover the methods of genetic testing which can be carried out on gametes or embryos. It may allow students to have access to more important research directions of clinical embryology, to the chance of application for animal biotechnology or other medical use. The students of this subject may obtain overviews

about the medical-, bioethical issues in connection with applying the methods of clinical embryology.

Lectures:

- Introduction to clinical embryology and history of assisted reproduction
- Gametogenesis, cell proliferation, process of fertilisation, review of cell biological and physiological basics
- Examination and treatment of female infertility
- Sampling and handling of gametes. Oocyte retrieval, identification and maturation; examination of egg quality. Semen analysis and process
- Laboratory methods of in vitro fertilization
- Traditional in vitro fertilisation (IVF), intracytoplasmic sperm injection (ICSI), fertilisation with surgically extracted spermatozoa from the tissue of testicle – testicular sperm extraction (TESE); the role of the micromanipulation in the clinical embryology. Evaluation of fertilisation
- Embryo culture, assessment of viability of cleaving embryos, embryo selection for transfer
- Use of artificial intelligence in assisted reproduction
- Quality assurance for Embryology Laboratory, investigation of effectiveness of laboratory work
- Cryopreservation of gametes and embryos. Use of donated gametes
- Fertility preservation strategies for patients under treatment of cancer diseases
- Preimplantation genetic diagnosis
- Ethical issues in connection with clinical embryology

Practical course:

- Examination and preparation of semen samples
- Fertilisation of oocytes
- Observation of embryo development, assessment of embryo viability
- Cryopreservation of gametes and embryos

CLINICAL ENDOCRINOLOGY

Department of Internal Medicine and Oncology

Second Semester

Lectures

- Introduction to clinical endocrinology. Case Presentations.
- Use of hormone measurements in the diagnosis of endocrine diseases.
- Molecular genetics of endocrine diseases.
- Radiological imaging methods of endocrine organs.
- New developments in surgical treatment of endocrine tumors.
- Case presentations: pituitary gland disorders.
- Case presentations: adrenal gland disorders.
- Case presentations: thyroid gland disorders.
- Case presentations: parathyroid gland disorders.
- Sex determination and its disorders.
- Hormone-replacement therapy
- Inherited disorders presenting with endocrine tumors.
- Osteoporosis.
- Endocrine hypertension.

GENETICS OF ENDOCRINE DISEASES

Department of Endocrinology
Course director: Prof. Peter Igaz

First Semester

Lectures:

- Overview of endocrine diseases with genetic background. Main disease groups and genetic mechanisms
- Multiple Endocrine neoplasia syndromes.
- Genetics of pheochromocytoma
- Relevance of Ca-sensor mutations in endocrinology
- Genetics of congenital adrenal hyperplasia
- Genetics of pituitary tumors and hypopituitarism
- Genetics of thyroid tumors
- Genetics of rare metabolic diseases
- Clinical picture and genetics of monogenic diabetes mellitus (MODY)
- Chromosome alterations with endocrine relevance (Turner-syndrome, Klinefelter-syndrome, Prader-Willi-syndrome)
- Genetics of hyperaldosteronism, hypercortisolism and adrenocortical cancer. Hormone resistance syndromes (thyroid hormone resistance, pseudohypoparathyroidism, glucocorticoid resistance, androgen insensitivity)

ENDOCRINE ONCOLOGY

Department of Endocrinology
Course director: Prof. Peter Igaz

First Semester

Lectures:

- Introduction to the realm of endocrine tumors
- The pathogenesis of endocrine tumors. Main molecular mechanisms and laboratory diagnosis
- Hereditary tumor syndromes
- Aggressive pituitary tumors, pituitary cancer
- Pathogenesis, diagnosis and treatment of differentiated thyroid cancers
- Ultrasound signs of thyroid malignancy. Anaplastic thyroid cancer and parathyroid cancer
- Medullary thyroid cancer – pathogenesis, diagnosis and management
- Differential diagnosis of adrenal tumors, establishment of malignancy Adrenocortical cancer: management. Malignant pheochromocytoma
- Neuroendocrine tumors and their treatment possibilities
- Paraneoplastic endocrine syndromes
- Hormone sensitive breast and prostate tumors and their hormonal treatment

EMERGENCY IN SURGERY

Course Director: Prof. Dr. Pál Ondrejka

Second Semester

Purpose of the subject: In the practice of surgery is very important the early detection of emergency cases. For this reason the collaboration with the representatives of other medical professions is indispensable. The goal of our lectures is to present the appropriate procedures of physical examination, laboratory and radiological findings in order to recognize the correct diagnosis; to know what is necessary, **what is possible and what is enough** to do in a case of surgical emergency; when to ask for a consultation for adequate therapy. The inborn errors, injuries, inflammations and tumors of the organs are also presented. In order to make the lectures more interesting we are going to review the relevant episodes in history of medicine and final arts.

Main topics:

- Introduction, life threatening disorders in surgery, emergency in gastrointestinal surgery,
- acut abdomen.
- Gastric, duodenal, small bowel emergencies.
- Peritonitis acuta.
- Abdominal trauma.
- Surgery of the wound, infections, anaerob infections in surgery (MRSA, Furnier, tetanus, anaerob)
- Small bowel obstruction, large bowel obstruction.
- Esophageal emergencies.

- Biliary emergencies.
- Complications of peptic ulcer.
- Gastrointestinal bleeding.
- Pancreatitis acuta.
- Pancreatitis chronica.
- Appendicitis, diverticulitis, sigmoiditis, typhlitis.
- Surgical intections.

Minimum 80% attendance rate for getting the signature is obligatory.

CLINICAL HEMATOLOGY

2nd Dept. of Internal Medicine

Course Director: Prof. Dr. Tamás Masszi

Second Semester

Topics of interest in the field of hematology, state of the art of various hematological and hemato-oncologic diseases

2 hours per week

Main topics:

1. Place and significance of hematology. Normal blood production, basics of hematologic diagnosis.
2. Classification of anemias, diagnosis.
3. Myelodysplastic syndromes.
4. Diagnosis and treatment of acute leukemias.
5. Acute leukemias of the childhood.
6. Classification and treatment of lymphomas I.
7. Classification and treatment of lymphomas II.
8. Clinical picture and diagnosis of hemorrhagical diatheses. Prophylaxis and treatment of venous thrombosis.
9. Gastroenterological complications of hematological diseases.
10. Dermatologic manifestations of hematological diseases and hematological symptoms of dermatologic diseases.
11. Immunocytopenias.
12. Hematological emergencies.
13. Stemcell transplantation.
14. Infectious complications of hematological diseases

CLINICAL CARDIOVASCULAR PHYSIOLOGY

Optional coursee for medical students in the 3rd, 4th and 5th years.

The purposes of the course:

- To refresh and extend – in selected topics – the basic knowledge related to normal and pathological functions of the human circulatory system
- To integrate the latest scientific results related to different organization levels – from molecular physiology to system physiology – of the cardiovascular system.
- To discuss and demonstrate measurement principles and techniques, as well as physiological and pathophysiological mechanisms related to the application of modern non-invasive cardiovascular diagnostic procedures in the clinical practice.

Program:

1. Investigation of blood pressure regulation by use of transgenic technologies
2. Complement-related immunological and cardiopulmonary responses (CARPA). Modern methods for measuring and monitoring arterial blood pressure
3. Hemodynamic background of normal and pathological cardiovascular functions
4. Pathophysiology of chronic venous insufficiency
5. Physiological mechanisms supporting venous return of blood; orthostatic tolerance

6. Recent results in control of cerebral blood supply, physiological and clinical aspects
7. Clinical physiology of the microcirculation
8. Interventional radiological procedures on arteries and veins
9. Age related changes in the vascular system, role of sexual hormones
10. Role of endothelial mechanisms in clinical symptoms
11. The cardiovascular risk and the protection of menopausal women. Coronary circulation
12. Biomechanical properties of cerebral aneurisms, their computer modeling
13. Visit to the MRI cardiovascular diagnostic unit of the Semmelweis University Heart Center
14. Ultrasonic investigation of the human heart: theoretical background; 2D-, M-, Doppler-mode, color Doppler imaging, echocardiography; diagnostics of valve insufficiency and coronary diseases. Duplex ultrasonic investigation of large vessel function: measurement of vessel wall elasticity, Doppler-indexes

Students who meet the following criteria will receive 2 credit points: regular attendance of classes and successful written exam. Material for the exam includes lecture topics and textbooks suggested by the lecturers.

CARDIORESPIRATORIC AND NEUROPHYSIOLOGICAL MEASURING METHODS

Optional coursee for medical students in the 3-6th years

Course director: Dr. Habil. László Dézsi, Private Professor of Physiology, Semmelweis University

The purpose of the course:

To review the theory and practice of modern measuring methods in experimental and clinical medicine, and providing practical knowledge to medical students on cardiorespiratoric and neurophysiological measurements. The course is based on but further extends the material delivered during the course of Medical physiology. Throughout the lectures we put an emphasis on potential methodological errors of measurements and examinations, as well as how to avoid them.

Detailed Program:

1. Introduction. Biomedical engineering. Design and safety requirements of biomedical equipments
2. Computerized data acquisition and analysis. Telemetry systems
3. General metrology. Basics of measurement and control theory
4. Home monitoring of cardiovascular health status. Determination of blood glucose and tissue glucose concentrations
5. Sampling of continuous signals. Digitizing analogue signals
6. Direct and indirect methods to determine cardiac output and peripheral blood flow
7. Experimental study of pulmonary function. Measurements of blood gases and the acid-base balance.

8. Significance of objective studies in the practice of audiology. Neurophysiological measurements (action potentials, brain stem evoked potentials)
9. Investigation of adaptive processes in the cardiovascular system. Investigative methods of experimental angiology
10. Measuring blood pressure in the lab and clinics (invasive and noninvasive methods)
11. Complement-related immunological and cardiopulmonary responses
12. Studying brain function by functional imaging systems
13. Experimental methods to study nociception
14. Investigating the electrical activity of the heart. Design of ECG amplifiers

Acknowledgement of the course: Prerequisite of the course is the completion of the first 2 years (Theoretical module). Regular attendance (maximum 3 absences) is required. Signature in the Index and 2 credit points will be awarded after successful exam. Source: material of the lectures, supplementary literature will be provided by the lecturers.

Applications: via Neptun system. Contact person: Dr. László Dézsi (e-mail: dezsi.laszlo@richter.hu; phone: 06-1-431-4823; phone/fax: 06-72-536-019). The application of min. 5 students is required.

CLINICAL PHYSIOLOGY OF RESPIRATION AND RESPIRATORY DISEASES

Optional course for medical students in the 3rd, 4th and 5th years.

The aims of the course are to strengthen knowledge on basic physiological principles related to respiration, summarize the most important aspects of cardiorespiratory adaptation in sport activities and also its changes in respiratory diseases and to provide integrated information about the physiological and pathophysiological background of the most important respiratory disorders in light of results from cutting edge research.

Program:

1. Physiological function of the respiratory system
2. Smoking, e-cigs, supporting cessation
3. Lung development
4. Inhalation therapy
5. Sleep related respiratory disorders.
6. COPD and COPD exacerbation
7. The lung in systemic diseases
8. Cystic fibrosis
9. Pulmonary circulation
10. Bronchoscopy

11. Cardiovascular exercise testing, COPD
12. Asthma bronchiale
13. Non-invasive ventilation
14. Chest imaging

Acknowledgement of the course: regular attendance (maximum 3 absences) is required; signature in the Index, and 2 credit points will be provided

MEDICINAL, EPIDEMIOLOGICAL, AND SOCIAL ASPECTS OF DRUG ABUSE

Department of Pharmacology and Pharmacotherapy

Course director: Prof. Dr. Susanna Fürst

Second semester

Credit: 2

Topics:

- **Introduction, general concepts.** Non-medical use of drugs. Drugs of abuse. Classification of scheduled drugs under WHO control. Vulnerability. Tolerance, physical and psychological dependence. Molecular basis of drug addiction.
- **Opioids.** Pharmacological action of opioid agonists and antagonists. Opioid receptors, endogenous ligands. Characteristics of opioid dependence.
- **Psychomotor stimulants.** Pharmacological action of amphetamine, its derivatives (methamphetamine, MDMA-“Ecstasy”, etc.) and cocaine. Role of the dopaminergic transmission in the drug abuse.
- **Hallucinogens. Ethanol.** Pharmacological action of hallucinogens, (LSD, mescaline, phencyclidine, etc.). Role of the serotonergic transmission in hallucination. Characteristics of ethanol dependence.
- **Marihuana (hesis, THC)** Pharmacological action of cannabinoids. Cannabinoid receptors and their endogenous ligands.
- **Sedative-hypnotics.** Pharmacological action of benzodiazepines, barbiturates, other sedative-hypnotics. Characteristics of prescription drug dependence. Polydrug-abuse.
- **Epidemiological data.** Significance of epidemiological data collection. Forms of questionnaires. Tendency of drug abuse, national (Hungarian) and international data. High risk groups.
- **Pharmacological treatment.** Traditional medicinal treatment and new methods. Medical treatment of withdrawal symptoms,

replacement therapy. Treatment of overdose. Prevention of relapse.

- **Psychotherapy.** Individual and group therapy. The problems of long-term rehabilitation. Counselling.
- **Drug abuse and society.** Legal issues. Statutory rules and regulations. Human rights.
- **Role of public and civil society.** Role, task and potential of governmental and non-governmental organizations in the prevention of drug abuse.
- **Detection of drug consumption.** Laboratory analysis of blood and urinary samples. The role of objective laboratory control in prevention and reduction of drug abuse.
- **Prevention and harm-reduction.** Primary, secondary and tertiary prevention. Demand-reduction and harm-reduction. Early recognition. Rehabilitation, social reintegration.
- **Psychosocial questions of drug abuse.** Psychosocial aspects. Self-destructive attitudes. Psychological and social background. Role, task and possibilities of the medical doctor.

Absence: Maximum number of absences is 25 percent of the lectures in the semester

Absence justification: Medical certificate is accepted
There is no midterm

Requirement: Participation at the lectures

Evaluation: On the base of the scores of the written test

Exam: written test

The written test is on the last lecture, registration has to be done through the NEPTUN system

How to modify the exam date: Personal discussion for another appointment

Exam absence justification: Medical certificate is accepted

BASICS OF FAMILY MEDICINE

Department of Family Medicine

Director: Dr. Péter Torzsa

Family medicine as a speciality

Past and present of family medicine in Hungary

Daily routine of family doctor

Dr. Kalabay László

Doctor-patient relationship in family practices. Communication skills

Dr. Torzsa Péter

Emergency care in family practice

Dr. Szabó János

Cardiology and prevention in family practice

Dr. Simon Judit

Diabetes mellitus in family practice

Optimal treatment of diabetes mellitus

Dr. Dani Vilmos

Prevention program in family practice

Optimal treatment of hypertension

Dr. Torzsa Péter

Primary care in cities

Dr. Torzsa Péter

Primary care in the countryside

Dr. Szabó János

Care of gipsy patients

Dr. Horváth Péter

Medical ethics and law

Dr. Vajer Péter

Continuing home care

Rehabilitation

Terminal illnesses

Summary

Prof. Dr. László Kalabay

Dr. Péter Torzsa

HISTORY OF THE MEDICAL PROFESSIONALISM

Lecturer: Dr. Péter Balázs

Class Sessions: Medical professionalism as an ethical norm is an ancient behavioural pattern and theoretical construction alike based on sacral calling. Consequently, roots of the modern professional mythology may be traced back to the late Neolithic age, but the whole framework was systematized **first** in the old Egyptian and Mesopotamian culture. Since the Hippocratic **era**, the medicine was based on teachings of natural sciences and the Middle Age **joined** the medicine **to the university faculties**, but only the Enlightenment provided **first** the social environment for a de-sacralized professionalism, nevertheless it **copied *mutatis mutandis*** exactly the ancient religious patterns.

General part of the topic is concerning the onset of professionalism while discussing different manifestations and transitions related to ideologies, socio-economic circumstances and scientific teachings from the Neolithic age down to the latest market economies. Specific part demonstrates milestones and historic ages, which were decisive in this proceeding: Old Egypt, Mesopotamia, old age Judaism, early and consolidated Christianity, impact of Islam on Europe, Reformation of the Roman Catholic church, Enlightenment, the Communist ideology and the social market economy.

Attendance at lectures, options for additional lectures:

Basic requirement: attendance at 8 sessions. In case of ***vis maior*** non-attendance of more students at a specific session, additional lecture is available.

Justification for non-attendance at lectures

Up to 2 sessions no need for **any certificates, missing** more than 3 sessions, **means automatic dropping from** the course.

Justification for non-attendance at the exam

Irrelevant item as the exam is writing an 2000 words essay or holding a 10 minutes presentation during the classes.

Control of knowledge acquired within the time-frame of sessions

No control during the session period

Requirements for confirming the session attendance

Attendance sheet has to be signed at all sessions.

Preliminary and final marks

There are no preliminary marks only final marks at the end of the course.

Type of exam

There are two options

- 1) 2,000 words essay sent to lecturer by the last teaching day of the semester.**
- 2) Short oral presentation (10 minutes) held during the last 3 sessions of the course.**

Entering for examination

There is no need to register for exam in the Student Administration System (NEPTUN)

Modification of data entered for examination

There is no need to register for exam in the Student Administration System (NEPTUN)

Justification for non-attendance at the exam

Irrelevant because of type of exams detailed above.

Note on readings

Basic course information is available as ppt-file for all attending students together with links of suggested electronic sources via Internet.

INTERCULTURAL HEALTHCARE INTEGRATED COURSE

Institute of Behavioural Science

Objectives of the course and its place in the medical curriculum:

The primary aim of the course is to help students develop intercultural competencies needed not only in their future role as medical doctors working with colleagues and patients from other cultures but in the present as well as students in the multicultural environment of Semmelweis University. To facilitate this aim, the course is integrated, welcoming students from the English, German and Hungarian programmes as well.

Besides the knowledge base required to function well in multicultural environments, the course also aims to sensitise students with regards to the values of cultural pluralism. The emphasis on analysing real cases involving cultural diversity in healthcare settings aims to provide a practical, problem-based component to the course.

Religion is an integral element of culture, and the course allocates three classes to help students understand values, norms, beliefs and practices of world religions relevant to health and healthcare. The course also aims to introduce students to the factors that need to be considered in intercultural decision making in healthcare settings

Competencies acquired through the completion of the course:

- Enhancing students' understanding of how culture shapes the health and illness behaviour of their patients to be.
- Enabling students to function better in a multicultural environment.
- Sensitising students to accept beliefs different from their own.

Prerequisites for course registration and completion:

Self-assessed English fluency is needed as the course is held in English.

Detailed course outline

All lessons are seminars

1. Introduction to intercultural healthcare- basic concepts
2. Norms, culture and deviance
3. Gender and culture
4. Cultural dimensions- comparing cultures
5. Cultural diversity in health: The cultural context of illness behaviour
6. Religion, culture and health I- the effect of religion on health: studies and pathways
7. Religion, culture and health II –Hinduism, Buddhism
8. Religion, culture and health III- Judaism, Christianity and Islam
9. The Roma in Hungary

10. Culture and Pain
11. Intercultural decision making in a healthcare setting- legal issues
12. Intercultural Decision making in a healthcare setting Case analysis
13. Round table discussion with doctors who have experience in intercultural healthcare
14. Summary

Attendance requirements: conditions under which students can make up for absences and the method of absence justification:

75% of the classes must be attended. One absence can be made up by a special assignment

Form of assessment in the study period:

Short tasks will be set for students on Moodle every week. 75% of the tasks must be completed. The tasks are not graded, just accepted or rejected.

Number and type of assignments for individual work and the deadline for submission:

A short assignment is given each week which has to be uploaded on moodle by the next class.

75% of the assignments must be completed. The deadline of the final essay is the Monday of the final week.

Requirements to obtain the teacher's signature:

75% of seminars must be attended. One practical absence can be made up by undertaking an extra task set by the teacher

The final assessment is a 1000-word essay with references to be handed in by the end of the term.

Method and type of grading:

100% final essay

List of course books, textbooks, study aids:

Healthy Diversity: A Manual of Critical Incidents, 2015- freely downloadable from: <https://healthydiversity.eu/resources/> Health Care and religious Beliefs, Alberta Health services, 2015
'A melting pot of cultures' -challenges in social adaptation and interactions amongst international medical students. Byrne E, Brugh R, McGarvey A. BMC Med Educ. 2019 Mar 18;19(1):86.

HEALTH INFORMATICS

Institute of Digital Health Sciences

Credit: 2

Lecture: 2 hours/week

Themes	
1.	Classification and Coding Systems
2.	ICD-10 Coding System
3.	Electronic patient's Record
4.	Electronic patient's Record
5.	DRG System
6.	Hospital Information Systems
7.	WEB 2.0
8.	WEB 2.0 Solutions in Health Care
9.	Introduction to Health Databases
10.	Oncology Database
11.	Evaluation of Country data. Presentation
12.	Evaluation of Aggregated data
13.	Principles of Documentation Making
14.	Documentation of Breast cancer: case study
	Self work: Stomach Cancer Documentation (data collection, evaluating, presentation, documentation) Deadline: half semester. Sending: via Internet

JEWISH MEDICAL ETHICS I - II.

Institute of Behavioural Sciences

Course Director: Rabbi Baruch Oberlander

Credit: 4 credits (2 credits for each semester; I and II)

Attendance at 75% of lectures is obligatory. Missed lectures cannot be made up for. In case of missing more than 25% of lectures (3 lectures) a note from a healthcare professional is required.

Semester grade requirement: A written report (paper) based on list of topics and recommended reading material.

Successful completion of semester I is the prerequisite of signing up for semester II.

Obligatory: Handouts given during lectures

Recommended: Dr. Avraham Steinberg (Translated by Dr. Fred Rosner): *Encyclopedia of Jewish Medical Ethics*, Feldheim Publishers, Jerusalem-New York, 1988, ISBN: 1-58330-592-0

Fred Rosner: *Pioneers in Jewish Medical Ethics*, Jason Aronson, New Jersey, 1997

Fred Rosner: *Medicine in the Bible and the Talmud: Selections from Classical Jewish Sources*, Ktav Publishing House, New York 1977

Rabbi Moshe Tendler-Fred Rosner: *Practical Medical Halachah*, Association of Orthodox Jewish Scientists, New Jersey 1990

David J. Bleich: *Judaism and Healing: Halakhic Perspectives*, Ktav Publishing House, New York 1981

Faithel Levin: *Halacha, medical science, and technology: Perspectives on contemporary Halacha issues*, Maznaim Publishing Corporation, New York-Jerusalem, 1987

Fred Rosner: *Medicine and Jewish Law II*, Jason Aronson, New Jersey, 1993

Semester I.

1-2. Lecture: The religious orders and the duty of saving a life

3-4. Lecture: Doctors and God – The function of healing and prayer in Jewish ethics

5-6. Lecture: Euthanasia – The questions of death and dying in society

7-8. Lecture: Smoking and use of light drugs from the aspect of Judaism

9-10. Lecture: Medical malpractice in the light of Jewish law and ethics

11-12. Lecture: The possibilities for artificial insemination in Jewish law

13-14. Lecture: The advantages, disadvantages and conditions of cloning

Semester II.

1-2. Lecture: Genetics and Jewish law – What rights do we have over our gene pool?

3-4. Lecture: Genetics and Jewish law – The problem of the gene manipulated food products

5-6. Lecture: Siamese twins – The question of valuation between two living persons

7-8. Lecture: Parasolvency – What is the best method to compensate the doctor?

9-10. Lecture: Contraception in Jewish law

11-12. Lecture: Permitted and prohibited methods of organ transplantation

13-14. Lecture: The questions of DNA identification in Jewish law

CLINICAL ONCOLOGY

– elective for students in the 4th and 5th year

Course Director: Prof. Dr. Zsolt Tulassay

2 hours/week, 2 credits

Department of Internal Medicine and Oncology

- Basic principles of clinical application of chemotherapy, principles of immunotherapy and endocrine therapy.
- Cancer prevention: tobacco dependence and its treatment, chemoprevention, role of surgery in cancer prevention.
- Cancer screening: principles, gastrointestinal, gynecologic, breast, lung.
- Specialized techniques in cancer management: vascular access, interventional radiology, RFA photodynamic therapy, molecular imaging and functional imaging of cancer.
- Cancer of head and neck: molecular epidemiology, treatment and rehabilitation.
- Cancer of the lung: molecular biology, NSCLC, SCLC.

- Cancer of esophagus and stomach: stage directed multimodality treatment.
- Pancreatic cancer: clinical presentation, evaluation, treatment of resectable and advanced diseases.
- Cancer of the liver: etiology, screening populations, clinical management, systemic therapy, regional therapy, radiotherapy.
- Colorectal cancer: molecular biology, screening, staging and prognosis, stage dependent treatment of colon cancer, combined modality treatment of rectal cancer.
- Kidney cancer: molecular biology of cancer, histologic types, localized and metastatic kidney cancer.
- Cancer of the breast: molecular biology, risk factors, diagnosis, prognostic and predictive factors, multimodality primary adjuvant treatment.
- Cancer of unknown primary site: histologic types of CUPS, management of CUPS.
- Immunosuppression related malignancies: AIDS, transplantation, chemotherapy.

The lecturers of the elective are the oncologists of Semmelweis University.

ORGAN TRANSPLANTATION

First Semester

Department: Faculty of Medicine, Department of Transplantation and Surgery

Time: 14x90 minutes

For semesters: 7, 9

Type of exam: written

Credits: 2

Minimum/maximum number of students: 20/140

Course thematics:

1. Introduction - History, Terminology, Organ Donation
2. Pediatric Kidney Transplantation
3. Histocompatibility, Immunologic Aspects and Immunosuppression
4. Kidney Transplantation Indication, Operation, Results, Complications

5. Liver Transplantation
6. Pediatric Liver Transplantation, Hepatocyte Transplantation
7. Follow-up of the Transplant Patient
8. Small Bowel and Multiorgan Transplantation
9. Pancreas and Islet Cell Transplantation
10. Lung Transplantation
11. Heart Transplantation
12. Radiological Aspects of Transplantation
13. Ethics of Transplantation - Case reports
14. Terminal Examination

Sign up: through the Neptun system

Deadline of sign up: September 1

INFLAMMATION BIOLOGY

Department of Genetics, Cell and Immunobiology

Course director: **A. Kristóf Fülöp**, PhD

Prerequisite subject: Immunology, Molecular Cell Biology II.

Credits: 2

In Every Second Academic Year

Lectures (2 hours per week):

- The place of inflammatory processes in the immune response and in the health science
- Molecular mechanisms in the induction of acute inflammation
- Inflammatory cells I.
- Inflammatory cells II.
- Chemotaxis and chemokines in the inflammation
- The systemic acute phase reaction and the termination of inflammation

- Histaminology
- The systemic inflammation
- Chronic inflammatory diseases I.
- Chronic inflammatory diseases II.
- Genomics of inflammation and asthma bronchiale
- Inflammation, regeneration and tumorigenesis
- Inhibition of inflammation, biological therapies
- Review and consultation

Attendance of a minimum of 75% of the lessons is necessary for the end-term signature.

Exam: written test in the exam period.

Literature: see on the homepage

Homepage: <http://gsi.semmelweis.hu>

GENETICS OF SEX

Department of Genetics, Cell and Immunobiology

Course director: Dr. Sára Tóth

No Prerequisites

Credits: 2

Second Semester

Lectures (2 hours per week):

1. Genetic background of sex determination; asexual and sexual reproduction; reproductive strategies.
2. From sex determining gene to sex chromosome
3. Male and female sex determination
4. Abnormalities in sex determination I.
5. Abnormalities in sex determination II.
6. Abnormalities in sex determination III.
7. Mechanism and role of X inactivation
8. Epigenetic effects; genome imprinting.

9. Causes of male infertility. Y chromosome mutations and ICSI.
10. Importance of Y chromosomal and mitochondrial polymorphisms in population genetics
11. Influence of sex on heredity
12. Aggressivity and sex
13. Genetics of sexual orientation
14. Ecology and sex; role of endocrine disruptors

Attendance of a minimum of 75% of the lessons is necessary for the end-term signature. No possibility to make up of absences.

Exam: no midterms, practice grade

Core texts: Chapters from Strachan & Read: Human Molecular Genetics 2nd Ed. and Gilbert: Developmental Biology 8th Ed. Both are downloadable from Pubmed Bookshelf.

Lecture presentations and additional texts are available on the homepage: www.dgci.sote.hu

Homepage: <http://gsi.semmelweis.hu>

EPIGENETICS

Department of Genetics, Cell and Immunobiology

Course directors: Dr. Sára Tóth

Credits: 2

First Semester

Lectures (2 hours per week):

1. Timeline of epigenetics; levels of epigenetic changes; targets of epigenetics
2. DNA methylation; de novo and maintenance methylation; Dnmt interactions
3. Histone modifications; histone code; histone modifying enzymes
4. Polycomb and trithorax complexes; Methylated DNA binding proteins
5. Transposons, and non-coding RNAs in epigenetic regulation; RNAi
6. Genome imprinting; skewed X inactivation their connection to DNA methylation
7. Epigenetic changes during early development and gametogenesis; Epigenetic consequences of cloning and ART

8. Transgenerational epigenetics; epigenetics of endocrine disruptors; maternal behaviour and its epigenetic consequences
9. Paramutation, transvection and mitotic bookmarking
10. Role of epigenetics in carcinogenesis; epigenetic therapy in cancer
11. Epigenetics in aging and autoimmunity
12. Epigenetic changes in diseases of the central nervous system
13. Methods used for the detection and analysis of epigenetic alterations.

Important notes:

Only for third and upper year students. There are no midterm exams. Attendance of 75% of lectures is necessary for the end-term signature. Exam: Written or oral exam (depending on the number of students). No possibility to make up of absences.

Core texts: CSHL Epigenetics textbook 2006. Downloadable from http://www-nmr.cabm.rutgers.edu/academics/biochem694/reading/Allisetal_2006.pdf

Lecture presentations and additional texts are available on the homepage: www.dgci.sote.hu

Homepage: <http://gsi.semmelweis.hu>

CHEMOTAXIS – its significance in biology and clinical sciences

Department of Genetics, Cell and Immunobiology

Course director: Dr. László Kőhidai

Credits: 2

Second Semester

Lectures (2 hours per week):

Week	Lecture	Lecturer
1.	Migratory responses of cells – General significance of chemotaxis in biology	Kohidai László, MD, PhD
2.	Phylogeny of signaling molecules and their receptors with special respect to chemotaxis	Kohidai László, MD, PhD
3.	Chemotaxis in invertebrates and vertebrates	Kohidai László, MD, PhD
4.	Chemotaxis in Inflammatory cells I.: Antigen presenting cell, monocytes-macrophages, eosinophils and neutrophils	Kohidai László, MD, PhD
5.	Chemotaxis in bacteria - A well studied signaling pathway	Kohidai László, MD, PhD
6.	Genetical backgrounds of bacterial chemotaxis	Kohidai László, MD, PhD
7.	Inflammation and chemotaxis	Kohidai László, MD, PhD
8.	Immunological aspects and their clinical implications in general	Kohidai László, MD, PhD
9.	Phagocytosis: the target reaction of chemotaxis	Szabó Rita, PhD
10.	Chemotactic ligands – Characterization of their genomics and proteomics	Kohidai László, MD, PhD
11.	Chemokines	Kohidai László, MD, PhD
12.	The optimal chemotactic ligand	Kohidai László, MD, PhD
13.	Clinical approaches – Tumor biology	Láng Orsolya, MD, PhD
14.	Does persist 'Life' without 'Chemotaxis'?	Kohidai László, MD, PhD

Important notes:

Prerequisite: Medical Chemistry.

Max. allowed absences: 3. Attendance of 75% of lectures is necessary for the end-term signature. One individual oral presentation (not for grade) is obligatory.

Exam: oral for practice mark

Possibility to make up of absences from the material on the website:

www.chemotaxis.usn.hu and www.dgci.sote.hu

Homepage: <http://gsi.semmelweis.hu>

NEUROSURGERY

Semmelweis University, Faculty of Medicine

Name of the managing institute (and any contributing institutes):

Department of Neurosurgery

Name of the subject: Neurosurgery

Credit value: 2

Number of lessons per week: 2 **lecture:** 14 **practical course:** - **seminar:** -

Subject type: optional course

Academic year: 2024/2025

Name of the course leader: Prof. Péter Banczerowski

His/her workplace, phone number: SE- Dept. of Neurosurgery, 1145 Bp., Amerikai út 57., +361-467-9325

Position: Head of Department

Date and registration number of their habilitation: 2010, reference number: 289

Objectives of the subject, its place in the medical curriculum:

Neurosurgery is a medical specialty concerned with the prevention, diagnosis and treatment of complex neurological disorders. Neurosurgeons deal with pathologies of the central and peripheral nervous system.

There are several subspecialties in neurosurgery. In neuro-traumatology, cranial and spinal injuries caused by an external mechanical forces are treated. Neuro-oncology is an important and developing field in neurosciences, that primarily deals with diagnosis and treatment of both primary central nervous system tumours and complications of systemic cancer. Vascular neurosurgery involves the treatment of abnormalities of blood vessels of the brain and spinal cord. Neurological spine surgeons treat several degenerative, neoplastic and vascular pathologies involving the bony spine or the neural structures. Neurological spine surgeons rather use minimally invasive operative techniques in order to minimize hospital stay and tissue damage. Functional neurosurgery involves the restoration of neurological condition and function. Pediatric neurosurgery is also a subspecialty and it aims to treat children with operable disorders of the nervous system.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

SE- Dept. of Neurosurgery, 1145 Bp., Amerikai út 57., Library

Successful completion of the subject results in the acquisition of the following competencies:

In our institute students can experience the various clinical presentations of central and peripheral nervous system abnormalities. We are able to introduce the diagnostic algorithm and special operative techniques with which they gain practical knowledge about neurology and neurosurgery.

Course prerequisites:

Medical Imaging

Number of students required for the course (minimum, maximum) and method of selecting students:

10/80

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments! Always attach a CV for guest lecturers!)

1. Introduction to neurosurgery: history of neurosurgery. – Prof. Dr. Nyáry István
2. Basics of micro-neurosurgical anatomy. – Dr. Balogh Attila
3. Neurological investigation of the neurosurgical patient. – Prof. Dr. Bereczki Dániel
4. Increased intracranial pressure. Hydrocephalus. – Prof. Dr. Nyáry István

5. Head and injury and neurotrauma basics. – Prof. Dr. Banczerowski Péter
6. Spine and spinal cord injuries. – Prof. Dr. Banczerowski Péter
7. Spinal tumors. – Prof. Dr. Banczerowski Péter
8. Brain tumors, neurooncology. – Dr. Bagó Attila
9. Vascular malformations of CNS. – Prof. Dr. Nyáry István
10. Degenerative spine diseases. – Dr. Nagy Gábor
11. Epilepsy surgery and investigations. – Dr. Erőss Loránd
12. Functional neurosurgery and stereotactic procedures. – Dr. Erőss Loránd
13. Radiosurgery. – Dr. Nagy Gábor
14. Visiting the operating theatre and examination.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

- Neurology
- Anesthesiology and Intensive Care
- Radiology
- Neuroradiology
- Traumatology

Special study work required to successfully complete the course:
(E.g. field exercises, medical case analysis, test preparation, etc.)

Requirements for participation in classes and the possibility to make up for absences:

To take part on lectures every Monday. In case of absences the lectures will be found in Moodle system.

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

Requirements for signature:

To gain knowledge from the lectures

Type of examination:

written essay and/or written test

Requirements of the examination:

Lectures of the topics of the curriculum

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark)

The students will be graded from 1 to 5.

offered mark: the students have opportunity to get offered mark, if they write an essay the end of the semester (until a predetermined deadline).

-written multiple choice test: written test comprises 15 multiple choice quiz questions.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material

- online notes: <https://semmelweis.hu/idegsebeszet/english/education/>
- Schmidek & Sweet's operative neurosurgical techniques / Alfredo Quinones-Hinojosa
- 62. publishing (Notes: 11/412 és 11/413)

ART OF LEARNING

Institute of Behavioural Sciences

Course Leader: *Dr. János Kollár*

First and Second Semesters

Objectives of the subject, its place in the medical curriculum:

Improving students' learning and presentation skills, and increasing their performance in the acquisition of study materials.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Seminar room.

Successful completion of the subject results in the acquisition of the following competencies:

- knowledge of creativity development practices,
- increase in educational and presentation skills (including the development of individual skills and knowledge of technical innovations),
- knowledge of mnemonic methods,
- knowledge of the wide application of the possibilities offered by the Internet (information search, communication),
- knowledge of the theory and practice of relaxation.

Course prerequisites:

None.

Number of students required for the course (minimum, maximum) and method of selecting students:

Minimum: 3, maximum: 10.

How to apply for the course:

By using Neptun.

Detailed curriculum:

1. Meeting 1: Keys of Originality - participants can learn simple but effective methods that can be used on a daily basis to develop their creativity.
2. Meeting 2: Lecturing technique - mastering the basic rules of presentation, acknowledging modern presentation methods developed in recent years and their application. Rules for developing and exercising confident performing skills.
3. Meeting 3: Learning technique - Acquiring mnemonic methods and appropriate time management to support learning.
4. Meeting 4: Advantages on the Internet - learning the application of RSS, doing own research by using RSS. Mapping Internet resources that can be used for learning and research. Relaxation: Learning the basics of relaxation, mastering the creation of body-soul-spirit harmony.
5. Meeting 5-7: Exam - Participants present their own presentation by using their knowledge acquired in the course, receive feedback from each other and from the course leader.

Lecturer: Dr. János Kollár

Requirements for participation in classes and the possibility to make up for absences:

Out of the 28 hours of the meetings, a maximum of 4 hours of absence is accepted.

Methods to assess knowledge acquisition during term time:

The course ends with an exam at one of the meetings 5th-7th.

Requirements for signature:

1. Making a presentation at an appropriate level.
2. Active participation, respect for the work of fellow students and active support.

Type of examination:

Practical grade based on the above-mentioned requirements.

Requirements of the examination:

Preparing a presentation based on the topics discussed during the course at an appropriate level.

Method and type of evaluation:

5 grade evaluation.

Excellent:	Active and constructive participation, high-quality performance of tasks. Completing the exam presentation to a high standard.
Good:	Active and constructive participation, good performance of tasks. Completing the exam presentation to a good standard with minor errors.
Satisfactory:	Passive participation, completion of the exam presentation at an appropriate level.
Pass:	Passive participation, preparation of a poor-quality exam presentation.
Failed:	Passive participation, failure to present or failure to complete the exam presentation.

How to register for the examination:

The exam is a part of the course. Special registration is not required.

Possibilities for exam retake:

In case of failure, the student will be given a one-time opportunity to improve his/her presentation.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Books:

1. Kermani, K. 1990. Autogenic Training. Souvenir Press Ltd. London.
2. Herkert, R. 1993. Die 90-Sekunden Pause. Integral Verlag, Wiesobrunn.
3. Tracy, B. 2005. Focal Point. Amacom, American Management Association International, New York.
4. O'Connor, J., Seymour, J. 1993. Introducing NLP. Thorsons Publisher Ltd. London.
5. Metzig, W., Schuster, M. 1996. Lernen zu lernen. Springer-Verlag Berlin Heidelberg.
6. Burke, J. 2001. The Knowledge Web. Simon & Schuster. New York.

DISRUPTIVE TECHNOLOGIES IN MEDICINE

Supervisors: Dr. Mária Judit Molnár, Dr. Bertalan Meskó

Code: AOSGRI374_1A

Credit: 1

Disruptive technologies bring groundbreaking changes to medicine and healthcare. While medical students are being prepared for the present conditions, medical technology is going to add different values and require new skills by the time students graduate, therefore modern medical education must prepare them for a world they will have to face in their professional lives. This course was designed to present and analyze today's medical challenges with tomorrow's technologies in a meaningful way addressing skills that students will be able to implement in their everyday practices.

Second Semester

Topics

- I. Introduction
- II. Personalized medicine and point of care diagnostics
- III. Personalized medicine- Genomic health
- IV. Personalized medicine - Imaging health
- V. Social Media and Medicine - Introduction
- VI. Social Media and Medicine - Filtering online
- VII. Social Media and Medicine - Sharing information
- VIII. Harnessing big data in healthcare
- IX. Mobile health and telemedicine
- X. Biotechnology and gene therapy
- XI. Regenerative medicine
- XII. Medical robotics, bionics, virtual reality
- XIII. Future of medical technologies

Textbooks:

Social Media in Clinical Practice, Springer, 2013

The Guide to the Future of Medicine <http://scienceroll.com/2013/10/30/whitepaper/>

INTRODUCTION TO PHARMACOLOGICAL RESEARCH

Semmelweis University, Faculty of Medicine

Name of the managing institute (and any contributing institutes):

Dept. Pharmacology and Pharmacotherapy

Name of the subject: Introduction to pharmacological research

Credit value: 2

Number of lessons per week: 2 lecture: 2 practical course: seminar:

Subject type: optional course

Academic year: both semesters in each academic year

Name of the course leader: Dr Zoltán Zádori

His/her workplace, phone number:

Semmelweis University, School of Medicine, Dept. Pharmacology and Pharmacotherapy; 459-1500/56392; 20/666-3319

Position: associate professor

Date and registration number of their habilitation: 2017; 05/2017

Objectives of the subject, its place in the medical curriculum:

The aim of the optional course is to rise the demand of following the recent literature in students. It also aims to improve the capability of critical evaluation and presentation of the information of the articles. To reach these aims, the students will present original articles.

The course will start with the review of the methods of searching original articles on the internet and ways of obtaining the full text version of the relevant papers. In addition, basics of short scientific presentation will be explained. Later on the students will present the papers independently. Tutors, i.e., researchers of the department, will help in selection, processing and presentation of the articles. The audience (researchers at the department and fellow students) will evaluate and improve the mode and quality of presentation. Pharmacological methods, applied at the department, will be demonstrated during the semester.

The course will be available for the Hungarian, English and German students of the Basic-, Preclinical- and Clinical modules from the 3rd semester. The language of the course is English.

We believe that our effort is highly fit to the new, state-of-the-art training approach of the Faculty of General Medicine, which places great emphasis on students gaining skills in following the literature, interpreting it correctly and acquiring appropriate presentation and discussion skills during their undergraduate training.

Place where the subject is taught (address of the auditorium, seminar room, etc.):

floor IV., room Knoll, NET, Budapest, Nagyváradi sq. 4., 1089 and Zoom

Successful completion of the subject results in the acquisition of the following competencies:

Obtaining the latest and most important knowledge of pharmacology and medical biology; ability of correct interpretation and presentation of the core knowledge; insight into the methodology and latest trends of pharmacological research.

Course prerequisites:

Prerequisite: Medical biochemistry I.

Taking the following courses simultaneously is also considered necessary: Medical biochemistry II., Medical physiology I.

Number of students required for the course (minimum, maximum) and method of selecting students:

Minimal number of students: 10

Maximal number of students: 45

Way of selection: the order of application in Neptun

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments! Always attach a CV for guest lecturers!)

Class	Title of topics	Tutor/Lecturer
1-2	Methods of searching the original articles on the internet and ways of obtaining the full text version of the relevant papers. Basics of short scientific presentation. Dr. Zoltán Varga, sen. res. associate	
3-4	Pharmacological modulation of mitochondrial function in ischemic heart disease.	Dr. Péter Ferdinandy, professor
5-6.	The role of microbiota in health and disease	Dr. Zoltán Zádori, associate prof.
7-8.	Perspectives in the research of antipsychotic agents.	Dr. Júlia Timár, associate prof.
9-10.	Potentially new therapeutic indications for the RAS modulatory drugs.	Dr. Mahmoud Al-Khrasani, ass. prof.
11-12.	Recent advances in pain research.	Dr. Kornél Király, assistant prof.
13-14.	Pharmacology of exosomes in ischemic preconditioning in the heart.	Dr. Zoltán Giricz, sen. res. associate
15-16.	Cell culture models in the field of cardiology and oncology	Dr. Anikó Görbe, associate prof.
17-18.	Pharmacological modulation of preconditioning.	Dr. Péter Ferdinandy, professor
19-20.	Opioid analgesics. Which way further?	Dr. Pál Riba, associate prof.
21-22.	Increasing the lifespan. How can pharmacology help?	Dr. Ildikó Miklya, associate prof.
23-24.	New directions in the drug therapy of IBD.	Dr. Zoltán Zádori, associate prof.
25-26.	Unbiased network theoretic target prediction in various diseases	Dr. Bence Ágg, assistant prof.
27-28.	Pharmacology of cognitive enhancers.	Dr. László Hársing, scientific cons.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

Medical biochemistry, Medical physiology, Pharmacology. No overlap.

Special study work required to successfully complete the course:

Attending the classes is a basic requirement. In addition, each student must give a presentation per semester, answer the questions raised, participate actively in the discussion, form an opinion on the presentation and ask questions.

Requirements for participation in classes and the possibility to make up for absences:

Attending the classes is mandatory and controlled. Four absences are acceptable. Over that the credit is refused. There is no replacement for missed classes, however, the original publications, the slides of the lectures and the recording of the event (in the case of Zoom meeting) will be available for the students in the Moodle system of the university.

Methods to assess knowledge acquisition during term time:

There is no formal examination during the term time. The presenting student will be, of course, asked to response for the questions and

comments of the course leaders, researchers and PhD and fellow students at the department.

Requirements for signature: Successful test exam and no more than four absences.

Type of examination: Single choice test exam.

Requirements of the examination:

There is a test exam at the end of the course. The single choice test questions ask about the actual publication-based lectures during the semester. Accordingly, test questions are updated every semester.

Method and type of evaluation:

Evaluation of the test exam on a scale of 1-5.

Possibilities for exam retake:

In justified cases, we provide an opportunity for a supplementary exam, after oral consultation.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Original publications, slides of the lectures and the recording of the events (in the case of Zoom meeting) will be available for the students in the Moodle system of the university.

Healthcare management

Course Leader: Dr. habil Judit Lám Ph.D.

Prerequisite: Internal Medicine I.

Credit: 2

Lecture: 2 hours / week

Thematics:

1st week: Introduction: the role of management in healthcare, basics

2nd week: Healthcare economics I.

3rd week: Healthcare economics II.

4th week: Healthcare financing

5th week: Healthcare system models and their international comparison

6th week: Organisational management

7th week: Organisational behavior

8th week: Human resource management in healthcare

9th week: Change management in healthcare

10th week: Patient safety in practice

11th week: Quality management and development in healthcare

12th week: Health politics

13th week: Project and time management

14th week: Summary

Medical genomics

Department of Genetics, Cell and Immunobiology

Lecturer: **Prof. Dr. Csaba Szalai**

Medical genomics introduces the basic knowledge in medical and human genomics and the associated genomic methods. The main topic of the course is the genetic and genomic background of the most common multifactorial diseases, like asthma, allergy, type 1 diabetes mellitus, type 2 diabetes mellitus, obesity, high blood pressure, atherosclerosis, Alzheimer disease and Parkinson disease. The lectures show the most important genes and genetic variations in these diseases which can influence the susceptibility to the them and how this knowledge can be used to get to know the pathomechanisms of these diseases and to reveal novel therapy and drug targets. There are also lectures about pharmacogenomics and how our genes influence our responses to different environmental effects. As genomics belongs to systems biology, a lecture introduces to basic terms of systems biology, and concentrating on diseases, some examples of the application and utilization of this scientific field are also be shown.

Planned lectures:

- Introduction to genomics, the human genom
- Multifactorial diseases
- Genomic methods
- Asthma, allergy
- Type 1 diabetes mellitus
- Type 2 diabetes mellitus
- Obesity
- High blood pressure
- Atherosclerosis
- Alzheimer and Parkinson diseases
- Gene-environmental interactions
- Pharmacogenomics
- Systems biology

Prerequisite subjects: Medical Biochemistry, Molecular and Cell Biology I, II and III.

Systems Neuroscience I–VI.

Faculty of Medicine, Department of Anatomy,
Histology and Embryology

Type of course: optional course-unit

credit: 2

Name of the responsible person: Dr. Gábor Gerber

Second Semester

Role of the course in the training of the Department:

The Systems Neuroscience program follows the approach of systems theory in understanding the brain. The aim is to provide students a view of the brain as a whole via unfolding, at least in part, its immense complexity. This is a major challenge of all time, but the right answer should be one that can integrate actual knowledge. As we are in the fortunate period of time when high performance tools (both hardware and software) and large datasets are getting more and more available, systems thinking is inevitable in brain research. Therefore, throughout the course students will learn how different approaches - reductionist, holist and functionalist – are all useful and necessary in understanding the brain. In one way the course is structured by introducing the students the different levels of organization all being complex systems themselves. After an introductory about the systems science approach of the brain (course 2) we discuss the molecular machineries at the subcellular level (course 3) then turn into the cellular level by learning why and why not the neuron is considered as the unit of brain organization (course 4). In the next step it is shown how billions of neurons make up the cerebral cortex and how this evolutionarily new structure can perform diverse cognitive and other functions (course 5). Finally, whole brain functions and functioning will be approached via its role in behavior (course 6).

In other way, each course will show how the brain functions at lower organizational levels such that synaptic and neuronal populations of different structures as well as a whole. Such holistic approaches have high importance in recent efforts made in deciphering the neurobiological basis of neuropsychiatric and neurological diseases (courses 5,6). Finally, with the closing series of lectures (course 7,8) we aim to provide tools, rules and examples, which help integrating knowledge acquired throughout the courses and also provide an outlook whereby the brain can be compared to other complex systems (course 2). Another notable feature of the Systems Neuroscience program is its interdisciplinary nature: it will introduce the students into several state of the art methods both experimental (molecular biology, cellular and extracellular physiology, different kinds of imaging) and theoretical (data and network analyses, simulation and modelling).

Each course includes visiting the lecturers' lab.

The course will start with an introductory about the history and culture of the geopolitical region thought as Central Europe.

The program of the course:

Weekly schedule of the Courses

1. Central European Culture
2. Introduction to Systems Neuroscience
3. Genomic analysis of single neurons. Neuronal proteomics.
4. Single neurons and beyond
5. Neocortex: from structure to function
6. Neural rhythms: normal and pathological. Brain imaging: from normal to pathological.
7. Neuroelectricity
8. Statistics and the Brain

Practical courses: introduction into cutting edge research techniques during the lab visits

Consultations: personally with the actual course leader

Requirements of course participation and options to recover missed hours:

1. Total absence allowed: 10% of the total course hours
2. Recovering missing hours: studying the material provided by the course leaders, consultation

Eligibility: US grade point average (GPA) of 3.0. Students with a GPA lower than 3.0 should inquire with the Directors on the possibility of a waiver.

Justification of absence from course hours or exams:

Hungarian medical certificate

Number and schedule of the examinations:

The course is divided into eight blocks each covering different fields and scheduled in a weekly basis. Each block ends with an exam in the last teaching day of the actual week.

Requirements of the successful completion of the program:

written or oral test in each course material

Marks:

In case of a written test grades are given after obtaining points as follows: 0-50% fail, 51-60% pass, 61-75% fair, 76-90% good, above 90% excellent.

Types of exam: test, essay, verbal

Requirements of the examinations:

Verbal and electronic etc. material provided by the lecturers. Syllabus is available upon opening the program on the web page.

Registration for exams: NEPTUN

Rescheduling the tests:

N/A

Each student has to take an examination in each block of the course.

Justification of absence from the exam:

Hungarian medical certificate (see above).

List of useful literature (books, papers etc):

It is made available for the students two weeks before the first lecture

PRECLINICAL AND CLINICAL NEUROPSYHOPHARMACOLOGY AND PSYCHOPHARMACOGENETICS

(Hungarian: Preklinikai és klinikai neuropszichofarmakológia és pszichofarmakogenetika)

Name of the Programme: Medicine, uninterrupted graduate programme
Neptun-Code (planned): AOVGYH198_1A
Institute: Department of Pharmacodynamics
Name of the tutor/lecturer: Dr. Gyorgy Bagdy PhD, Dsc.
Phone: +36-1-4591495, +36-1-2104411, +36-1-2102927
E-Mail: bagdy.gyorgy@pharma.semmelweis-univ.hu

Further tutors: Juhász Gabriella Associate Professor, PhD, Lévy György PhD, CSc, Gyertyán István PhD, Gonda Xénia PhD, Ujváry István PhD, Tamási Viola PhD, Vas Szilvia PhD, Eszlári Nóra researcher psychologist (MA)

Number of lectures /week:
blocked course (2X7 lessons)
Credit points: 1

Brief course summary:
The aim of this course is to introduce the function of the central nervous system (CNS), diseases that impact the CNS as well as the (psychiatric, neurological, neurosurgical and addictological) way of their treatment for the interested students. The course creates a bridge between theoretical and clinical subjects. During the course, genetics, molecular sciences, animal models and human investigating methods are demonstrated as well as the possibilities and limits of their application using concrete examples.

Course data

Recommended semester of completing the course	Lecture (contact hrs/ week)	Practice (contact hrs/ week)	Seminar (contact hrs/week)	Individual lecture	Total number of contact hours/ semester	Semester	Consultation
from the 4 th semester	14				14	Spring semester* Winter semester* Both semesters*	

Semester program

I. Lecture topics/week

1. week:	Principles of the function and pharmacological modification of the central nervous system. (György Bagdy) (I-III.) Animal models of diseases affecting the central nervous system (György Lévy) (IV-V.) The dopamine theory of schizophrenia. Antipsychotic drug research (István Gyertyán) (VI-VII.) Experimental studies in learning and memory (István Gyertyán) (VIII.) Genetics of behavioural characteristics influencing psychiatric disorders (Nóra Eszlári) (IX.)
2. week:	Application of neuroimaging techniques in the neuropsychopharmacology (Gabriella Juhász) (X.) Pharmacogenetics (Xénia Gonda) (XI.) Sleep and behaviour. The neurotransmitter regulation of sleep (Vas Szilvia) (XII.) The phenomenon of hallucination: from tribal customs to chemical structures (Ujváry István) (XIII.) The role of “omic” methods in the innovation of psychopharmacons (Viola Tamási) (XIV.)

Course requirements

Prerequisites: previous attendance of courses in Biology, Physiology and Biochemistry

Semester acceptance conditions: (successful course attendance, mid-term tests, absence, etc.)
Attendance of 11 of 14 lectures is required.

Knowledge testing during the semester: -
Requirements of the signature at the end of the semester:
Attendance of 11 of 14 lectures. Repetition of the lessons during the course is not possible.

Individual activity of the student during the semester (protocol, etc.) -

Performance control in the examination period final examination
Performance control in the examination period (written, oral, written and oral) written, correction examination: oral
Prescribed external practice: -

List of teaching materials: (List of textbooks, hand-outs, scripts, etc.)

1. Kirilly E., Gonda X., Bagdy G.: CB1 receptor antagonists: new discoveries leading to new perspectives. ACTA PHYSIOLOGICA 205:(1) pp. 41-60. (2012)

2. Lazary J., Juhasz G., Hunyady L, Bagdy G.: Personalized medicine can pave the way for the safe use of CB(1) receptor antagonists. TRENDS IN PHARMACOLOGICAL SCIENCES 32:(5) pp. 270-280. (2011)

3. J.M. Monti, S.R. Pandi-Perumal, B.L. Jacobs and D.J. Nutt (Eds): Serotonin and Sleep: Functional, and Clinical Aspects, Birkhauser, Basel, 2008.

4. J.N. Crawley: What’s Wrong with my Mouse? Wiley-Liss, New York, 2000.

List of course materials: classroom, projector

Scientific, course related researches, publications/essays:

1. Juhasz G, Hullam G, Eszlari N, Gonda X, Antal P, Anderson IM, Hökfelt TG, Deakin JF, Bagdy G. Brain galanin system genes interact with life stresses in depression-related phenotypes. Proc Natl Acad Sci U S A. 2014 Apr 22;111(16):E1666-73. doi: 10.1073/pnas.1403649111. Epub 2014 Mar 24. PubMed PMID: 24706871.

2. Bagdy G, Juhasz G. Biomarkers for personalised treatment in psychiatric diseases. Expert Opin Med Diagn. 2013 Sep;7(5):417-22. doi: 10.1517/17530059.2013.821979. Epub 2013 Jul 22. PubMed PMID: 23875948; PubMed Central PMCID: PMC3786517.

3. Kátaí Z, Adori C, Kitka T, Vas S, Kalmár L, Kostyalik D, Tóthfalusi L, Palkovits M, Bagdy G. Acute escitalopram treatment inhibits REM sleep rebound and activation of MCH-expressing neurons in the lateral hypothalamus after long term selective REM sleep deprivation. Psychopharmacology (Berl). 2013 Aug;228(3):439-49. doi: 10.1007/s00213-013-3046-4. Epub 2013 Mar 21. PubMed PMID: 23515582.

4. Lazary J, Juhasz G, Hunyady L, Bagdy G. Personalized medicine can pave the way for the safe use of CB₁ receptor antagonists. Trends Pharmacol Sci. 2011 May;32(5):270-80. doi: 10.1016/j.tips.2011.02.013. Epub 2011 Apr 16. Review. PubMed PMID: 21497918.

5. Adori C, Low P, Andó RD, Gutknecht L, Pap D, Truszka F, Takács J, Kovács GG, Lesch KP, Bagdy G. Ultrastructural characterization of tryptophan hydroxylase 2-specific cortical serotonergic fibers and dorsal raphe neuronal cell bodies after MDMA treatment in rat. Psychopharmacology (Berl). 2011 Feb;213(2-3):377-91. doi: 10.1007/s00213-010-2041-2. Epub 2010 Oct 30. PubMed PMID: 21052985.

ULTRASONOGRAPHY IN OBSTETRICS AND GYNECOLOGY

Department: Department of Obstetrics and Gynecology

Study time: In every second Semester 2×45 minutes. Advised Semester: between 6. und 12. Semester

Exam: Written test and practical note

Credit: 1

Minimal/maximal participants: (1/5 person)

Application deadline: 1. December

Prerequisite: Completion of second year

The knowledge gained in theoretical basic subjects (anatomy, physiology) can be used by medical students as practical knowledge in the clinic. As a result of more than four decades of experience, ultrasound examination has a fundamental role in modern obstetrical and gynecological diagnostic. The course helps you to acquire skill in this field. Performing obstetrical-gynecological ultrasound tests and assessment of findings can only be learned through appropriate training. This non-invasive procedure is also safe for patients. The modern ultrasound equipment of the Department and the wide range of patients and diseases provide the opportunity for learning.

Not only obstetricians and gynecologists, but also other associate colleagues such as clinical genetics, radiologists, gynecological cancer surgeons, anesthetists, and intensive therapists can utilize the knowledge provided by the subject

Themes:

Physical basics of ultrasound examination. Parts of the ultrasound device. Application modes (amplitude, motion, brightness, Doppler). Gynecological ultrasound examination. Early pregnancy tests. Ectopic pregnancy. Standard planes of the first ultrasound screening during the 11-13th week of pregnancy. Neurosonography and fetal echocardiography. Standard planes of the second ultrasound screening during the 18-22th week of pregnancy. Ultrasound examinations in the third trimester. Amniotic fluid index and fetal Doppler examinations. 3-4-dimensional ultrasound examinations and their practical application.

György Bagdy

CARDIAC ELECTROPHYSIOLOGY

Semmelweis University, Faculty of Medicine

Name of the managing institute (and any contributing institutes):

Gestor Institute: Department of Physiology

Name of the subject: Cardiac electrophysiology

Credit value: 2

Number of lessons per week: 2 lecture: 2 practical course: seminar:

Subject type: optional course

Academic year: 2024/2025

Name of the course leader: András TÓTH, DSc.

His/her workplace, phone number: Semmelweis University, Department of Physiology; phone: +36-1-459-1500/60436

Position: External lecturer

Date and registration number of their habilitation: 18/2009 (SZTE, ÁOK).

Objectives of the subject, its place in the medical curriculum:

The course is intended to provide up-to-date and extended knowledge based on the latest literature for practically all medical students, especially those planning to be cardiologists or internists in order to meet a predictable future requirement of a strongly established knowledge related to the electrophysiological background and ion channel dependent pathomechanisms of severe, often lethal heart diseases and to facilitate their better understanding of the corresponding scientific literature. Their expected competent knowledge on cardiac electrophysiological mechanisms will significantly help young MDs to introduce novel, highly effective cardiopharmacological agents and/or to select optimal clinical therapeutic strategies. Via providing a detailed introspection into molecular and cellular basis of the electric activity of the heart the course is willing to offer the students an opportunity to collect an important section of these competences during their student years. During the course the motivated students may collect a comprehensive knowledge on:

- the biophysical basis of cardiac electrophysiology; the principles of operation and regulation of major cardiac ion channels
- the kinetic properties and regulation of ion currents generating cardiac action potentials; the significance of the repolarization reserve; the molecular background of substantial differences between atrial and ventricular and among various ventricular action potentials; and the basic pathomechanisms of arrhythmogenesis
- the principles of intracellular Ca^{2+} homeostasis in cardiomyocytes; the major mechanisms of excitation/contraction coupling; functional adaptation of the Ca^{2+} -cycle; pathomechanisms of Ca^{2+} -dependent and Ca^{2+} -facilitated heart diseases and several therapeutic strategies
- common genetic disturbances leading to malfunction of cardiac ion channels
- most important experimental techniques and animal models applied in experimental cardiac electrophysiology and the human/clinical relevance of the collected data

Finally a practical demonstration (13-th week) based on the material of the lectures is organized in order to help realistic, problem-oriented application of the theoretical knowledge via jointly processing experimental data derived from a few running scientific projects

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University; EOK; H-1094 Budapest, Tűzoltó u. 37-47

Successful completion of the subject results in the acquisition of the following competencies:

Understanding of the human physiology which is foundation of medical practice.

Course prerequisites:

Medical Physiology 1 (the course is suggested for 2-4 year students)

Minimum and maximum number of students registering for the course: Minimum 5 and maximum 80 students

Detailed curriculum:

1. week: **Introduction**

- the role and importance of cellular level cardiac electrophysiology in medical practice
- historical background

2. week: **Basic contexts of electrophysiology; propagation of stimulus in cardiac muscle**

- biophysical principles of transcellular ion movements, Nernst equation, Donnan equilibrium, equilibrium potential
- generation and maintenance of the resting potential
- generation and propagation of the action potential (AP)

3. week: **Ion channels**

4. week: **Action potentials in the heart; major contributing ion channels/ion currents**

- generation of the cardiac action potentials, fast and slow AP
- atrial-ventricular and ventricular regional differences in action potentials and distribution of ion channels
- Na^+ and Ca^{2+} specific ion channels and -currents
- properties of various of K^+ currents (early/late, ultrarapid/rapid/slow, ATP-dependent, inward rectifying, etc.) and their role in the AP

5. week: **Developmental mechanisms of cardiac arrhythmias**

- significance of the repolarization reserve, consequences of its decrease
- mechanisms of generation of afterpotentials; extrasystole
- ventricular arrhythmias: torsade de point (TdP), ventricular fibrillation
- atrial fibrillation

6. week: **Experimental techniques in cardiac electrophysiology 1. – Microelectrode based measurements**

- action potential measurements with conventional microelectrodes
- ion current determinations using the „patch clamp” technique

7. week: **Ca^{2+} homeostasis in cardiac cells**

- intracellular Ca^{2+} compartments
- ion transport mechanisms involved in the Ca^{2+} cycle
- cardiac Ca^{2+} transporters, their major characteristics and principles of function
- the relationship between intracellular Ca^{2+} movements and AP repolarization

8. week: **The electromechanical coupling (ECc) and its regulation in cardiac cells**

- regulation of the Ca^{2+} transport and -homeostasis
- conditions for steady state activity of the heart
- mechanisms of functional adaptation of the heart

9. week: **Perturbations of Ca^{2+} homeostasis and their role in development and progress of a number of heart diseases**

- Pathomechanisms leading to cellular Ca^{2+} overload or Ca^{2+} deficit
- Ca^{2+} -dependent and Ca^{2+} -facilitated heart diseases
- afterpotentials and arrhythmogenesis; atrial fibrillation
- ischemia/reperfusion injury
- malignant hypertrophy and heart failure

10. week: **Experimental techniques in cardiac electrophysiology 2. Optical techniques**

- basic principles of the application of fluorescent „tracer” molecules
- „single” and „multichannel” measurements in isolated cardiomyocytes, isolated heart
- novel, complex imaging (mapping) experimental techniques

11. week: **Experimental (animal) models and their clinical relevance**

- the importance of experimental (animal) models in cardiology
- small animal (mouse, rat, guinea pig) models
- large animal (dog, rabbit, goat, etc.) models
- human relevance of data and information derived from animal models
- significance of human models and samples

12. week: **Genetic background of malfunction of cardiac ion channels**

- „QT” syndromes and their genetic background
- consequences of genetics originated disturbances of Ca²⁺ transporters
- transgenic animal models

13. week: **Antiarrhythmic drug classes + a few examples from arrhythmia research**

- Classification of antiarrhythmic drugs provided by Vaughan Williams
- Principles of the „Sicilian Gambit”
- Modernized scheme of antiarrhythmic drug classes
- A few examples from experimental arrhythmia research

14. week: **Consultation**

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes:

Minimal overlap with Medical Physiology 1 and Cardiology

Requirements for participation in classes and the possibility to make up for absences:

It is required to attend at least 75% of the lectures (10 lectures).

Missing attendance may be partially compensated at a consultation offered during the semester

Methods to assess knowledge acquisition during term time: (E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)

Understanding of the material of the previous lectures will be verified by two „multiple choice” tests (10-10 questions) + interactive during the lectures

Requirements for signature:

It is required to attend at least 75% of the lectures (10 lectures).

Missing attendance may be partially compensated at a consultation offered during the semester

Type of examination:

Colloquium. Oral exam. Theoretical exam.

Requirements of the examination:

Before the exam the examinee should suggest at least six topics he/she knows best from at least six lectures. From the suggested topics the examiner will pick two to be orally presented.

The most important requirement is the best possible understanding of the selected lectures.

Lecture 1:	–
Lecture 2:	–
Lecture 3:	1 Basic features and classification of ion channels
	2 Characterization and principles of regulation of voltage-gated ion channels
	3 Characterization and principles of regulation of ligand-gated ion channels
Lecture 4:	1 Heterogeneity of action potentials and depolarizing ion currents in the heart
	2 Repolarizing ion currents in the heart – the principle of repolarization reserve
	3 Atrium specific, nonselective and anion currents in the heart
Lecture 5:	1 Principal mechanisms of arrhythmogenesis
	2 Atrial fibrillation
	3 Ventricular arrhythmias
Lecture 6:	1 Cardiomyocyte isolation techniques; patch-clamp measurement
	2 Multicellular heart preparations; action potential measurements
Lecture 7:	1 Major Ca ²⁺ compartments in cardiomyocytes
	2 Trans-sarcolemmal Ca ²⁺ transport in cardiomyocytes
	3 Ca ²⁺ transport in the sarcoplasmic reticulum and in mitochondria
Lecture 8:	1 Principal mechanisms of the EC-coupling – the local control theory
	2 Control of Ca ²⁺ release and Ca ²⁺ content of the sarcoplasmic reticulum – principle of flux balance
	3 Mechanisms of functional adaptation of the heart
Lecture 9:	1 Afterpotentials and arrhythmogenesis
	2 Intracellular Ca ²⁺ overload and ischemia/reperfusion injury
	3 Cardiac hypertrophy and heart failure
Lecture 10:	Basic properties of Ca ²⁺ -sensitive dyes; Ca ²⁺ measurements in isolated single cardiomyocytes and in isolated intact heart; subcellular Ca ²⁺ measurements
	Optical mapping of membrane potential; principles of using genetically encoded Ca ²⁺ indicators;
Lecture 11:	1 QT syndromes and their genetic background; consequences of genetic disorders of Ca ²⁺ transporters
	2 Transgenic animal models in cardiac electrophysiology – principles and perspectives of human gene transfer
Lecture 12:	1 Advantages and limitations of small and large animal models; human relevance of data and information derived from animal models
	2 Animal models of arrhythmogenesis, ischemic heart disease and heart failure human relevance of data and information derived from animal models
Lecture 13:	–

Method and type of evaluation:

Two simple topics from the corresponding topic list will be picked randomly by the examinee.

The overall grade of the exam is the mean of two partial grades:

Excellent (5): 4.51 - 5.00

Good (4): 3.51 - 4.50

Satisfactory (3): 2.51 - 3.50

Pass (2): 2.00 - 2.50

Fail (1): below 2.00

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Obligatory:

1. The material presented during the classroom lectures and made also available on-line.

Suggested:

1. Ion channels for communication between and within cells; Erwin Neher Nobel Lecture, 1991
2. Heart Rate and Rhythm Ed. O.N Tripathi, U. Ravens and M.C. Sanguinetti; Springer, 2011
3. Excitation-Contraction Coupling and Cardiac Contractile Force D. Bers; Springer, 2001
4. Basis and Treatment of Cardiac Arrhythmias Ed.: R.S. Kass, C.E. Clancy; Springer, 2006
5. Electrical Diseases of the Heart Ed. I. Gussak, C. Antzelevitch; Springer, 2008
6. Handbook of Cardiac Electrophysiology Ed. A. Natale; Informa UK, 2007
7. Klinikai szív-elektrofiziológia és aritmológia Sz. Fazekas T., Merkely B., Papp Gy., Tenczer J.; Akadémiai Kiadó 2009

BIOMEDICAL INNOVATION FOR THE 21st CENTURY

We would like to bring to the attention of Semmelweis University students a newly started English course on the topic of engineering innovation in medical research and patient care. By Béla Merkely Rector, the course is being promoted with the Pázmány Péter Catholic University Faculty of Information Technology and Bionics. The course does not require any engineering previous experience. This course was designed for medical student with basic biophysical knowledge. The aim of the course is to introduce those interested in areas where engineering opportunities are becoming increasingly important in patient care. Each lecture converges on a theme that is presented by a medical and an engineering specialist based on their own perspectives. This allows the audience to learn about the engineering and medical aspects of the same topic. On the other hand, this course provides a deeper insight into the specific field of medical engineering to facilitate the development of research collaboration between the two fields. We strive to promote medical developments and facilitating a safe but rapid transfer of research results into clinical practice.

Language English.

Exam: 2-page essay on a selected topic.

Held by Medical and Engineering specialists

Thematics

- Recent advances in biomedical engineering.
- Microfluidics for diagnostics and therapy.
- Robotics for healthcare: robotics surgery from minimal invasive surgery to DaVinci.
- Ultrasound diagnostics and therapy.
- Advances in bioimage processing.
- Deep learning algorithms in medical imaging.
- Proteomics: the new era of microbiology.
- 3D printing and 3D planning in medicine.
- Prosthetics in medical and engineering field.
- *Biosignal processing for personalized treatment.*
- Gene Therapy from the perspective of Systems Biology.
- Organ-on-a-chip, and investigation and development of stem cell based therapies.
- From patents to university spin-off companies.

MEDICAL HUNGARIAN FOR ADVANCED LEARNERS 1., 2.

Institute of Languages for Specific Purposes

General information: szaknyelvi.intezet@semmelweis.hu

Address: H-1091 Budapest, Üllői út 25.

CLINICOPATHOLOGY

Semmelweis University, Faculty of Medicine

Name of the managing institute (and any contributing institutes):

Department of Pathology, Forensic and Insurance Medicine

Name of the subject: CLINICOPATHOLOGY

Credit value: 3

Number of lessons per week: 28 lecture: 28 practical course: seminar:

Subject type: optional course

Academic year: 2024/2025.

Name of the course leader: Lotz Gábor MD.

His workplace, phone number: Department of Pathology, Forensic and Insurance Medicine, 06208259665

Position: associate professor

Date and registration number of their habilitation:

Objectives of the subject, its place in the medical curriculum:

Practical application of 3rd year theoretical material in Clinics with the active supports of clinicians and specialist in pathology.

Place where the subject is taught (address of the auditorium, seminar room, etc.):Lecture room Department of Pathology, Forensic and Insurance Medicine

Successful completion of the subject results in the acquisition of the following competencies:

Completion of the subject may provide additional experiences to the students to apply theoretical knowledge in their future medical practice.

Course prerequisites: Completion of the final exam of Pathology (6th semester requirement).

Number of students required for the course (minimum, maximum) and method of selecting students: minimum 5, maximum 180

Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks).

Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments! Always attach a CV for guest lecturers!)

1. Dr. Kiss: Introduction, case presentation
2. Dr. Lilla Madaras: Gynecology
3. Prof. Dr. András Kiss: Liver
4. Prof. Dr. Janina Kulka & Dr. Lilla Madaras: Breast
5. Dr. Attila Kovács: Pancreas
6. Dr. Judit Halász: Pediatrics
7. Dr. Attila Kovács: Head and Neck
8. Prof. Dr. András Kiss: GI
9. Dr. Deján Dobi: Kidney
10. Dr. Eszter Székely: Cytology
11. Dr. Eszter Székely: Urology
12. Dr. Jeannette Tóth: Eye
13. Dr. István Kenessey: Final exam

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes: Subject overlaps with 3rd year medical studies in pathology as well as with all clinical subjects.

Requirements for participation in classes and the possibility to make up for absences: Attending at least 9 lectures.

Requirements for signature: Attending at least 9 lectures. Individual essay work from a future determined topic which was lectured during the semester.

Type of examination: Written. Essay

Requirements of the examination: Topic of the performed lectures (see above).

Method and type of evaluation: *(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)* Subjective evaluation of the essay work.

Possibilities for exam retake: No retake opportunity. In the absence of the essay signature will be refused.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

Material will be submitted to the Moodle system of the University.

DEVELOPMENTAL BIOLOGY: from gene to newborn. I. -

"Our real teacher has been and still is the embryo, who is, incidentally, the only teacher who is always right."

Hamburger 1900-2001

Regulatory mechanisms and early development of embryology 2 hours/week, 2 credits

Prof. Dr. Imre Oláh

Department of Human Morphology and Developmental Biology

Introduction to developmental biology

Comparative embryology, epigenesis and preformation, evolutionary embryology, medical implications

Regulatory elements of the ontogenesis I.

Hormones, growth factors, transcription factors, instructive and permissive interactions

Regulatory elements of the ontogenesis II.

DNA-methylation, X chromosome inactivation, genomic imprinting

Cell-cell and cell-extracellular matrix interactions

Adhesion molecules, integrins, cytoskeleton and cell movement, cell polarization

Cell lineages

Fate map, stem cells, peripheral blood fibrocytes, cell specification, polarity in biological system

Neurogenesis

Origin of neural cells, switch between neuronal and glial fates, axonal specificity, synaptic plasticity

Neural crests and placodes

Origin of neural crest and placodes, flexibility and heterogeneity of neural crest cells.

Myogenesis

Embryonic origin of skeletal, smooth and cardiac muscles. Induction of myogenesis, regulatory factors of myogenesis, regeneration of skeletal muscles

Teratogenesis

Morphogens, morphogenetic period, cancer as an altered development, stem cell therapy, teratogens.

Primordial germ cells (PGC)

Origins, migration, mitosis, differences between male and female PGC, maturations

Fertilization

Acrosome reaction, prevention of polyspermy, activation of egg metabolism

Embryonic induction

Spemann organization center, mosaic and regulative zygotes

Early embryonic development

Cleavage, neurulation, X-chromosome inactivation, parental imprinting

Gastrulation

Differentiation of mesoderm, primary tissue formation

Axis formations in birds and mammals

Symmetry breaking, left-right asymmetry formation.

ORGANOGENESIS

2 hours/week, 2 credits

Prof. Dr. Imre Oláh

Department of Human Morphology and Developmental Biology

Axial and paraxial mesoderm

Formation of axial skeleton, somitogenesis, clinical correlations

Segmentation and Homeobox genes

Retinoic acid, gain of function, loss of function

Intermediate mesoderm I.

Development of kidney, clinical correlations

Intermediate mesoderm II.

Development of gonads, sex determination, clinical correlations

Lateral plate mesoderm, splanchnopleura I.

Vasculogenesis, blood formation, hematopoietic stem cell.

Lateral plate mesoderm, splanchnopleura II.

Early development of the heart. Cardiac anlage, cardiac jelly, cardiac skeleton, development of coronary vessels, contribution of neural crest cells, epicardial body, clinical correlations

Lateral plate mesoderm, somatopleura

Development of the limb, evolutionary and ontogenetic aspects, clinical correlations

Branchiogenic arches and their derivatives

Clinical correlations

Prechordal plate as head organizer, AVE-anterior ventral entoderm

Cranial neural crest and head mesoderm, somatic and visceral head and neck, clinical correlations

Development of arteries

Branchiogenic, parietal and visceral segmental arteries, clinical correlations

Epithelio-mesenchymal interactions

Ecto-entoderm <—> mesoderm, tooth and lung development, clinical correlations

Neurogenesis

Antero-posterior, and craniosacral regionalization, axon guidance, growth, synapsis formation

Development of eye

Retina, lens

Entoderm formation

Foregut and its derivatives (thymus, thyroid, parathyroid), development of pancreas

Environmental regulation of development

Developmental symbiosis, seasonality and sex, nutritional contribution

BIOINFORMATICS

Department of Bioinformatics

Credit value: 2

Number of lessons per week: lecture: 1 practical course: 1

Subject type: optional course

II. semester

Name of the course leader: Prof. Dr. Balázs Györfly

Objectives of the subject, its place in the medical curriculum:

Today, we have plenty of data in medicine and the challenge lies not any more in obtaining the data but in interpreting the data. Figuring the result of genomics, transcriptomics and other omics technologies present a serious obstacle in understanding the molecular mechanism behind definite diseases. Luckily, bioinformatics is at hand to assist in solving these problems.

Bioinformatics comprises of the computer-assisted evaluation of clinical and biological data. We will discuss in detail three areas of bioinformatics. The first contain databases dealing with clinical and biological data. These also include biobanks and data repositories for storing and accessing information. The second area contains the data processing, modelling, visualization and interpretation. The third pillar is the interpretation of the data within the clinical context of a selected disease.

We will give lectures on the most important chapters of medical bioinformatics including databases, decision-support tools, genomics, transcriptomics, proteomics, medical informatics and artificial intelligence.

Successful completion of the subject results in the acquisition of the following competencies:

Students will be able to understand the theoretical basics and to utilize the most important bioinformatical tools. They will know the advantages and limitations of each method. The students will have a hand-on experience of these tools enabling successful application in research projects and in clinical diagnostics.

Course prerequisites:

Completed first two semesters.

Number of students required for the course (minimum, maximum) and method of selecting

students:

minimum: 20

maximum: 60

Thematics

I. section: Basics of bioinformatics

1. Introduction to bioinformatics (Balázs Györfly)
2. Utilization of a training and test set (János Tibor Fekete)
3. Statistical errors and dichotomania (János Tibor Fekete)
4. Survival analysis* (Balázs Györfly)
5. ROC analysis: predicting sensitivity and specificity * (János Tibor Fekete)

II. section: Omics

6. Similar genes and proteins, BLAST* (Balázs Györfly)
7. Introduction to genomics (Balázs Györfly)
8. Genomics: quality control* (Ádám Nagy)
9. Genomics: alignment of data to a reference genome * (Ádám Nagy)
10. Genomics: identifying mutations (SNV, indels) (Ádám Nagy)
11. Genomics: determining the consequence of a mutation* (Ádám Nagy)
12. Genomics: what is the clinical relevance of a mutation, ClinVar, dbSNP* (Ádám Nagy)
13. Genomics: mutation signatures (Ádám Nagy)
14. Genomics: copy number variations* (Ádám Nagy)
15. Genomics: identifying processing artefacts and quality issues (Otília Menyhárt)
16. Proteomics: pre-processing (Balázs Györfly)
17. Transcriptomics: processing RNA-seq data (Balázs Györfly)
18. Proteomics: tools to analyze immunohistochemistry results (Áron Bartha)
19. Proteomics: processing mass spectrometry (Áron Bartha)
20. Proteomics: understanding molecular functions, Uniprot (Otília Menyhárt)
21. Genomics: GeneBank (Attila Marcell Szász)

III. section: Integrative science

22. Application of multi-omic tools (Otília Menyhárt)
23. Clinical studies utilizing multi-omics (Otília Menyhárt)
24. Multiple hypothesis testing* (Balázs Györfly)
25. Analyzing COVID-19 (Ádám Nagy)
26. Reproducibility issues in medicine (Otília Menyhárt)

IV. section: Artificial intelligence

27. Introduction to artificial intelligence (Balázs Györfly)
28. Machine learning* (János Tibor Fekete)
29. The Bayes rule (János Tibor Fekete)
30. Clinical application of a decision tree (Áron Bartha)
31. Determining distance* (Balázs Györfly)
32. Clustering* (Balázs Györfly)
33. Neuronal networks* (Balázs Györfly)
34. Principal component analysis (Áron Bartha)
35. Support Vector Machines (János Tibor Fekete)
36. Regression* (Áron Bartha)
37. Diagnostic tools using artificial intelligence (Attila Marcell Szász)

V. section: Medical informatics

38. Using REDcap (Attila Marcell Szász)
39. Electronic health records (Áron Bartha)
40. Time distortion and computer addiction (Otília Menyhárt)
41. Development, learning and work (Otília Menyhárt)
42. Outlook (Balázs Györfly)

Each lecture comprises of three 15-minute talks. Starred lectures have associated exercises.

The exercises are held by:

Balázs Györfly, Áron Bartha, János Tibor Fekete, Máté Balajti, Ádám Nagy

It is recommended to bring a private laptop for the exercises.

Other subjects concerning the border issues of the given subject (both obligatory and optional courses!). Possible overlaps of themes: Biophysics (biostatistics), translational medicine Requirements for participation in classes and the possibility to make up for absences: According to the current regulation of the University. Missed exercises can be repeated at the last exercise.

Methods to assess knowledge acquisition during term time:

(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)
Completed exercises give 33% of the final result.

Requirements for signature:

Maximal number of missed lectures: 25% of all lectures.

Type of examination:

The semester ends with a colloquium.

Requirements of the examination:

(In case of a theoretical examination, please provide the topic list; in case of a practical exam, specify the topics and the method of the exam)

The final exam will comprise a theoretical part (42 multiple-choice selection test) and an exercise. The exercise will comprise a bioinformatic evaluation of a new data. Any support tool, including utilization of a private laptop is allowed when solving this final exercise.

Method and type of evaluation:

(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)

Completed exercises (33%), multiple-choice test (33%), final exercise (33%)

Possibilities for exam retake:

According to the current Study and Examination Regulations.

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

The lectures contain all necessary information, a hard copy of the slides will be provided at each lecture.

CARDIORESPIRATORIC AND NEUROPHYSIOLOGICAL MEASURING METHODS

Optional course for medical students in the 3-6th years

Course director: Dr. Habil. László Dézsi,

Private Professor of Physiology, Semmelweis University

The purpose of the course: To review the theory and practice of modern measuring methods in experimental and clinical medicine, and providing practical knowledge to medical students on cardiorespiratoric and neurophysiological measurements. The course is based on but further extends the material delivered during the course of Medical physiology. Throughout the lectures we put an emphasis on potential methodological errors of measurements and examinations, as well as how to avoid them.

Detailed Program:

1. Introduction. Biomedical engineering. Design and safety requirements of biomedical equipment
2. Computerized data acquisition and analysis. Telemetry systems
3. General metrology. Basics of measurement and control theory
4. Home monitoring of cardiovascular health status. Determination of blood glucose and tissue glucose concentrations
5. Sampling of continuous signals. Digitizing analogue signals
6. Direct and indirect methods to determine cardiac output and peripheral blood flow
7. Experimental study of pulmonary function. Measurements of blood gases and the acid-base balance.

8. Significance of objective studies in the practice of audiology. Neurophysiological measurements (action potentials, brain stem evoked potentials)
9. Investigation of adaptive processes in the cardiovascular system. Investigative methods of experimental angiology
10. Measuring blood pressure in the lab and clinics (invasive and noninvasive methods)
11. Complement-related immunological and cardiopulmonary responses
12. Studying brain function by functional imaging systems
13. Experimental methods to study nociception
14. Investigating the electrical activity of the heart. Design of ECG amplifiers

Acknowledgement of the course: Prerequisite of the course is the completion of the first 2 years (Theoretical module). Regular attendance (maximum 3 absences) is required. Signature in the Index and 2 credit points will be awarded after successful exam. Source: material of the lectures, supplementary literature will be provided by the lecturers.

Applications: via Neptun system. Contact person: Dr. László Dézsi (e-mail: dezsi.laszlo@richter.hu; phone: 06-1-431-4823; phone/fax: 06-72-536-019). The application of min. 5 students is required.



Faculty of Medicine

6th year

FACULTY OF MEDICINE

STUDY PROGRAMME

Sixth year in the 2025/2026 academic year

Comment:

Please read more about the rules concerning the criteria of selecting the foreign clinical practice positions and accepting the practice period spent abroad that can be found on our website <https://semmelweis.hu/registrar/>

Please note the following:

- 1. When not at Semmelweis University the one week Traumatology is to be completed at a surgical department providing *neurochirurgia* as well.
- 2. It is strongly required to keep the instructions of the Examination and Studies Regulations concerning the requirements of the diploma work focusing especially on the deadlines.
- 3. The final exams can be done only on the exam dates published by the clinical departments of Semmelweis University.

Please note: there are no individual requests, and the rule should be kept strictly.

11th–12th Semester

Course name	Neptun code	lecture (h/week)	lecture (h/semester)	practice (h/week)	practice (h/semester)	seminar (h/week)	seminar (h/semester)	credit points	prerequisite(s)	examination
Internal Medicine (incl. 1 week Infectology and 1 week Family Medicine)	AOKBHK785_SA AOKKAR662_SA AOKBOK786_SA AOKCSA645_SA AOKSZL644_SA	–			240+40+40			8	Internal Medicine II, Medical Imaging, Pulmonology and Thoracic Surgery	comprehensive examination
Neurology	AOKNEU657_SA	–			120			3	Neurology and Neurosurgery	comprehensive examination
Obstetrics and Gynecology	AOKNOI655_SA	–			160			4	Clinical Genetics, Obstetrics and Gynecology	comprehensive examination
Pediatrics	AOKGY1848_SA vagy AOKGY2849_SA	–			240			6	Internal Medicinell, Pediatrics, Clinical Genetics	comprehensive examination
Physical Education XI	AOKTSI009_11A	0		1				0	Physical Education (PE) *, Physical Education (PE) *	signature
Physical Education XII	AOKTSI009_12A	0		1				0	Physical Education (PE) XI *	signature

INTERNAL MEDICINE

Department of Internal Medicine and Oncology (former 1st Department of Internal Medicine)

Budapest VIII., Korányi Sándor u. 2/A Phone: 459-1500 / ext 51465

Head of the Department: **Dr. István Takács**

Tutor: **Dr. Péter Studinger**

Email: studinger.peter@semmelweis.hu

Department of Internal Medicine and Hematology (former 2nd and 3rd Department of Internal Medicine)

Budapest, VIII. Szentkirályi u. 46. Phone: 459-1500

Head of the Department: **Prof. Dr. Tamás Masszi**

Tutor: **Dr. Katalin Keltai**

E-mail: keltaikati@gmail.com

The 8-week course includes one-week Infectology and one-week Family Medicine practice.

Sixth-year students must work under the supervision of a tutor (Internal Medicine specialist). Students work at the ward and participate in consultations that aim to help the preparation for the final exam.

Students spend 6 weeks (5 days / week, 8 hours / day, between 8:00 AM - 4:00 PM) at a medical ward.

Tasks to be performed:

- patient admission: taking patients' medical history, evaluation of signs and symptoms, physical examination
- making a preliminary diagnosis, consideration of differential-di-

agnostic possibilities, preparation of a diagnostic and therapeutic plan

- evaluation and follow-up of the patients' general condition, and changing diagnostic and therapeutic plan according to new findings
- patient referral on rounds (at least one patient / week)
- participation in consultations with specialists
- practicing common medical interventions under supervision (venous blood draw, injections, infusion, ECG, digital rectal examination, catheter insertion)
- observing transfusion, nasogastric tube / central line insertion, removal of pleural / ascetic fluid
- observation of imaging techniques (US, CT, angiography, endoscopies, biopsies, isotope scans etc.)
- evaluation and interpretation of laboratory parameters and radiologic findings
- becoming familiar with special units of the teaching hospital (dialysis center, plasmapheresis center, osteodensitometry, endoscopy laboratory, echocardiography)
- becoming familiar with patient documentation (daily follow-up, discharge summary, consent forms, consultation requests)
- becoming familiar with teamwork (joint work of nurses and doctors) in emergency and crisis situations (resuscitation, septicemia, shock, coma, myocardial infarction)
- participation in consultations aimed for students' preparation for the final exam
- performing one case presentation in written form
- optional stay in the teaching hospital for an evening shift

FAMILY MEDICINE IN DAILY PRACTICE within Internal Medicine

Department of Family Medicine

Budapest VIII., Stáhly u. 9. Phone: 355-8530

Head of the Department: Dr. Péter Torzsa

Tutor: Dr. Ádám Becze

E-mail: fekete.ilona@semmelweis.hu (Ms. Ilona Fekete)

Total number of hours: 40 lectures: – practices: 5×8

Type of the course (mandatory/elective): mandatory

Academic year: 2024/2025

Aim of the subject and its place in the curriculum:

Family practice training is based on a one-to-one model involving a tutor and a medical student. The training is practice oriented. Medical students can gain experience about what kind of work a family practice involves while taking an active part in managing the consulting hours and being involved in patient treatment and care and screening.

Location of the course (lecture hall, practice room, etc.):

Accredited tutorial practices

Competencies gained upon the successful completion of the subject:

Medical students working together with the family practice team are involved in patient care during the consulting hours as well as in the patients' home.

During the training they learn how to

- do physical examination
- make a diagnosis
- make a differential diagnosis
- set up a therapeutic plan
- write a case study
- manage paperwork and patient data recording
- manage expert activity

The medical students' communicative skills develop and they get to know the statistical characteristics of the practice as well as the patient flow, morbidity and mortality data of the practice they are trained at. During the training medical students are expected to keep a practice training diary and to shortly document the cases they meet (and to make detailed documentation of one particular case).

Prerequisite(s) for admission to the subject:

Internal medicine, Pharmacology, Laboratory medicine, Family Medicine, Public Health

Minimum and maximum number of students registering for the course:

Student selection method in case of oversubscription:

Where they are assigned

How to register for the course:

To register for the course in the 'Neptun' system

Detailed thematic of the course:

In a one-week training:

- Paperwork and data management
- Registration of a new patient and setting up a patient care summary for them
- Making out a prescription by hand
- Writing a referral (to hospital or to consultation)
- Compiling a therapeutic sheet and updating it
- Expert activity
- Judging whether the patient is fit for work and managing sick leave documentation
- Compiling patient data for official rehabilitation and social assessment
- Examining patients, diagnosis/therapy
- Recognising and treating upper and lower respiratory infections
- Recognising and treating urogenital infections
- Recognising and treating gastrointestinal infections
- Therapy/care
- Therapy, care and rehabilitation of cardiovascular and hypertonic patients
- Therapy, care and rehabilitation of diabetic patients and patients with metabolic diseases
- Therapy, care and rehabilitation of cancer patients
- Therapy, care and rehabilitation of patients with musculoskeletal diseases
- Therapy, care and rehabilitation of patients with cardiorespiratory diseases

Potential overlap(s) with other subjects:

- Internal medicine – Diagnosing and treating symptoms
- Public health issues and preventive medicine – communicable diseases, diseases to notify
- Surgery – acute abdominal symptoms, treatment of wounds

Policy regarding the attendance and making up absences:

It's obligatory for the student to attend 75 percent of the training sessions.

Means of assessing the students' progress during the semester:

During the short training period there is no assessment.

Requirement for acknowledging the semester (signature):

Attending the training sessions, a completed diary and an assessment sheet filled in by the tutor.

INFECTOLOGY in internal medicine

Department of Internal Medicine and Hematology, Division of Infectology at Szent László Hospital

Budapest, Albert Flórián u. 5-7.

Head of the Department: **Dr. Gergely Kriván**

Tutor: **Dr. János Sinkó**

E-mail: infectology.hun@gmail.com (Ms. Júlia Nagy)

One-week infectology practice within sixth year's rotation in internal medicine

Subject: Infectious diseases (Infectology)

Head of Division: Dr. Gergely Kriván

Location: Department of Internal Medicine and Hematology, Division of Infectology at Szent László Hospital
1097 Budapest, Albert Flórián út 5-7.

Time period: 40 hours a week

Registration: NEPTUN system

Program: a detailed program plan will be announced about locations and tutors of daily practice in time.

Group size: Our institution can only accept a limited number of students at a time. In order to keep the program interactive and due to changing infection control rules, structure and logistics of the practice may change and the maximum number of participants may be restricted. For places available please check the NEPTUN system.

Overview

Knowledge in infectious diseases has been part of ancient medical practice and science for ages. Epidemics, isolation of patients with communicable diseases, vaccinations and anti-infective therapy had a significant impact not only on the progress in healthcare but also on history and socio-cultural development of mankind. Although infectology is often considered being of marginal importance within internal medicine, it should be noted that an increasing number of diseases and conditions seem to have an infectious background. In

addition, around a third of chapters within major medical textbooks deal with infectious diseases. As a result of the recent pandemic caused by SARS-CoV-2 virus unprecedented attention is being paid to infectious disease management globally.

Currently development of infectology has two important directions that are complementary to each other. The traditional one will target classical and emerging infections often of global scope, like COVID-19, influenza, gastrointestinal infections, hepatitis, or malaria etc. A newer branch of infectology is focusing on infections related to modern medicine, like nosocomial outbreaks caused by multiresistant organisms or infections occurring in immunocompromised hosts. Prophylaxis and therapy of infections as well as knowledge on antibiotic therapy is of significant importance in both fields.

Program details

During infectology rotation you will be invited to take part in rounds at the Departments of Infectious Diseases (infection control situation permitting), participate in round table discussions on current topics in infectology, discuss real life cases especially in the immunocompromised host setting, and gain insight into modern HIV/AIDS. management.

Sessions are intended to be as interactive as possible, so you are encouraged to actively take part in discussions and feel free to ask questions from the tutors at all times.

Completion of rotation and signature: Registered students must attend all courses to receive their signature. We can only accept hospital discharge papers for verification of absences. The absence must be substituted at a later time period, assigned by the tutor. In the case of further absences, the practice cannot be accepted. Excuses like having been unable to locate the venue of practice are not acceptable. Students arriving later than 10 minutes past the scheduled start of the sessions will not be accepted to take part in the program.

NEUROLOGY

Department of Neurology

Budapest VIII., Balassa u. 6. Phone: 210-0330

Head of the Department: Prof. Dr. Dániel Bereczki

Tutor: Dr. Róbert Debreczeni (debreczeni.robert@semmelweis.hu)

E-mail: kovacs.andrea@semmelweis.hu (Ms. Andrea Kovács)

Office hours at the Department of Neurology:

Monday 13,00-14,00 Friday 10,00-12,00

Responsible Secretary: Andrea Kovács (Andi)

Rotation periods: set by the English Secretariat, but for individual changes one might apply at the Department of Neurology. To ease the scheduling of other 6th year practices the Department shall organize "early rotations" right after taking the 5th year semifinal exam.

Neurology rotation is 3 weeks long. Students receive their schedule and assignments on the first day of practice. During the training students must write one neurological case report. It is also obligatory to spend one day at our Outpatient Clinic and to take part in one night duty (no sleep in). Students' activity in the wards, at the Outpatient Clinic and during duty, and also the case report is evaluated by the student's tutor on an assessment sheet. The assessment form and the case report must be presented at the final exam. During the training period two days of absence are allowed.

Final examination

One can register for the exam only through the Neptun-system.

The final examination consists of:

1. practical part: neurological examination skills, decision making, tested at the bedside;
2. theoretical part: 3 theoretical questions.

Examinations start at 10 a.m. Students must present their index book, assessment form, case report and in case of retake the permission from the Office of Dean.

On event of failing the earliest possible retake is 10 days later.

Official textbooks:

1. Arányi Zs., Kamondi A., Kovács T., Szirmai I.: Investigation of neurological patients
2. Adams: Principles of Neurology. McGraw-Hill
3. Lindsay, Bone, Callender: Neurology and Neurosurgery Illustrated. Churchill Livingstone

Other suggested books:

1. Marsden, Fowler: Clinical Neurology. Raven Press
2. Duus: Topical Diagnosis in Neurology. Thieme Medical Publishers
3. Gilroy: Basic Neurology. Pergamon Press
4. Weiner- Lewitt: Neurology of House Officer. Williams and Wilkins
5. Bannister: Brain and Bannister's Clinical Neurology. Oxford University Press
6. Mumenthaler: Neurology. Georg Thieme Verlag.

6th year Medical Student Clinical Neurology Learning Objectives

Neurologic History and Examination

1. Perform a competent history, noting the following factors:
 - A. Establish the onset, progression and character of the disorder identifying all related symptoms.
 - B. Perform a standard neurologic review of symptoms with regard to personality, memory, headaches, pain, seizures, impairments of consciousness, vision, hearing, language function, swallowing, coordination, gait, weakness, sensory alterations, sphincter disturbance, and involuntary movements.
2. Perform a neurologic examination
 - A. Perform a screening mental status examination to include: level of consciousness assessment, and aphasia assessment.
 - B. Examine for meningismus, straight leg raising maneuver.
 - C. Cranial nerve examination
 - D. Motor examination including: tone, strength and bulk, pronator drift, abnormal movements.
 - E. Perform a reflex examination (muscle stretch reflexes, superficial reflexes, pathologic reflexes)
 - F. Coordination examination including finger-to-nose- test, heel-to-shin test, rapid alternating movements.
 - G. Gait examination: stance and Romberg test, gait, tandem gait, ability to rise from sitting, toe walking and heel walking.
 - H. Perform sensory examination including primary modalities (pain, temperature, position, vibration) and secondary/cortical modalities (stereognosis, graphesthesia, double simultaneous stimulation).

I. Acquire the following skills:

- A. Anatomic and physiologic basis of the neurologic examination.
- B. Competent history, physical and neurologic examination.
- C. Localize the lesion using the clinical database.
- D. Develop a differential diagnosis of the clinical problem.
- E. Assess the acuteness of neurological diseases, recognize neurological emergencies.
- F. Formulate a plan of investigation and management.

II. Describe the indications, techniques, results, contraindications and risks of the followings:

- A. Lumbar puncture (investigation of CSF)
- B. EEG, EMG, ENG, Transcranial magnetic stimulation
- C. CT, MRI, SPECT, PET
- D. Carotid and transcranial Doppler ultrasound

III. Disorders of motor function

- A. Differentiate between upper and lower motor neuron lesion (UMN, LMN).
- B. UMN facial weakness and LMN facial weakness.
- C. Disorders of coordination. Recognize symptoms of cerebellar disorders.
Define ataxia, dysmetria, wide-based gait, and discuss the localization.
- D. Define and differentiate involuntary movement disorders: tremor, rigidity, spasticity, athetosis, chorea, dystonias, myoclonus, tics. Discuss the findings and treatment of: Parkinson's disease, essential tremor, tardive dyskinesia, Huntington's chorea, Wilson's disease.

IV. Disorders of sensation

- A. Differentiate central sensory disorders from peripheral sensory disorders.

V. Disorders of vision

- A. Localize the lesions causing vision disorders and visual field defects.
- B. Differentiate papilledema from papillitis.
- C. The innervation deficit of the ocular muscles.
- D. Recognize gaze problems and nystagmus.
- E. Assess pupillary abnormalities.

VI. Episodic disorders

- A. Seizure disorders: generalized and partial seizures, distinguish seizure from syncope.
- B. Describe Todd's postictal phenomenon.
- C. Evaluation of a patient for new-onset seizure.
- D. The anticonvulsants, their indications and side effects.
- E. Management of a patient in status epilepticus.
- F. Narcolepsy and obstructive sleep apnea.

VII. Cerebrovascular diseases

- A. Define the following: asymptomatic carotid bruit, TIA, amaurosis fugax, ischemic infarct, lacunar infarct, hemorrhagic infarct, parenchymal hemorrhage, SAH.
- B. The clinical features of various territorial infarcts.
- C. Treatment options to prevent infarction in atrial fibrillation and carotid stenosis.
- D. The clinical features for hypertensive parenchymal hemorrhage.
- E. The clinical picture and diagnosis of SAH. Early medical/surgical management of a patient with a SAH.

VIII. Multiple sclerosis (MS)

- A. The criteria for the clinical diagnosis of MS.
- B. The treatment of MS.

IX. Head trauma

- A. Define the temporal profile, symptoms and treatment of: commotion, concussion, anterograde and retrograde amnesia, subdural hematoma, epidural hematoma, contusion or hemorrhage, liquorrhea.

X. Dizziness and disorders of hearing

- A. Define vertigo, and contrast it with other type of dizziness.
- B. Describe nystagmus, hanging head test (Hallpike maneuver), calorics.
- C. Identify the clinical features of: benign paroxysmal positional vertigo, vestibular neuronitis, Meniere's disease, brainstem TIA with vertigo, acoustic neuroma.

XI. Disorders of higher cognitive functions

- A. Define and assess: dementia, delirium, amnesia, confabulation, hallucination.
- B. Define normal-pressure hydrocephalus.
- C. Define the anatomical basis for aphasia and dysarthria.
- D. Differentiate the aphasias on the basis of ability to produce speech, comprehension, naming, repetition.

XII. Disorders of altered consciousness

- A. Define hypnoid and non-hypnoid unconsciousness.
- B. The anatomic basis of consciousness.
- C. Assess the comatose patient, evaluation and treatment.
- D. Localize the following: decorticate and decerebrate rigidity, conjugately deviated eyes, pathologic respiration, pinpoint pupils, anisocoria, intact versus absent oculocephalic response
- E. Diagnosis and management of increased intracranial pressure (ICP).
- F. Symptoms brain herniations.

XIII. Headaches and facial pain

- A. Clinical features of migraine, cluster headache, tension headache, trigeminal neuralgia, "organic" headache.
- B. Treatment for common headaches.

XIV. Brain tumors

- A. Clinical presentation and diagnosis of primary brain tumors.
- B. Metastatic tumors to the brain in adults.

XV. Infections

- A. Bacterial meningitis, viral meningitis, encephalitis including herpes simplex, chronic meningitis, brain abscess. Neurosyphilis. Lyme disease.
- B. HIV and the nervous system.

XVI. Spinal cord disorders

- A. Neurological symptoms caused by compression, transection and hemisection of the spinal cord.
- B. Autonomic deficits caused by spinal cord lesion.
- C. Clinical presentation of vitamin B12 deficiency.

XVII. Peripheral nervous system disorders

- A. Clinical syndromes of neuropathy, neuromuscular junction disorders, myopathy.
- B. Describe: radicular pain, radiculopathy, mononeuropathy, meralgia paresthetica, mononeuritis multiplex, polyneuropathy, paresthesia, fasciculation.
- C. Clinical findings in root lesions at C5, L4, L5, S1.
- D. Intervertebral disc herniation

- E. The tunnel syndromes.
- F. The acute inflammatory demyelinating polyneuropathy (Guillain-Barre synd.)
- G. The motoneuron disease.
- H. The myasthenia gravis.
- I. Duchenne muscular dystrophy, myotonic dystrophy, polymyositis.

XVIII. Alcohol related disorders

- A. Wernicke-Korsakoff syndrome, dementia.
- B. Delirium tremens, alcohol withdrawal seizure.
- C. Cerebellar degeneration, peripheral polyneuropathy.

Neurology Examination Question List for 6th year Students

1st series Priority questions

1. Brainstem reflexes
2. The facial nerve
3. Differential diagnosis of vertigo and dizziness
4. Localisation of paresis syndromes
5. Symptoms of upper and lower motroneuron lesion
6. Types and localisation of aphasia
7. Classification of unconscious conditions
8. Examination of the unconscious patient
9. Unconsciousness due to metabolic origin
10. Neurological emergencies
11. Clinical manifestation of increased intracranial pressure. Herniations.
12. Traumatic intracranial bleedings
13. Trauma of the spine and spinal cord
14. Clinical syndromes of impaired circulation of the internal carotid artery
15. Clinical syndromes of impaired circulation of the vertebro-basilar system
16. Emergency in cerebrovascular disorders
17. Diagnostic procedures in cerebrovascular disorders.
18. Disturbance of cerebral venous circulation.
19. Intracerebral bleedings.
20. Diagnosis, treatment and prognosis of subarachnoid hemorrhage
21. Status epilepticus
22. Meningitis, encephalitis
23. Multiple sclerosis
24. Signs of brain tumors
25. Signs of tumors of the spine and spinal space
26. Brain edema
27. Diagnostic criteria of dementia
28. Diagnosis of Parkinson's disease
29. Wernicke-Korsakow syndrome
30. Guillain-Barre syndrome
31. Disturbance of micturition and defecation
32. Myasthenia gravis

2nd series

1. Neurological causes of impaired visual acuity. Visual field defects.
2. Ocular movement and gaze disorders
3. Disorders of the vestibular system.
4. Syndromes of lower cranial nerve dysfunctions.
5. Syndromes of pons and mesencephalon lesions
6. The muscle tone control
7. Neuroanatomical basis of sensory disturbances
8. Functional systems of cerebellum. Signs of cerebellar disorders.
9. Gait disorders
10. Symptoms of frontal lobe damage
11. Symptoms of temporal lobe damage
12. The limbic system
13. Symptoms of parietal lobe damage
14. Symptoms of occipital lobe damage
15. Classification of aphasia

16. Agnosia, apraxia, alexia, agraphia
17. The basal ganglia
18. Disorders of the thalamus
19. Localisation of memory disturbances
20. Imaging techniques (angiography, CT, MR, PET, SPECT)
21. Investigation of cerebral circulation
22. EEG in the diagnostic workup
23. EMG, nerve conduction studies, transcranial magnetic stimulation and evoked potentials (BAEP, VEP, SSEP)
24. The lumbar puncture and the examination of cerebrospinal fluid
25. The cerebral circulation, and its regulation
26. Classification of cerebrovascular disorders
27. TIA
28. Causes of cerebral ischaemia in young adults
29. Treatment and prevention of cerebral ischemia
30. Classification of epilepsy
31. Diagnostic workup of epilepsy
32. Differential diagnosis of syncope and other types of disturbed consciousness
33. Treatment of epilepsy

3rd series

1. Neurological disorders caused by viral infections
2. Neurological disorders caused by Herpes virus
3. Prion-diseases, slow virus infections
4. Neurological consequences of AIDS
5. Clinical types and treatment of multiple sclerosis
6. Hystopathological classification of brain tumors
7. Metastatic tumors of the brain
8. Paraneoplasias of the nervous system (PML, neuropathies, cerebellar deg., Lambert-Eaton sy.)
9. Disorders associated with parkinsonian syndrome
10. Treatment of Parkinson's disease
11. Hyperkinetic movement disorders
12. Classification of encephalopathies
13. Primary degenerative dementias
14. Multiple system atrophy
15. Disturbed cerebrospinal fluid circulation (hydrocephalus)
16. Syndrome of brachial plexus damage
17. Syndrome of radial, ulnar and median nerve damage
18. Syndrome of lumbosacral plexus damage
19. Etiology of polyneuropathies
20. Neuropathies in diabetes mellitus
21. Inherited neuropathies (Charcot-Marie, Dejerine-Sottas)
22. Low back pain, and cervical disk disease
23. Malformation of the spine and spinal cord
24. Symptoms of the disorder of spinal cord
25. Motoneuron diseases
26. Muscular dystrophies
27. Muscle disorders
28. Primary headache syndromes
29. The neuralgias
30. The physiological sleep and the sleep disorders
31. Genetic disorders in neurology (Huntington chorea, fragile X, dystrophia myotonica)

OBSTETRICS AND GYNECOLOGY

Department of Obstetrics and Gynecology

Budapest VIII., Baross u. 27. Phone: 266-0473

Head of the Department: Prof. Dr. Nándor Ács

Tutor: Dr. Gyula Richárd Nagy

E-mail: szlaby.emese@semmelweis.hu (Ms. Emese Szlaby)

Essential Requirements in Obstetrics

- Prenatal care (anamnesis, lab tests, screening during pregnancy, obstetrical examinations, Leopold's manoeuvres)
- Cardiotocography (NST, OCT)
- Ultrasonography (evaluation)
- Abnormal pregnancy (diagnosis and therapy), intercurrent diseases (diabetes, heart diseases, renal diseases). Preeclampsic toxemia, hypertension, twins, hemorrhages, abortions
- Normal labor
 - fetal and maternal monitoring, management of the stages of labor (examinations during labor)
- Abnormal labor
 - breech delivery, transverse lie (diagnosis)
- Obstetric operations (assistance at labor and delivery)
- Obstetric operations (vacuum extraction, forceps, cesarean section, episiotomy)
- Postnatal care
 - Evaluation of the premature, dysmature and eutrophic newborns
 - Fundamentals of neonatal management

- Essential Requirements in Gynecology
- Gynecologic anamnesis
 - Gynecologic examinations (to be carried out)
 - vaginal examination
 - colposcopy – cytology (basic knowledge, how to take a PAP smear)
 - examination of the breast
- Gynecologic operations (assistance)
 - Bartholin abscess, cyst
 - D and C
 - abdominal hysterectomy
 - vaginal hysterectomy
 - colporrhaphy
- Postoperative management (basic knowledge)
- Outpatient clinics (to take part in the office work of outpatient clinics for gynecology, genetic counseling, adolescent gynecology, menopause, endocrinology, etc.)
- Bleeding disorders
- Cervical, corporal, ovarian, vulvar cancer (etiology, screening, diagnosis, therapy)
- Inflammation of the genital tract (PID)
- Urinary incontinence
- Contraception

PEDIATRICS

Pediatric Center, Bókay street Department

Budapest VIII., Bókay J. u. 53. Phone: +36-1-313-8212

Director, Head of the Department: Prof. Dr. Attila Szabó

Tutor: Dr. Ádám Balogh

E-mail: education.bokay@semmelweis.hu (Ms. Enikő Stalmár)
(Phone: 52656)

Pediatric Center, Tűzoltó street Department

Budapest IX., Tűzoltó u. 7-9. Phone: 215-1380

Head of the Department: Prof. Dr. Gábor Kovács

Tutor: Dr. Klára Horváth

Pediatric Center Tűzoltó street Department

Budapest IX., Tűzoltó u. 7-9. Phone: 215-1380 / ext. 52800

Head of the Department: Prof. Dr. Attila Szabó

Tutor: Dr. Klára Horváth

According to the curriculum, 6th-year medical students must complete a 6-week pediatric practical rotation. During this rotation, students will work in a different ward each week, allowing them to acquire and practice a wide range of activities and procedures on both infants and children.

Students should practice or potentially practice the following procedures during the rotation:

- Measuring pulse and blood pressure, and accurately measuring weight and height (including infants) using percentile tables.
- Actively participating in blood sampling, taking throat swabs, etc., under the supervision of the ward physician.
- Practicing various injection techniques (venous, intramuscular, subcutaneous) under the supervision of the ward physician.

- Preparing and controlling infusion and transfusion accessories, and performing these activities under the supervision of the ward physician. This includes determining blood groups.
- Assisting with special diagnostic or therapeutic interventions and learning to perform them under supervision (e.g., bone marrow sampling, lumbar puncture).
- Conducting blood counts and urine analyses (including sediment analysis), based on necessary physiological knowledge.
- Taking case records and maintaining temperature charts.
- Participating in daily student rounds, where simpler differential diagnostic questions are discussed with guidance from a full or associate professor.
- Attending tutorials on important theoretical subjects, gaining insight into the hospital's perspectives on debated questions.
- Additionally, students are expected to interact effectively with pediatric patients of various ages, perform basic nursing duties (feeding, drinking, bathing, changing diapers, administering medications), and engage in ward activities such as physical examinations, discussions about illnesses, therapies, and differential diagnoses.

Exam type: Bedside practical exam and oral exam.

Exam requirements: The list of topics is available on the department's website and on Moodle.

Note: Only legibly, completely, and accurately filled out, institutionally sealed, original acceptance letters are recognized by the Pediatric Center.

PHYSICAL EDUCATION XI-XII.

Practice: 1 hour per week

PREHOSPITAL EMERGENCY MEDICINE

National Ambulance Service Medical and Educational Directorate

Budapest 1142. Erzsébet királyné útja 87. Phone:350-6931

Course Director: Dr. Gábor Göbl

email: gobl.gabor@mentok.hu

Secretary: Ms. Katalin Fabula

E-mail: fabula.katalin@mentok.hu

Lecturer: Dr. Gábor Göbl

Syllabus

During the 2 weeks practice students will join the staff of an ALS (Advanced Life Support) Unit. They will experience the acute, in-field presentation of emergencies, occasionally urgencies, as well as the special viewpoints of interhospital transfer.

- Goal of the ambulance practice is to gain insight into:
- Patient's assessment in the prehospital setting (primary and secondary survey)
- Recognition of critically ill conditions and the emergency interventions required (airway management, CPR, IV. line, volume substitution, pain relief, etc).
- Recognition of severe emergencies (ACS, stroke,

hypertensive emergencies, bronchial asthma, trauma, poisoning, psychiatric disorders, etc).

- Patient's mobilization, immobilization, special viewpoints of extrication
- Monitoring patient en route to the hospital, transportation trauma.

The certification of the practice should contain the

- period of time spent at the ambulance station
- signature of the local director of the Ambulance Service
- if the practice has been performed abroad: list and short summary of 15 cases have experienced

Evaluation: practical mark

Important information: Solely in the Neptun registered students are welcome at the Medical and Educational Directorate (Budapest 1142. Erzsébet királyné útja 87.) on the first day of the term at 9 in the morning. All the information concerning the location of the practice, schedule of work, information about safety at work, etc. will be announced at this time. Without getting this information nobody will be allowed to start the practice, and there will be no opportunity for replacement.

PSYCHIATRY

Department of Psychiatry and Psychotherapy

Budapest VIII., Balassa u. 6. Phone: 210-0330 / ext. 51100

Head of the Department: Dr. János Réthelyi

Tutor: Dr. Erika Szily

E-mail: szecsi.tunde@med.semmelweis-univ.hu (Ms. Tünde Szécsi)

Teaching Psychiatry for the sixth-year students at the Department of Psychiatry and Psychotherapy at Semmelweis University

The goals of the psychiatric practices (3 weeks)

The goal of our Clinic is to teach medical students about the most important signs and symptoms of the most common diseases as psychiatric disorders have a relatively high prevalence in the population. Considering the high prevalence and the last but not least economic consequences, psychiatric disorders can be a burden for every society. Every medical student must be familiar with the high prevalence of depressive and anxiety disorders. Hungary was once one of the leading countries among those with high suicide rates; therefore, we require them to get acquainted with important details of the main causes and therapeutic possibilities of suicide, as well. As many psychiatric disorders can mask somatic diseases, medical students have to learn about the differentiation of these conditions.

In the 5th year students must base their knowledge on lectures and materials of practice where they have an opportunity to talk to a psychiatric patient, so they can learn how to detect the most important signs and symptoms of diseases. During the 6th year, they need to explore patients and write a case report according to the sample that is available on the website of our Clinic. Before the oral exam they have to discuss this case report with the responsible tutor who will give a mark for it. Students are not allowed to take their final exam without a marked case report. We have a certificate form on

our website containing all the details students must bring from the hospital where they have completed their rotation.

The link is: <http://semmelweis.hu/pszichiatria/oktatas/the-english-version-can-be-found-here/>

Objectives/target abilities:

- The ability how to obtain a complete and reliable history
- The method of asking about specific psychiatric symptoms or how to evaluate the information provided by the patients including:
 - orientation and attention
 - affect
 - thought disorder
 - memory
 - psycho-motor abilities
 - perception
 - motivation, intellect and personality
- The ability of noticing states of potential psychiatric emergency
- The ability to recognize specific symptoms that can refer to any hidden psychiatric problem which is not told by the patients
- The ability of summarizing all the gained information in a detailed case report
- The ability of establishing a tentative diagnosis and to know what kind of tests (either laboratory or psychological or neuro-radiological, etc) are needed for the correct diagnosis
- Being aware of the most important effects and side/adverse effects of drugs used in psychiatry
- To learn that the practitioner must always consider the possible existence of psychiatric disorders even when there are a lot of somatic symptoms, since they can also appear as a result of psychiatric diseases

We have 5 wards with different profiles in our Clinic. Students must join these wards according to their schedule made by our training

coordinator. Everybody has a tutor within the ward he or she is scheduled to. The tutor presents the specific profile of that particular ward, but they also have the opportunity to go and see other wards, too. They spend a day at the out-patient department of our Clinic, which is very useful because there are many patient examinations referred from other departments of Semmelweis University. Thus, they can gain insight into the most important psychiatric features of internal medicine, neurology, surgery etc. Students must join for one all-night-duty and they have to participate in the emergency treatment performed during this period.

Under the supervision of an appointed physician students have to:
Participate in the work of one unit;
Evaluate patients independently;
Write a detailed case history of one patient which has to be presented at the exam;

Participate in consultations.

The internship in Psychiatry has to be completed at a Department of a University or in a Teaching Hospital which has a contract with a University. Students completing the internship abroad have to present a document of evaluation (i.e. Certificate downloadable from our website) indicating their performance during the internship and a grade from 5 (excellent) to 1 (failure).

Requirements

1. The 6th year includes a 3-week-long rotation in Psychiatry in a hospital or clinic which is accredited for teaching by Semmelweis University.
2. If you want to complete your rotation abroad, then before you start it, you must present at our department an officially stamped statement of acceptance issued by the teaching hospital abroad where you intend to spend your rotation.
BE AWARE: The Letter of Acceptance for the 4-week-long Psychiatry internship requested from practice places abroad must state:
 - a) The training place abroad is a teaching hospital
 - b) A brief description of how Psychiatry is taught in that institution
 - c) The name of the responsible tutor (name, e-mail)
3. The Psychiatry practice must consist of 8 hours on 40 (8x5) workdays at psychiatric wards. Students participate in the everyday work of the ward(s), in patients' admission, in ward rounds and in therapeutic decisions. One afternoon duty is obligatory within the rotation period.
4. Writing a case report during the rotation period is a task for every student. A sample case report is available on the website of our department
<http://semmelweis.hu/pszichiatria/oktatas/the-english-version-can-be-found-here/>
5. Case reports should not include patients' personal data (name, birth date, national insurance number, etc). Only those practice places are acceptable where the release of the case report is not forbidden by law. Students completing the internship abroad have to present at the exam the CERTIFICATE in which the tutor has indicated their performance during the internship on the scale: excellent-satisfactory-unsatisfactory and commented on their strengths and weaknesses.

Without these documents students are not allowed to take their final exam in Psychiatry.

Please note that the Final Examination in Psychiatry cannot be taken within the 3rd week of the rotation, just after the completion of 3 full weeks.

Sign-up for the exams: through the NEPTUN SYSTEM.

7. It is important to bring to the final exam this signed Certificate of the practice the case report (or a detailed report of the case report by the tutor on a separate sheet of paper) the mark for the case report, the filled-in *Register of observed psychiatric conditions* that was signed continuously by the tutors during the 5th and 6th year. The form is available on our website:

<http://semmelweis.hu/pszichiatria/oktatas/the-english-version-can-be-found-here/>

Psychiatry Examination Question List for 6th year Students

English questions for the Psychiatry and Psychotherapy final examination

Questions A

1. Diagnosis and classification in psychiatry (DSM-IV, DSM-5, ICD-10 and 11, the logic of diagnostic systems in psychiatry, diagnostic instruments)
2. Important test procedures in psychiatry (laboratory, psychological, brain imaging, electrophysiology)
3. Psychopharmacology I.: Antipsychotics and anxiolytics: mechanism of action, indications, effects and side effects
4. Psychopharmacology II.: Antidepressants, mood stabilizers, ant-dementia medications and stimulants: mechanism of action, indications, effects and side effects
5. Other biological therapies: electroconvulsive therapy, sleep, rTMS, bright light treatment.
6. Major and minor neurocognitive disorders (Dementia): etiology, diagnostic criteria and clinical management
7. Delirium-etiology, diagnostic criteria and clinical management
8. Schizophrenia-etiology, diagnostic criteria, subtypes, course and outcome, differential diagnosis
9. Schizophrenia-acute and long term treatment, rehabilitation
10. Mood (affective) disorders-etiology, diagnostic criteria, subtypes, course and outcome, differential diagnosis
11. Mood (affective) disorders-acute and long term treatment
12. Anxiety disorders: panic disorder and agoraphobia, generalized anxiety disorder, phobic disorders, etiology, epidemiology, diagnostic criteria, subtypes, course and outcome, differential diagnosis
13. Somatoform disorders, somatization and conversion disorders and hypochondriasis-etiology, diagnostic criteria and clinical management
14. Alcohol use disorder-epidemiology, diagnostic criteria (including alcohol withdrawal and alcohol hallucinosis), course and outcome
15. Psychoactive Substance use disorders-diagnostic criteria and clinical management
16. Disorders of childhood and adolescence-diagnostic criteria of psychiatric disorders usually first evident in infancy, childhood or adolescence

Questions B

17. The neurobiological basis of mental disorders
18. Posttraumatic stress disorder: etiology, epidemiology, diagnostic criteria, subtypes, course and outcome, differential diagnosis, and treatment.
19. Obsessive-compulsive disorder: etiology, epidemiology, diagnostic criteria, subtypes, course and outcome, differential diagnosis, and treatment.
20. Alcohol use disorder (including alcohol withdrawal and alcohol hallucinosis) treatment and rehabilitation
21. Eating disorders-diagnostic criteria and clinical management
22. Old-age psychiatry
23. Sleep disorders-diagnostic criteria and clinical management
24. Sexual disorders-diagnostic criteria and clinical management
25. Personality disorders-diagnostic criteria (clusters a-b-c) and clinical management
26. Basic concepts and methods in psychotherapy.
27. Cognitive-behavioural therapy
28. Psychotherapy with special populations (addictology patients, psychotic patients)
29. Basic psychoanalytic concepts
30. Family therapy. Autogenic training. Hypnosis
31. Suicide and self-injurious behavior: etiology, epidemiology and prevention
32. Rehabilitation and community psychiatry, transcultural psychiatry

6 weeks elective practice option within Psychiatry

It is possible to extend the 3 week-long mandatory rotation with this six-week-long optional course to help students further deepen their practical knowledge. Furthermore, aspiring residency trainees in psychiatry may also take the six-week-long optional course to express their intention of specialization. During this optional course student may also study the prerequisites of the practical board exam in Psychiatry. (Course completion requires students to write and defend a psychiatric case report during the elective practice period on a patient of your choice. At the end of the internship, it is necessary to prepare a Power Point report on a selected patient, which the students present to the doctors of the Clinic, and then obtain a practice evaluation.

The 6-week elective internship is divided into 3 weeks by the students, according to the schedule, a student participates in the clinical work

in 2 wards, thereby helping to gain experience and learning, as they may encounter different clinical diagnoses in each department.

AFTERNOON DUTY: During the six-week elective internship, at least two afternoon shifts are mandatory. Students are required to actively participate at one of the afternoon duties during the three-week-long mandatory rotation and two evening duties during the six-week-long optional course. During their duty day students are at work at the Outpatient unit (Ambulancia) between 1 pm-4 pm and join the night duty team until 9 pm. After 9 pm, students may opt in for the rest of the night duty if they want to. During the optional course, students will also be introduced to the foundation of the out-patient psychiatric care and the management of the most common psychiatric conditions that occur in other medical fields (eg. psychiatric emergencies). The topics of psychiatry required for this course are identical to the topics for the final exam published online at the Department's homepage.

SURGERY

Department of Surgery, Transplantation and Gastroenterology

Budapest VIII., Üllői út. 78. Phone: 459-1500 / ext. 52120

Head of the Department: Prof. Dr. Attila Szijártó

Tutor: Dr. Péter Ónody

E-mail: kovacs.zsanett@semmelweis.hu (Ms. Zsanett Kovács)

NG	nasogastric
GA	general anesthetic
CVP	central venous pressure
ITU	intensive therapy unit

- Acting as a HO or SHO under strict supervision, including administration and practical skills.
 - Admitting of patients with full physical examination, including breast and PR examinations.
 - Theoretical planning for examinations and treatments for the examined patients.
 - Continuous observation and registration of the patient's condition with administration.
 - Writing of discharge reports.
 - Performing different injections (iv., im, sc), insertion of venflons, phlebotomies. To determine blood group, performing of transfusions under strict supervision. Completion of administration.
 - Insertion of NG tubes.
 - Catheterization (urethral and suprapubic).
 - Removal of clips and stitches.
 - Changing of dressings.
 - Assistance at abdominal and thoracic wash-outs or punctures.
 - Taking part in consultations with other specialists.
 - Theoretical decisions about operations. Consenting.
 - Taking part in operations, scrubbing in, stitching.
 - Examination and treating of emergency patients.
 - Taking part in anesthesiological preparation of patients.
 - Observation of premedications.
 - Assistance at several anesthesiological procedures, including spinal, peridural and GA.
 - Assistance at intubations. If possible, independent intubation.
 - Measurement of CVP.
 - Assistance at jugular and subclavian venal punctures.
 - Suction of the throat and trachea.
 - Observation of ITU work.
- HO house officer
SHO senior house officer
PR per rectum

- Observation of postoperative treatment.
- Observation of resuscitation and reanimation.
- Observation of autopsies of the ward.
- Being present at every medical discussion of the ward.
- Observation of outpatient work.
- Assistance in outpatient work including assistance at day surgical operations.
- Changing of dressings of outpatients.
- Treatment of infected wounds.
- Assistance at i.v. anesthesia.
- Performing and assisting at local anesthesia.
- Observation and assistance at ultrasound, endoscopies and X-ray examinations.
- As interns, students take part in the daily rounds and report on the patients examined by them or treated in their section. Interns examine the patients under the supervision of the ward chief or ward surgeon. Interns are required to be personally involved in the examinations and the evaluation of the findings.

Involvement in the preparation of the documentation of the patients.

Involvement in the preoperative preparations as well as in the postoperative care and treatments.

Take part in the operations as second assistants.

Take part in on-call duty without numerical limitations. During on-call (night) duty, interns should-under the supervision of the ward chief or authorized surgeon – be involved in solving all problems caused by either acute or chronic diseases.

Interns are required to take part in all consultations organized for them.

Interns will be eligible for the final examination if the above conditions have all been met and their academic achievements during their internship proved.

TRAUMATOLOGY

Department of Traumatology

Semmelweis University Clinic for Traumatology Budapest VIII,
Korányi Sándor utca 2.

Mobile: 06-20-825-8680

Head of the Department: Dr. Tamás Bodzay

Tutor: Dr. Dániel Koczka

Credits: 0

Total number of hours: 40 lectures: practices: 40 seminars:

Type of the course (mandatory/elective): Mandatory

Academic year: 2025/2026

Course director (tutor): Dr. Tamás Bodzay

Contact details: Semmelweis University Department of Traumatology
06 20 825 86 80

Email: office.trauma@semmelweis.hu

Position: Head of Department

Date of habilitation: 2025. February

Objectives of the course and its place in the medical curriculum:

Traumatology as a specialty deals with the treatment of injured patients, independent of the injured organ, patient's age or previous diseases. In developed countries, the 4-5th leading cause of death is injury, while in the actively working population, the rate of death is even higher. Morbidity in children and in the elderly is also high. Since the patient examination and therapeutic algorithm somewhat differ from the previously taught examination and treatment methods in the curriculum, our aim is to offer a general and practical approach to treating trauma patients for students. The prerequisite for 6th year Traumatology is the material and exam from the 5th year in Traumatology, to be used in a more practical manner. Beside this, familiarization and active participation in the daily routine of a Traumatology department play a role in the students' curriculum.

Location of the practice

- Semmelweis University Department of Traumatology
1083 Budapest, Korányi Sándor u. 2.
- Uzsoki Hospital, Department of Orthopedics-Traumatology, 1145 Budapest, Uzsoki street 29-41.
- Dr. Manninger Jenő Trauma Center, Budapest
1081 Budapest, Fiumei street 17.

Detailed syllabus:

1. First Aid
2. Evaluation of the mental-stage/orientation with the Glasgow-score
3. Evaluating and management of external wounds
4. Termination of bleeding
5. Transportation of trauma patient
6. Transient fixating bandage of traumatic part of body
7. Preparation of the surgical area
8. Surgical scrub-in and clothing
9. Infiltrational anaesthesia
10. Incision and drainage
11. Management of infected, necrotic wound
12. Closure
13. Stitch removal
14. Applying pressure-bandage
15. Reuniting closed fractures
16. Fracture stabilization
17. Reduction of dislocation
18. Transient fixation of broken extremities
19. Insertion of Foley's catheter in men
20. Insertion of Foley's catheter in women
21. Venous-cannulating
22. Pain management
23. Assisting surgical procedures

Further information can be found at the website of the Department of Traumatology:

<https://semmelweis.hu/traumatologia/>

VASCULAR SURGERY

Department of Vascular and Endovascular Surgery

Budapest, XII., Városmajor u. 68. Phone: (+36-1) 458-6700

Head of the Department: *Prof. Péter Sótonyi M.D.*

Tutor: Dr. László Hidi

Type of the subject: mandatory

Credits: 0

Interval of practice: 1 week

Total number of hours per week 40

Syllabus of the subject

Objectives of the course and its place in the medical curriculum:

Vascular surgical pathologies include a number of diseases with a high mortality rate, which are increasing nowadays. In our country, the number of limb amputations performed for non-traumatic reasons is three times higher than the average of Western European countries. This data also draws attention to the importance of vascular medicine. The purpose of the practice is to describe chronic and emergency, life- and limb-threatening vascular diseases, and to present their differential diagnosis. Knowledge of the patient's symptoms and complaints is still important in the accurate diagnosis of vascular surgical diseases, and the emphasis is on the outpatient examination at the patient's bedside, where questioning the patient is essential for establishing the correct diagnosis. The students also receive a general training where they learn to ask patients questions that enable them to effectively investigate the patient's complaints. The physical examination is the basis of vascular examinations. It may be sufficient to establish a diagnosis even without other imaging tests. Perhaps there is no other specialty where the patient's general condition co-morbidities, and age have such an influence on the burden of surgery and intervention. Students learn that establishing a diagnosis is not the same as establishing a therapy plan.

Competencies acquired through the completion of the course:

As a general practitioner, students will be able to assess the most important emergency cases of vascular origin (stroke, dissection, aneurysm rupture, acute limb ischemia) and perform the first steps. They learn the basics of the physical examination of the vascular system, the forms of imaging examinations, and the indications for its request. After evaluating the results of the physical and imaging tests, they take the necessary therapeutic steps and direct the patients to the appropriate type and level of specialist care. In the field of vascular diseases, they learn the place and role of primary and secondary prevention.

Prerequisites for course registration and completion:

Anatomy of the vascular system, regional anatomy of the neck, abdomen, and extremities. Vascular pathology, pathophysiology. Completed Cardiology-angiology course.

Student headcount conditions for starting the course (minimum, maximum) and method of student selection:

Subject and course enrollment in Neptun according to the block schedule.

Detailed course description:

General Information:

The practice takes place in five locations: vascular surgery outpatient clinic, vascular surgery department, vascular surgery operating room, angiography laboratory, ultrasound diagnostic laboratory. Each student spends 1 day at each location, in a rotating system. Monday morning briefing (important information related to the internship: tour of locations, explanation of rotation schedule, distribution of necessary documents, information about the test exam). The tutor present at the practice locations confirms attendance with his signature. The signed attendance sheet must be submitted to the departmental secretariat on the last day of the practical week.

Knowledge assessment: On the last day of the internship, the test will take place, which will be conducted using the Moodle system. The test is evaluated with a five-point grade, by converting the achieved percentage values: 100-90%: excellent, 89-80%: good, 79-70%: moderate, 69-60%: sufficient, <60%: insufficient. The exam grade obtained in this way will NOT be included in Neptun. The results are sent to the education secretariat of the Surgery, Transplantation and Gastroenterology Clinic (STéC) in the form of an official notification. The result of the test is counted as one-third of the theoretical grade of the surgery examination in the examination result.

Absence, substitution: A certified absence can only be made up at a time agreed with the department's education administrator. It is sufficient to make up the practice according to the day of absence. Only students who have completed the practical at each location and who have submitted a completely filled out and fully signed attendance sheet to the departmental secretariat may take the test exam. Due to the large number of students and the severely limited capacity of individual practice locations, you may have to wait several weeks for a replacement, so it is recommended to complete the practice with your own group according to the block schedule.

External vascular surgery practice:

In accordance with faculty regulations, internships can only be carried out at external training sites officially accepted (accredited) by the faculty. The documents for reporting and authorizing this and certifying the fulfillment must be used in accordance with the faculty regulations. In the case of an internship completed at an external training location, it is also mandatory to write the test. This will take place at a specific time, according to the consultation with the department's education administrator.

Appearance at practice locations: A white coat is mandatory at all locations (use of your own coat is allowed) and other equipment according to current regulations (e.g. face mask). A guarded changing room is provided at the clinic. Practice in the ward begins at 7:00 a.m. with the morning visit. The student must participate in the visit. Practice at the outpatient clinic starts at 9:00. At the other locations, practice starts at 8:00 a.m.

Knowledge and competences that can be acquired at each practice location:

I-II. Students' ward and outpatient activities:

In the ward and the outpatient clinic, the primary focus is meeting the patient, the examination, and the specific questioning of the patient's vascular system problem. We usually hold a morning meeting at 7:30 a.m., which the student assigned to the class must also attend. Our goal is to provide assistance with a thorough knowledge of emergency, life, limb, or other target organ (stroke) cases. Under the guidance of the tutor, the student participates in ward visits, where he learns about the medical history of the inpatient patients, the types of operations that have already been performed, or the planned surgical options. When taking an anamnesis, the student learns what the specific questions are that help to find out to what extent the patient's complaints may stem from a vascular lesion. What are the dynamics of the lesion, how acute or emergency care is needed. In the physical examination, palpation of the vascular status, examination with a mini-doppler device, and recognition of signs of acute blockage are the primary goals. The student can participate in bandaging operated patients, setting up injection and infusion treatments, and can use and observe computer systems.

III. Getting to know the diagnostic possibilities of vascular patients:

The student spends at least one day in the angiography lab. One of the goals of the consultations in the department and the outpatient clinic, as well as in the operating room, is for the student to learn about the most common invasive and non-invasive diagnostic options and to be able to choose from them if necessary. In addition to all this, they have the opportunity to get to know the ultrasound diagnostic laboratory operating at the vascular surgery outpatient clinic.

IV. Operating theater activity:

In the operating room, observation is primarily carried out, but you can even actively participate in some processes. During the time between operations, information related to the operations can be discussed, especially the explanation of the algorithm for setting up the indication for the operation. In certain surgeries, it may be possible to perform assistant activities in the surgeries, depending on the nature of the surgery.

V. Vascular surgery outpatient clinic:

The student participates with the assigned specialist in the examination of vascular patients. You yourself perform a patient examination (palpation, auscultation, doppler, and participation in the evaluation of the findings), the patient's admission to care, the treatment decision mechanism, and aspects of the control of operated patients are discussed. You see a large number of acute and chronic patients in a relatively short period of time. At the ambulance, you can really learn about real diagnostic and therapeutic algorithms in actual cases. The student can often follow these patients in the ward, in the angiography lab and in the operating room.

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

25% absence is allowed, however, missed practice elements must be made up. Confirmed absences can only be made up at a time agreed with the departmental education administrator by joining the designated group. It is sufficient to make up the practice according to the day of absence. Only students who have completed the practical at each location and who have submitted a completely filled out and fully signed attendance sheet to the departmental secretariat may take the test exam. Due to the large number of students and the severely limited capacity of individual practice locations, you may have to wait several weeks for a replacement, so it is recommended to complete the practice with your own group according to the block schedule.

Type of assessment: Test exam, as a condition for signature.

Examination requirements:

Examination topics:

- Epidemiology and risk factors of arterial and venous diseases
- Screening, prevention and conservative treatment of arterial diseases
- General symptoms and physical examination of arterial and venous diseases
- Vascular ultrasound diagnostics
- Vascular CT and MR diagnostic methods
- Angiography and intervention
- Basic vascular surgery techniques. Vascular grafts
- Lower extremity obliterative arterial diseases
- Supraaortic branches and upper limb arteries
- Aortic aneurysms, peripheral arterial aneurysms
- Renal and visceral occlusive diseases and aneurysms
- Aortic dissections
- Chronic venous insufficiency. Deep vein thrombosis
- Vascular access: surgically created arteriovenous fistulas
- Malformations
- Vasculitis in the clinical practice of vascular surgery/ interventional radiology/angiology
- Diabetic foot, amputations
- Chronic peripheral lymphedema.

List of course books, textbooks, study aids and literature facilitating the acquisition of knowledge to complete the course and included in the assessment, precisely indicating which requirement each item is related to (e.g., topic by topic) as well as a list of important technical and other applicable study aids:

Sótonyi P., Szeberin Z.: Vascular Medicine, Semmelweis Kiadó, 2019 (university course book in English)

TRANSFUSION

Department of Transfusion Medicine

Budapest VIII., Nagyvárad tér 4.

Phone: 210-2940

Head of the Department: Prof. Dr. Attila Tordai

E-mail: kristof.szilvia@semmelweis.hu (Ms. Szilvia Kristóf)

Course Director: Prof. Dr. Attila Tordai

Thematic of the lectures:

1. Introduction, the history of transfusion medicine
2. Immunological introduction: basic mechanisms important in transfusion medicine, immune response to incompatible transfusion
3. Organ donation and transplantation programs in Hungary and Europe
4. Blood donors, bloodletting for donation, donor screening, risk assessment and reduction, international trends
5. The molecular structure and physiological role of red cell antigens
6. Infectious diseases transmitted by transfusion, epidemiology, screening, prevention
7. Red cell, platelet and granulocyte antigen systems
8. The blood group serology compatibility
9. Immunological complications of transfusions: hemolytic and non-hemolytic
10. Non immunological complications of transfusions: circulatory and iron overload, infections
11. Unstable blood products: Red cell, platelet, granulocyte and plasma: manufacturing, storage, quality parameters
12. Challenges and approaches of blood supply management, international examples
13. Steps and practices of transfusion execution, international outlook
14. Transfusion aspects of the coagulation system, generation and clinical application of coagulation factor products, substitution therapies
15. Effects of massive transfusion, factor substitution in acquired bleeding disorders
16. Introduction of the HLA system, diagnostics in transplantation immunogenetics
17. Generation and clinical use of albumin and immunoglobulin blood products
18. Solid organ transplantation and its transfusion aspects: complications, case reports
19. Stem cells, regenerative medicine
20. Patient blood management: restrictive transfusion approaches
21. Indications of red cell transfusion, stimulation of red cell formation
22. Indication of platelet and granulocyte transfusions
23. Apheresis and photopheresis
24. Hungarian and international legal aspects of transfusion medicine
25. Test examination

COMPLEMENTARY ELECTIVE INTERNSHIP PRACTICE

Heart and Vascular Center

Department of Internal Medicine and Hematology

Department of Internal Medicine and Oncology

Pediatric Center, Bókay street Department

Pediatric Center, Tüzoltó street Department

Department of Neurology

Department of Psychiatry and Psychotherapy

1st Department of Surgery and Interventional Gastroenterology

2nd Department of Surgery

Department of Transplantation and Surgery

Department of Obstetrics and Gynecology

Credit: 5

Duration: 5 weeks (2 “gap” weeks + 3 weeks in May)

Practice time: 40 hours per week

Lecturers:

Dr. Béla Merkely

Dr. Tamás Masszi

Dr. István Takács

Dr. Attila Szabó

Dr. Gábor Kovács

Dr. Dániel Bereczki

Dr. János Réthelyi

Dr. Attila Szijártó

Dr. Gábor István

Dr. László Kóbori

Dr. Nándor Ács

Topic of the subject:

During the practice the student is assigned to a Tutor or to a Medical Team and is shadowing the work of them. Student can work only under the continuous careful supervision of a tutor who is responsible for the student. Daily work hours for the student: 8 hours

Activities during the practice should include the following:

- examination of patients in the department, with special emphasis to case history taking and full physical examination
 - gain practice in patient documentation, problem-oriented medical record keeping
 - participate in the preparation of diagnostic and therapeutic plan for patients, differential diagnosis of the case
 - take an active part in medical consultations concerning their patients, as well as in the medical conferences in the department
 - participate actively or as an observer at invasive and semi-invasive interventions, diagnostic or imaging procedures
 - evaluation of routine laboratory results
 - evaluation of imaging results
 - possible participation on night or weekend duties
 - get to know the work of the special sections of the department
 - regular consultations with the doctor responsible for the student
- students should also practice communication with patients and their relatives, while giving them relevant medical information on the disease but avoiding conflicts with medical confidentiality.

Prerequisite of the course: Completion of the first 10 semester's subjects.

Special academic work required for completion of the course:

Under the supervision of the Tutor(s) the student takes part of the management of out- and inpatients of the Dept thereby obtaining competence in the subdiscipline.

Type of exam: Bedside practical exam

Suggested print, electronic, online material: Material given by the hosting subject for the final year.

The subjects taken into consideration when calculating the average of the diploma are the following:

- all subject with final exam
- list of the subjects ending with a semifinal:
- Medical biology
- Medical chemistry
- Genetics and genomics
- Immunology
- Otorhinolaryngology
- Dermatology
- Clinical Genetics
- Oncology (from 2025)
- Orthopedics
- Pulmonology (from 2025)
- Radiology
- Urology
- Forensic Medicine
- Ophthalmology
- Oral surgery and dentistry
 - grade of the thesis
 - grade of the written part of the final board examination
 - grade of the oral part of the final board examination
 - grade of the practical part of the final board examination

GENERAL INFORMATION

Deadline of paying the tuition fee in the 6th year: the first semester's fee is to be paid until 11 July, 2023, the second semester's until 29 January, 2024

The professor responsible for the student's instruction during the clinical rotation outside Hungary is requested to give a detailed certificate of the student's performance. It is requested to be done in the Student Handbook! This certificate in the Student Handbook must be signed by the professor, the Head of the Department as well as by the director of the hospital or the Dean of the University the hospital is affiliated to. **Semmelweis University reserves the right to accept a certificate or refuse it in justified cases.** Students have to present these certificates to the concerned departments. After the departments have accepted them, students have to retain the originals and hand them in at the English Secretariat.

Tuition fee reduction:

In case the student completes all the rotations regardless whether the 1 week Basics of Transfusion Medicine subject is completed at Semmelweis University or abroad, he/she has to pay 80% of the tuition fee valid in the academic year. The relevant acceptance letters should be handed in latest until December 15, 2023. Otherwise the student is not entitled for the reduction!

Please write a letter of request addressed to the Academic Program Director when applying for the 20% reduction!

Please note: that you have to sign up for the General Board Examination held in June latest until April 30, 2024! For the August exam latest until July 15, 2024 and for the November exam latest until October 15, 2024!



Faculty of Medicine

1st–2nd semester

FACULTY OF DENTISTRY

BASIC MODULE

1st Semester

	Subject	Subject code	CREDITS	Hours per semester	Lecture (hr/semester)	Seminar (hr/semester)	Practice (hr/semester)	Lecture (hr/week)α	Seminar (hr/week)α	Practice (hr/week)α	Prerequisite(s)	Evaluation
Obligatory	Biophysics I.	FOKOFIZ378_1A	4	56	14	0	42	1	0	3		Examination
Obligatory	Cell Science	FOKOGEN225_1A	3	42	14	0	28	1	0	2		Examination
Obligatory elective	Introduction to the Hungarian language	FOKONYE399_1A	0	56	0	0	56	0	0	4		End-term examination
Obligatory	Macroscopic anatomy and embryology I.	FOKOANT338_1A	6	84	14	0	70	1	0	5		Examination
Obligatory	Medical Chemistry	FOKOABT304_1A	4	56	28	0	28	2	0	2		Examination
Obligatory elective	Medical Terminology	FOKVNYE396_1A	2	28	0	0	28	0	0	2		End-term examination
Obligatory	Physical Education I.	FOKOTSI380_1A	0	14	0	0	14	0	0	1		Term grade
Obligatory	Physical Foundations of Dental Materials Science	FOKOFIZ307_1A	2	28	28	0	0	2	0	0		Examination
Criterion requirement	Taken the Freshmen's Oath	FOKOANG395_1A	0									
	Sum of credits in the semester:		21									

The following "new" language requirements will be Obligatory from the academic year 2024/25 in years I-II-III and will have to be completed in an ascending line from then on:

In the Dentistry Program, the condition of issuing a diploma in the foreign language programs: a final examination in Hungarian language. Students who participate in the English language program are required to be able to communicate in Hungarian which they shall prove by taking a Hungarian final examination. The abstract of the thesis/diploma work must be attached to the finalized and submitted thesis/diploma work in Hungarian in accordance with the formal and content requirements. As a new criterion, the linguistic and grammatical evaluation of the abstract is also added to the assessment form of the thesis work. At the defense of the thesis/diploma work, the last, summarizing slide of the slides, on which the oral presentation is based, must be presented in Hungarian language. In the defense report of the thesis/diploma work, the student's Hungarian language performance must be evaluated as well.

Studying the language for dental medical purposes: foreign language for specific purposes has been built into the curriculum as a criterion requirement in the form of a professional basic university exam subject. For obtaining a master's degree, foreign language knowledge including the relevant terminology of dentistry must be acquired before obtaining the pre-degree certificate in accordance with the requirements set out in the curriculum.

α For the number of lectures/seminars/practices per week, the Course Syllabus is normative, and where it was not possible to interpret, these columns were left empty.

Courses to be included in the degree average grade: comprehensive examinations and examinations* (weighted examinations), with the exception of the Hungarian for Dental purposes V.

Examination* = an examination that is to be concluded in the degree average grade (pursuant to Article 49 (2) of the Organizational and Operational Regulations – Part III, Study and Examination Regulations)

2nd Semester

	Subject	Subject code	CREDITS	Hours per semester	Lecture (hr/semester)	Seminar (hr/semester)	Practice (hr/semester)	Lecture (hr/week)ᵃ	Seminar (hr/week)ᵃ	Practice (hr/week)ᵃ	Prerequisite(s)	Evaluation
Obligatory	Biophysics II.	FOKOFIZ378_2A	3	56	21	0	35	1.5	0	2.5	Biophysics I.	Comprehensive examination #
Obligatory	Dental Biochemistry I.	FOKOBMT305_1A	4	56	28	0	28	2	0	2		Examination
Obligatory	Dental Laboratory Practice	FOKODO405_1A	1	60								Term mark (three-scale)
Obligatory elective	Dental Medical Terminology	FOKVNIE397_1A	1	28	0	0	28	0	0	2	Medical Terminology	End-term examination
Obligatory elective	Dental Psychology	FOKVAAG233_1A	1	28	28	0	0	2	0	0		Examination
Obligatory	First Aid	FOKOOXI197_1A	1	14	0	0	14	0	0	1		Term grade
Obligatory	General Dental Materials	FOKOFPK364_1A	1	14	0	14	0	0	1	0		Examination
Obligatory elective	History of Medicine and the Semmelweis University	FOKVNIE381_1A	2	28	28	0	0	2	0	0		Examination
Obligatory	Hungarian for Dental Medical Purposes I.	FOKONYE398_1A	0	56	0	0	56	0	0	4	Introduction to the Hungarian language	End-term examination
Obligatory	Macroscopic anatomy and embryology II.	FOKOANT338_2A	8	112	42	0	70	3	0	5	Macroscopic anatomy and embryology I.	Comprehensive examination #
Obligatory elective	Medical Informatics	FOKVDEI316_1A	2	28	0	0	28	0	0	2		Term grade
Obligatory elective	Medical Sociology for dentistry	FOKVMAG382_1A	1	28	12	0	16	1	0	1		Examination
Obligatory	Microscopic anatomy and embryology I.	FOKOANT339_1A	4	56	28	0	28	2	0	2		Examination
Obligatory	Physical Education II.	FOKOTSI380_2A	0	14	0	0	14	0	0	1		Term grade
Obligatory	Summer Practice of Dental Assistance	FOKOASZ406_1A	0	60								Term mark (three-scale)
	Sum of credits in the semester:		29									

Explanation

15 credits should be gained from the **elective subjects** during the 5-year studies – see the elective list after the 3rd year study program

LIST OF TEXTBOOKS (The list may change!)

- 1 **Sobotta Atlas of Human Anatomy** (Package), 15th English ed. Musculoskeletal system, internal organs, head, neck, neuroanatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 2013
- 2 **Gray's Anatomy for students** with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchel Elsevier; 2014; ISBN 9780702051319
- 3 **Gosling, Harris, Humpherson, Whitmore & Willan: Human Anatomy, Color Atlas and Textbook**, 6th Edition, Elsevier 2016.
- 4 **Stevens & Lowe's Human Histology**, Elsevier, 4th ed ISBN 978-0-723435020, 2015.
- 5 **The Developing Human – Clinically Oriented Embryology**, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384
- 6 **Neuroanatomy An Illustrated Colour Text**, 4th Edition by Crossman & Neary Publication Date: 13/04/2010 ISBN-13: 9780702030864
- 7 **Oral Anatomy, Histology and Embryology**, 4th Edition, by B. Berkovitz Paperback with STUDENT CONSULT Online Access and e-book ISBN: 9780723434115 Copyright: 2009
- 8 **McMinn's Color Atlas of Head and Neck Anatomy**, by Logan, Reynolds, Rice & Hutchings, 5th Edition, Elsevier 2016.
- 9 Ebbing, DD-Grammon, SD: General Chemistry. 9th ed. 2009. Houghton Mifflin Co. Boston ISBN 10: 0-618-85478-6 / 13: 978-0-618-85478-7
- 10 Harper's Illustrated Biochemistry, 30th edition, Lange, ISBN-10: 0071825347
- 11 Laboratory Manual I-II (Bp.)
- 12 Hrabák: Selected Collection of Chemical Calculations (SOTE) (Bp.)
- 13 Csermely P.-Hrabák A.: Principles of Organic Chemistry. Bp. 1999.
- 14 Harvey Lodish et al.: Molecular Cell Biology, 6th edition, ISBN-13: 978-0716776017, ISBN-10: 0716776014
- 15 Wilson, Mansfield, Heath, Spence: Dental Technology and Materials for Students. Blackwell Scientific Publications. ISBN 0632017635
- 16 Powers, Wataha: Dental Materials Properties and Manipulation. Mosby ISBN 9780323078368
- 17 Primary Preventive Dentistry. Ed.by Norman O.Harris, F.Garcia-Godoy. 5th ed. Appleton and Lange, Stamford. 1999. ISBN 0-8385-8129-3
- 18 Damjanovich – Fidy – Szöllősi (eds) Medical Biophysics, Medicine, Budapest, 2009. ISBN 978 963 226 127 0
- 19 Miklós Kellermayer: Medical Biophysics Practices. Semmelweis Publishers, Budapest, 2015. ISBN 978-963-331-349-7.
- 20 Alberts et al. Essential Cell Biology (4th edition) Garland Science, ISBN-13: 978-0815344544; ISBN-10: 0815344546
- 21 McMinn and Abrahams' Clinical Atlas of Human Anatomy with STUDENT CONSULT Online Access 7th Edition by Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973 Publication Date: 22/03/2013
- 22 Andrea, Barta – Éva Katalin, Varga – Ákos, Zimonyi: Medical terminology for students of dentistry. Bp., 2019 (e-book, available on the course's Moodle site).

Recommended textbooks:

- 1 Zumdahl: Chemical Principles. 3rd ed. 1998. Houghton-Mifflin Co. Boston. ISBN 0-395-83995-5
- 2 McCabe J.F.: Applied Dental Materials. Blackwell Scientific Publications. ISBN 0-632-02826-2
- 3 First Aid manual. St Andrews' Ambulance Association and the British Red Cross St John Ambulance. Ed. Dorling Kindersley, 2002. ISBN: 0751337048.
- 4 Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O'Dowd and P Woodford ISBN 9780702047473, Churchill Livingstone, Edinburgh, 2013.
- 5 Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, ISBN13 978007178033, 2013.
- 6 **Langmann's Medical Embryology**, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
- 7 **Netter's Head and Neck Anatomy for Dentistry**, 3rd Edition, Elsevier, 2016.
- 8 **McMinn and Abrahams' Clinical Atlas of Human Anatomy** with STUDENT CONSULT Online Access 7th Edition by Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973 2013.
- 9 **A.L. Kierszenbaum Histology and Cell Biology: An Introduction to Pathology** 3rd Edition, Paperback with STUDENT CONSULT Online Access and E-Book ISBN: 9780323085885 2012.
- 10 **Illustrated Dental Embryology, Histology, and Anatomy**, 3rd Edition by Mary Bath-Balogh ISBN: 9781437717303, 2011.

BIOPHYSICS I

Tutor: Dr. Dániel Sándor Veres

First Semester

Week	Lecture (1 hour per week)	Laboratory (3 hours per week)
1	Introduction to biophysics, radiations, electromagnetic spectrum	Laboratory safety rules, data analysis
2	Ray optics: Fermat's principle, refraction, image formation by lenses, microscope	Resonance
3	Wave optics: Huygens' principle, diffraction, interference, resolution of lenses	Emission spectroscopy. Light sources
4	Light scattering, absorption, reflection, color vision	Spectrophotometry
5	Structure of matter: atoms, molecules, crystals	Statistics
6	Thermal emission, emission of human body, infradiagnostics	Detection of nuclear radiations
7	Luminescence and its applications in medicine	Dosimetry
8	Lasers with applications in medicine Amplifier	Special light microscopes
9	Photobiology, applications in medicine	Optics of the eye
10	Modern microscopy techniques	Polarimeter
11	X-ray production, spectral characteristics, interactions with matter	The attenuation of gamma-radiation
12	X-ray diagnostics	Determination of skin-impedance
13	Nuclear radiations, isotope diagnostics	Concentration determination with refractometer
14	Clinical applications of nuclear radiations	Repetition

BIOPHYSICS II

Second Semester

Week	Lecture (1.5 hours per week)	Laboratory (2.5 hours per week)
1	X-ray diagnostics	Signal processing-1: human body as signal source
2	Skin impedance	Signal processing-2: amplifiers, digital signal processing
3	ECoulter counter	Dosimetry of ionising radiation
4	Gamma energy determination	Biophysics in dentistry
5	Pulse generators (e.g. pacemaker, defibrillator)	Medical sonography
6	Ultrasound	Biophysics of sensory functions: vision and hearing
7	Audiometry	ECG, pulse generators, pacemaker
8	Isotope diagnostics	Transport processes 1: flow
9	Densitography (CT)	Transport processes 2: diffusion
10	Flow of fluids.	Transport processes 3: membrane potential
11	Electrocardiography	MRI - medical imaging
12	Diffusion	Biostatistics 1: descriptive statistics
13	Sensory function	Biostatistics 2: hypothesis testing
14	Repetition	Biostatistics 3: regression analysis

CELL SCIENCE

Institute of Genetics, Cell- and Immunobiology

Address: NET Building, H-1089 Budapest, Nagyvárad tér 4.

Course director: Edit Buzás MD, DSc

Course coordinator: Eszter Lajkó PharmD, PhD

Aim of the course:

The Cell Science course is designed for medical students as part of the Basic Module. The course presents the most important aspects of cell morphology and function. It provides a detailed overview of compartmentalization in the eukaryotic cell and highlights the key features of essential cellular functions, including migration, endocytosis, cell-cell communication, division, stem cell differentiation, ageing, and cell death.

The practical sessions introduce students to the microscopic techniques used in the study of cell morphology. The aim of the course is to demonstrate the complexity of the relationship between cell structure and function, as well as to present fundamental methods of in vitro cell culturing and their potential medical applications.

Location of the course (lecture hall, practice room, etc.):

Lecture: NET building, Selye János Lecture Hall (1089 Budapest, Nagyvárad tér 4.)

Practical classes: NET building: Lab rooms L13-L16 (H-1089 Budapest, Nagyvárad place 4.)

Lecturers: Prof. Edit Buzás, Dr. András Kristóf Fülöp, Dr. Hargita Hegyesi, Dr. László Kóhidai, Dr. Eszter Lajkó, Dr. Tamás Visnovitz, Dr. Zsófia A. Szász, Dr. Ria O. Szabó, Dr. Krisztina V. Vukman

Lectures (1 hour per week):

1. Cell membrane
2. Structure and function of nucleus I.
3. Structure and function of nucleus II.

Course requirements: The requirement for obtaining the end-of-semester signature is the fulfillment of at least 75% attendance and participation in practical sessions (maximum three absences are permitted, [TVSZ §29 (2)]).

Midterms: During the semester, there will be two midterms (Moodle tests). (The dates and topics will be announced at the beginning of the semester). Students who achieve 75% of the points on the midterms will be offered a grade of "Good" (4), and those who achieve 85% will be offered a grade of "Excellent" (5).

Completing the Moodle tests is not mandatory; missed midterms can only be made up during the same week in another group, with prior approval from the practical instructor and the course administrator. Based on the cumulative performance during the semester, students may receive an offered final examination grade.

Exam:

There is a written colloquium in Cell Science at the end of the semester, in accordance with the rules of the current Study and Examination Regulations. The exam is considered passed if the student achieves at least 50% of the total score on the test.

4. Endoplasmic reticulum
5. Golgi complex, vesicular transport and secretion
6. Endocytosis. Autophagy
7. Structure and function of mitochondria and peroxisomes
8. Cell adhesion and cell junctions
9. Cytoskeleton and Cellular movement
10. Cell communication. Extracellular vesicles.
11. Cell cycle and mitosis
12. Cellular aging and cell death
13. Stem cells and differentiation
14. Tumor cell biology

Practices (2 hours per week):

1. The light microscope
2. The general cell structure. Light microscopic microtechnique
3. The electron microscope. Cell membrane
4. The interphase nucleus. Cyto(histo)chemistry
5. Immunohistochemistry. Fluorescence microscopy
6. Endoplasmic reticulum
7. Golgi complex and secretion
8. Endocytosis and lysosomes, Enzyme histochemistry
9. Cell and tissue culture
10. Cell surface differentiation, enzyme-histochemistry
11. Store and supply of energy. Mitochondria. Peroxisome.
12. Mitosis
13. Cell death (necrosis and apoptosis)
14. Consultation

The order of topics may vary

The examination grade will be calculated from the sum of the examination scores if the students obtain at least 50% of the scores.

The written exam is a Moodle test. You will have to study from the presentations and doc files on the homepage and from the Essential Cell Biology book. There will be questions from both lectures and practical material. Figures are just as important as text. The exam test may include short essay questions, simple multiple-choice questions, concept matching, LM and EM images, diagrams, or table-based tasks.

Students who achieve 75% of the points on the midterms will be offered a grade of "Good" (4), and those who achieve 85% will be offered a grade of "Excellent" (5).

Core text: Alberts et al. Essential Cell Biology (4th edition) Garland Science ISBN-13: 978-0815344544 ISBN-10: 0815344546

Lecture and practice presentations and additional texts are available on the homepage: <http://gsi.semmelweis.hu/index.php/en/> (The username and password are on the course datasheet of Neptun)

Introduction to the Hungarian Language

Institute of Languages for specific purposes

Lecturer: **Katalin Fogarasi PhD, habil.**

Thematics:

The subject prepares students for the most important everyday communication situations in Hungary. Students get acquainted with the basics of the Hungarian language necessary for everyday communication. In the 2nd semester students expand their communication skills in language basics and become familiar with simpler terms used in conversations in the pharmacy and dental office and in the medical records of internal medicine.

Attendance and absence:

A maximum of 7 absences is allowed; if the number of absences exceeds this, students may make up missed classes in another group (maximum two times) in agreement with the instructor. Students who miss more than 25% of the classes will not be allowed to get a signature.

Certifying absence:

For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required.

Requirements:

Two oral tests in weeks 7 and 14

Topic: the material covered

Make-up and upgrade opportunities: to be arranged outside of class with the instructor.

Semester signature:

A maximum of 7 absences is allowed; if the number of absences exceeds this, students may make up missed classes in another class (maximum two times) in agreement with the instructor. Students who miss more than 25% of the classes will not be allowed to get a signature; attendance in classes; attendance in both oral tests.

Evaluation:

Students will receive a grade and a percentage evaluation for both oral tests. If students achieve a minimum of 80% on both the first and second oral test, the instructor will offer them a grade. If the average of the two midterm results is between 80% and 90%, a grade of four will be offered; if it is above 90%, a grade of five will be offered. In this case, there is no need to take an exam during the exam period. Those whose performance is below the criteria will have to demonstrate their knowledge during the exam period at the times announced in Neptun, in front of a two-member committee.

Assessment of oral tests:

0-49%	= fail (1)
50-59%	= pass (2)
60-74%	= fair (3)
75-89%	= good (4)

90-100% = excellent (5)

Introduction to the Hungarian Language

Hungarian Language is a course for students in the first year without any previous exposure to Hungarian.

Students will be introduced to the basic vocabulary of general Hungarian. Topics of the course are arranged into 14 teaching units (weeks), with special attention to the most important expressions. Each text is linked to vocabulary, grammar issues and tasks. The course consists of 56 hours (4 hours per week).

- Week 1.** the alphabet, greetings, the verb 'lenni' ('to be') in the present tense;
a few adjectives: hungry, thirsty, tired, sad, happy...
- Week 2.** nationalities: Hungarian, English, German, Iranian, Canadian, Russian...;
occupations: e.g., dentistry student, student, dentist, doctor, teacher, assistant, dental technician;
using verbs (general introduction)
- Week 3.** using verbs in simple sentences (e.g., stand, sit, read, watch, ask, speak, cook, rest, walk, dance, like, know, study) + days and parts of the day
- Week 4.** verbs ending in -ik ('lakik' – 'live', 'dolgozik' – 'work', 'dohányzik' – 'smoke');
eat, drink + nouns with accusative ending
- Week 5.** 'I like reading', 'I can dance', 'I would like to be a dentist' 'tilos' ...-ni (it is forbidden to...), 'szabad ...-ni' (you are allowed to...) (eat, drink, smoke)
when? (months, seasons)
who with? (live, study)
- Week 6.** numbers: How much does it cost? How old are you? What is the time? What time is it?
What number (bus, tram); what size (rubber gloves); which (floor, district)
How (by metro, etc.)
- Week 7.** Revision, oral test
- Week 8.** adjectives (cold, hot, etc.)
sensitive to (cold, heat) (What are you sensitive to?)
practising verbs
- Week 9.** Where do you live? (details: district, street, floor, etc.)
- Week 10.** the three directions (to – in – from) in detail: a) library, school, restaurant, bank, café, shop, hospital, polyclinic, pharmacy b) university, square, clinic
What is the apartment/surgery like?
- Week 11.** Practicing the three directions (with the help of drawings, situations)
- Week 12.** What do we do 'from morning till night'?
- Week 13.** Revision
- Week 14.** Oral test

Textbooks

Teaching materials and audio recordings using authentic medical documentation, edited by the instructors of the [Department of Institute of Languages for Specific Purposes](#).

MACROSCOPIC ANATOMY AND EMBRYOLOGY I – II

Department of Anatomy, Histology & Embryology

Course Director: Dr. Andrea D. Székely

LEARNING OBJECTIVES

Aims of the lectures in anatomy: Presentation of the important and/or complicated chapters such as introductory chapters, thorax, pelvis, hand, foot, skull, heart, chapters of the visceral organs, central nervous system, organs of special senses, topographical anatomy, together with the developmental relevances, introduction to general and organ based embryology.

Aims of the practical sessions in the dissecting room: Based on the weekly programs (see separate), students will both observe prosected cadaver specimens (bones, joints, muscles, viscera, brain) and perform dissections on parts of, or on an entire, embalmed cadaver. Students are supervised by the lab instructors. Bones, joints, muscles and peripheral nervous system will be primarily taught in the dissecting room.

LECTURES: First semester: 1×45 min; second semester: 3×45 min.

PRACTICAL CLASSES: First semester: 5×45 min; second semester: 5×45 min.

ECTS CREDITS: Altogether 14 (first semester: 6; second semester: 8).

MIDTERM TESTS: Oral

ACCEPTANCE OF THE SEMESTER:

Active participation in lectures, and dissection room sessions is obligatory for every student. Students should attend at least 75% of the scheduled hours to gain a signature proving the validity of the semester. Absences are therefore limited in **25%**. Attendance will be recorded in the lectures and in the dissection room classes.

To gain a signature proving the validity of the semester students should attend at least 75% of the scheduled practical hours including the midterm tests. In case the latter has not been fulfilled, there will be two make up dates offered during the last two weeks of the semester. One of the midterm test should be at least a 2 (one midterm will have to be passed for the signature)

Students are eligible to sit for the final examination only upon presentation of a dissected specimen. The dissection work may be done during the two semesters. The specimen will be evaluated by a departmental board.

TYPE OF EXAMS: oral and written

First semester: semifinal examination, second semester: final exam

Semifinal and final examinations consist of written and oral (practical and theoretical) parts

1. Written pretest (e-learning module – access to SeKA account is obligatory) Students may continue with the oral examination even if the written part was unsuccessful.
2. Macroscopic Anatomy (successful identification of structures on true anatomical specimens) including correct answers to relevant theoretical questions)

LIST OF TEXTBOOKS

Sobotta Atlas of Human Anatomy (Package), 15th English ed. Musculoskeletal system, internal organs, head, neck, neuroanatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 2013

Gray's Anatomy for students with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchel, Elsevier; 2014; ISBN 9780702051319

McMinn and Abrahams' Clinical Atlas of Human Anatomy with STUDENT CONSULT Online Access, 7th Edition By Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973 , 2013

Human Anatomy, Color Atlas and Textbook, 6th Edition by J Gosling, P Harris, J Humpherson, I Whitmore and P Willan; ISBN 9780723438274 Elsevier, 2016.

Fitzgerald's Clinical Neuroanatomy and Neuroscience, 7th Edition, Elsevier, 2015.

Oral Anatomy, Histology and Embryology, 4th Edition, by B. Berkovitz Paperback with STUDENT CONSULT Online Access and e-book ISBN: 9780723434115 Copyright: 2009

McMinn's Color Atlas of Head and Neck Anatomy, by Logan, Reynolds, Rice & Hutchings, 5th Edition, Elsevier 2016.

Recommended textbooks:

1. **Illustrated Dental Embryology, Histology, and Anatomy, 3rd Edition** by Mary Bath-Balogh ISBN: 9781437717303, 2011.
2. **Netter's Head and Neck Anatomy for Dentistry**, 3rd Edition, Elsevier, 2016.
3. **Anatomy, A Photographic Atlas**, 8th Edition by Rohen, Yokochi; Wolters Kluwer, 2016, ISBN: 978-1-4963-0870-2
4. **Bräuer: Sobotta Flashcards** (Muscles; Bones, Ligaments, and Joints) URBFI, 2013.
5. **KL Moore–AF Dalley: Clinically Oriented Anatomy**. 4th ed. Lippincott William and Wilkins, 1999.
6. **RMH McMinn: Last's Anatomy, Regional and Applied**. Churchill Livingstone, Edinburgh 1990. ISBN 0-443-03484-4
7. **Neuroanatomy An Illustrated Colour Text**, 4th Edition by Crossman & Neary Publication Date: 13/04/2010 ISBN-13: 9780702030864
8. Functional Anatomy Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.

Macroscopic Anatomy and Embryology I

Department of Anatomy, Histology & Embryology

Lecturer of the Course: Prof. Dr. Gábor Gerber

Course Director: Dr. Andrea D. Székely

Lectures and dissection classes

Subject matter: Macroscopy and clinically oriented anatomy of the parts of the musculoskeletal system, i.e. osteology, arthrology and myology, together with the vascular and nervous supply of the

limbs and the trunk. Skull (viscerocranium, neurocranium). Cavities, muscles of the head & neck region. Macroscopy of the brain and spinal cord, membranes (dura, arachnoid and pia mater). General and organ based embryology, developmental malformations.

Credits: 6

Prerequisite: none

Week	Lectures	Dissection room
Week 1	The role of anatomy in the medical curriculum. Terminology. General arthrology and myology	General introduction to practical work in the dissection room, tools and rules Bones of the upper limb and the girdle, shoulder joint, dissection of the upper limb
Week 2.	Clinical anatomy of the upper limb	Muscles (flexors) of the upper limb/ girdle Elbow joint
Week 3.	Clinical anatomy of the lower limb	Upper limb, arm, forearm Muscles and joints of the hand
Week 4.	Gametes, fertilization, cleavage, blastulation	Dissection of the muscles, vessels and nerves of the upper limb (branches of the axillary a+v, brachial plexus)
Week 5.	Implantation, structure of the placenta, placental circulation. Fetal membranes	Dissection of the muscles, vessels and nerves of the upper limb 1. Midterm test (oral): Upper limb including the girdle
Week 6.	Gastrulation, formation and derivatives of germinal layers. Folding of the embryo. Body axes, cranio-caudal and dorsoventral differentiation	Lower limb, pelvis, hip joint Dissection of the muscles, vessels and nerves Cadaver and free limb dissection
Week 7.	Components, muscles, joints, ligaments and movements of the vertebral column. Components and movements of the thorax. Diaphragm	Dissection of the limbs and superficial regions of the trunk (cadaver) Knee joint, bones of the leg and foot
Week 8.	Components of the abdominal wall. Rectus sheath. Subinguinal hiatus. Inguinal canal. Adductor and femoral canals.	Dissection of the limbs and superficial regions of the trunk (cadaver) Inspection of the structure of the body wall on prosected specimens (torso) Femoral vessels, lumbar plexus
Week 9.	Bony framework of the skull: spaces of viscerocranium.	Sacral plexus Diaphragm Components of the body wall, rectus sheath, hernia canals inspection of the structure of the body wall on prosected specimens (torso)
Week 10.	Introduction to the study of the nervous system. General organization of the central and peripheral nervous systems	Dissection of the lower limb and superficial regions of the trunk (cadaver) Inspection of the structure of the body wall on prosected specimens (torso)
Week 11.	Blood supply to the brain. Meninges, CSF, ventricles	Bones of the skull Internal and external skull bases Bones of the facial skeleton, mandible. Orbit, nasal cavity, pterygopalatine fossa
Week 12.	Macroscopy of the brain stem, cerebellum and spinal cord.	Bones of the skull Internal and external skull bases Bones of the facial skeleton, mandible. Orbit, nasal cavity, pterygopalatine fossa
Week 13.	Neurulation. Development of the central nervous system.	Morphology of the brain and spinal cord Blood supply, meninges, sinuses CSF circulation, cisterns Cadaver dissection Demonstration of prosected specimens
Week 14.	Development of the skull, vertebral column and the limbs	Telencephalic hemispheres, gyri and sulci, Diencephalon, lateral and 3 rd ventricles, Brain stem, cerebellum, 4 th ventricle Frontal sections of the brain Non-obligatory assessments I-II : Topics of the semester

Midterm tests: The time and topics of midterm tests will be announced in the departmental homepage at the beginning of the semester (<http://semmelweis.hu/anatomia>).

Topic list for the semifinal examination:

Macroscopic Anatomy and Embryology I

Musculoskeletal Anatomy

- General osteology, classification of bones
- Continuous connections of bones. Components and classification of joints
- General myology
- Structure and movements of the vertebral column, the gross anatomy of the muscles acting upon it
- Movements and muscles of the head&neck (atlantooccipital and atlantoaxial joints)
- Osteofibrous structure of the thoracic cage (bones, joints, ligaments, movements)
- Joints of the shoulder girdle, the gross anatomy of the muscles acting upon them
- Shoulder joint, the gross anatomy of the muscles acting upon it
- Axillary fossa, quadrangular and triangular spaces
- Muscles and cross section of the arm
- Muscles and cross section of the forearm
- Elbow joint, the gross anatomy of the muscles acting upon it
- Cubital fossa
- Structure and movements of the radiocarpal joint, gross anatomy of the muscles acting upon it
- Osteofibrous spaces and muscle compartments of the hand, tendinous sheaths
- Muscles, joints and movements of the fingers
- Composition of the pelvis (bones, ligaments and membranes)
- Hip joint and the gross anatomy of the muscles concerned with the movements
- External and internal muscles of the hip, supra- and infrapiriform hiatuses.
- Osteofibrous compartments, muscles and of the thigh
- Knee joint and the gross anatomy of the muscles concerned with the movements. Popliteal fossa
- Subinguinal hiatus, vascular and muscular compartments; adductor canal, femoral canal
- Osteofibrous spaces and muscle compartments and cross section of the leg (crus)
- Ankle joint together with the gross anatomy of the muscles acting upon it
- Subtalar and talocalcaneonavicular joints, the muscles acting upon them

- Structure of the foot, arches of the foot
- Diaphragm
- Muscles and spaces of the abdominal wall, rectus sheath
- Inguinal canal, femoral canal
- Pelvic floor (muscles); urogenital diaphragm, perineal muscles
- Components and connections of the anterior, middle and posterior cranial fossae.
- External skull base, connections
- Walls and connections of the orbit
- Walls and connections of the nasal cavity
- Oral cavity, temporal and infratemporal fossae
- Walls and connections of the pterygopalatine fossa

Macroscopy of the nervous system

- Blood supply to the brain, meninges, CSF
- Hemispheres, lateral ventricles, diencephalon, the 3rd ventricle
- Brain stem, cerebellum, the 4th ventricle, spinal cord
- Frontal sections of the brain
- Dorsal branches of the spinal nerves, intercostal nerves
- Cervical plexus
- Brachial plexus
- Lumbar plexus
- Sacral plexus

General Embryology

- Spermatogenesis, spermiogenesis
- Oogenesis
- Fertilization
- Cleavage of the zygote
- Blastocyst formation; the bilaminar embryonic disc
- Implantation
- Major parts of the early embryo (primary and secondary yolk sacs, amnion, chorion, chorionic cavity, body stalk)
- Gastrulation, formation of the intraembryonic mesoderm; the notochord
- Neurulation (neural tube and neural crest), formation of brain vesicles
- Derivatives of ectoderm, endoderm and mesoderm
- Folding of the embryo
- Development of the fetal membranes (chorion and amnion)
- The umbilical cord
- Placenta (structure and formation)
- Twin formation
- Development of the skull
- Development of the vertebral column and limbs
- Development of the musculoskeletal system

Macroscopic Anatomy and Embryology II including Maxillofacial Anatomy

Lectures and dissection classes

Subject matter: Morphology, development, topography and clinically oriented anatomy of the internal organs (i.e. cardiovascular, gastrointestinal, respiratory and urogenital systems).

Morphology and topography of the intracranial spaces. Course and branches of cranial nerves. Autonomic nervous system. Maxillofacial Anatomy

Credits: 8

Prerequisite: Macroscopic Anatomy and embryology I

Week	Lectures	Dissection room
1	1. Composition of the oral cavity, palate, tongue and the faucial isthmus 2. Temporomandibular joint, muscles of mastication 3. Anatomy of teeth	Muscles of facial expression, neck muscles, triangles, cervical fasciae Muscles of mastication, TMJ
2	4. Nasal cavity, paranasal sinuses 5. Morphology of the pharynx and esophagus, peripharyngeal spaces 6. Anatomy of the larynx	Oral cavity, teeth, tongue Pharynx, nasal cavity, larynx
3	7. Classification of cranial nerve nuclei 8. Salivary glands 9. Autonomic nervous system. Sympathetic and parasympathetic nervous systems	Dissection of the temporal region Dissection of the face, neck and parotid region (cadaver)
4	10. Trigeminal nerve (CN 5). Cutaneous innervation 11. Facial (CN 7) and hypoglossal (CN 12) nerves 12. Glossopharyngeal (CN 9), vagus (CN 10) and accessory (CN 11) nerves	Dissection of the infratemporal and pterygopalatine regions (cadaver) Head and neck prosections
5	13. Orbit, eye bulb. Extraocular muscles and eye movements. Oculomotor (CN3), trochlear (CN4) and abducent (CN6) nerves 14. Vessels, lymph nodes and lymphatic drainage of the head&neck 15. Development/derivatives of the foregut together with the pharyngeal clefts/arches/pouches	Head and neck prosections Dissection of the orbit Cranial nerve branches (cadaver)
6	16. Innervation of the teeth and the gingiva, the anatomy of dental local anaesthesia 17. Face development together with developmental malformations. 18. Imaging anatomy of the jaws, teeth and the maxillary sinus (Radiology lecture)	Dissection of cranial nerve branches MAXILLOFACIAL MIDTERM
7	19. Internal organs of the thoracic cavity. Divisions of the mediastinum. Lymphatic drainage. 20. Chambers of the heart, external features, annuli fibrosis, valves. Vessels, conducting system of the heart. Surface projection of the heart, pericardium. Auscultation points. 21. Morphology of the trachea and the lung. Pleura.	Dissection of the cadaver, opening of the thorax. Morphology of the heart
8	22. Development of the heart. Fetal circulation 23. Development of arteries and veins 24. Stomach and small intestines (duodenum, jejunum, ileum)	Morphology of the heart Dissection of the posterior mediastinum
9	25. Large intestine, rectum 26. Development of midgut and hindgut. 27. Liver, gall bladder, pancreas, spleen. Portocaval anastomoses	Dissection of the cadaver. Opening of the abdominal cavity, celiac trunk Superior mesenteric artery, duodenum
10	28. Peritoneum, peritoneal recesses, peritoneal relations of abdominal organs. 29. Development of the peritoneum, Separation of body cavities. 30. Macroscopy of urinary organs	Inferior mesenteric artery Dissection of the kidney, renal capsules and the retroperitoneal region (cadaver)
11	31. Development of the lung. Circulatory adaptation in the newborn 32. Development of urinary organs. 33. Morphology and coats of the testicle. Epididymis.	Ureter, urinary bladder, male urethra Dissection of the retroperitoneal organs (cadaver)
12	34. Morphology of the spermatic cord, seminal vesicle and prostate. Morphology of the penis and male urethra. 35. Anatomy of the ovary, Fallopian tube and uterus 36. Vagina, external genital organs. Female and male perineum.	Male genital organs Female genital organs
13	37. Development of genital organs 38. Topographical and sectional anatomy of the pelvis 39. Topographical and sectional anatomy of the abdomen	Macroscopy of the pelvic floor Revision; cross sectional anatomy
14	40. Topographical and sectional anatomy of the thorax 41. Topographical and sectional anatomy of the neck 42. Topographical and sectional anatomy of the head.	Revision Non-obligatory assessment: Limbs and internal organs (except for the head and neck region)

Midterm tests: The time and topics of midterm tests will be announced in the departmental homepage at the beginning of the semester (<http://semmelweis.hu/anatomia>).

Topic list for the final examination:

Macroscopic Anatomy and embryology I

(see there)

Macroscopic Anatomy and embryology II

- Muscles of the neck, triangles of the neck, cervical fasciae
- Orbit, accessory organs of the eye, extraocular muscles, eye movements.
- Shape, external features of heart
- Skeleton of heart, anuli fibrosi
- Structure of heart wall
- Chambers of heart
- Endocardium, ostia, valves of heart
- Pulse generating and conducting system of heart
- Vessels of the heart
- Pericardium
- Position and surface projections of heart. Radiology of heart
- Percussion and auscultation (area of cardiac dullness, heart sounds)
- Pulmonary circulation
- Parts and topography of the aorta
- Arch of aorta together with its branches
- Blood supply, venous and lymphatic drainage of the thoracic wall and mammary gland
- Thoracic duct, right lymphatic trunk
- Thoracic aorta and its branches
- Abdominal aorta and its branches
- Subclavian artery, axillary artery together with their branches
- Celiac trunk and its branches
- Superior mesenteric artery and its branches
- Inferior mesenteric artery and its branches
- External and internal iliac artery and its branches
- Superior vena cava and its tributaries
- Inferior vena cava and its tributaries
- Azygos and hemiazygos veins and their tributaries
- Portal vein and its tributaries, portocaval anastomoses
- Esophagus (anatomy)
- Stomach (macroscopy and peritoneal relations)
- Duodenum (macroscopy, shape, position, vessels)
- Jejunum and ileum (macroscopy, shape, position, vessels)
- Colon (macroscopy, shape, position, vessels)
- Rectum, anal canal (macroscopy, shape, position, vessels)
- Liver (macroscopy and peritoneal relations)
- Gall bladder and biliary passages (anatomy)
- Pancreas (macroscopy, shape, position, vessels)
- Trachea and bronchial tree
- Lung (macroscopy, shape, position, vessels)
- Surface projection of pleura and lung
- Pleura, pleural cavity
- Mediastinum (divisions and content)
- Kidney (macroscopy, shape, position, vessels)
- Urinary passages (macroscopy of ureter and urinary bladder)
- Macroscopy of the male and female urethrae
- Testis (macroscopy, shape, position, vessels)
- Epididymis, vas deferens, spermatic cord
- Scrotum, coats of testis
- Seminal vesicle, prostate
- Macroscopy of penis
- Ovary (macroscopy, shape, position, vessels)
- Uterine tube (shape, position, vessels)
- Uterus (shape, parts, position, supporting structures, vessels)
- Broad ligament (lig. latum) and its components
- Vagina, external female genital organs
- Topography of the female pelvic organs (connective tissue spaces, peritoneal relations)
- Topography of the male pelvic organs (connective tissue spaces, peritoneal relations)
- Pelvic floor, perineum
- Peritoneum, greater and lesser omentum, mesentery, omental bursa
- Sympathetic nervous system (cervical and thoracic parts, sympathetic trunk)
- Sympathetic nervous system (abdominal and pelvic parts)
- Sacral parasympathetic system
- Macroscopy questions in Maxillofacial Anatomy
- Oral cavity (divisions, boundaries)
- Frontal section of the oral cavity, sulcus lateralis linguae
- Facial isthmus, palate
- Macroscopy of the tongue (parts, vessels, innervation)
- Floor of mouth (descriptive anatomy)
- Pharynx, muscles, para- and retropharyngeal spaces
- Nasal cavity and paranasal sinuses
- Larynx (skeleton, fibroelastic membranes joints and muscles)
- Larynx (mucous membrane, cavity)
- Types and morphology of teeth
- Tooth eruption and exfolition
- Blood supply and innervation of upper teeth
- Blood supply and innervation of lower teeth
- Temporomandibular joint
- Muscles concerned with the opening and closing of the mouth
- Muscles of facial expressions
- Muscles and mechanism of mastication
- Anatomy of the parotid gland, parotid nest
- Anatomy of the submandibular gland, submandibular region
- Anatomy of the sublingual gland, sublingual region
- Branches of the ophthalmic nerve (CN 5/1)
- Branches of the maxillary nerve (CN 5/2)
- Branches of the mandibular nerve (CN 5/3)
- Branches of the facial nerve (CN 7)
- Branches of the glossopharyngeal nerve (CN 9)
- Branches of the vagus nerve (CN 10)
- Branches of the accessory and hypoglossal nerves (CN 11 & 12)
- Lymph nodes and lymphatic drainage of the head & neck region
- External carotid artery and its branches
- Maxillary artery and its branches
- Course and branches of the internal carotid artery
- Veins of face and neck
- Cranial sympathetic and parasympathetic nervous systems
- Cervical plexus
- Maxillofacial Embryology
- Tooth development together with their malformations
- Development of the jaws
- Development of the face
- Developmental malformations of the face
- Derivatives of pharyngeal grooves and pouches
- Derivatives of pharyngeal arches
- Development of the primary and secondary palates
- Development of the tongue
- Organ development
- Fetal circulation
- Formation of atria, development of the interatrial septum
- Formation of ventricles, development of the aorticopulmonary septum
- Development of arteries
- Development of the inferior vena cava and the portal vein
- Development of the superior vena cava, azygos and hemiazygos veins
- Development and differentiation of the midgut
- Development and differentiation of the hindgut
- Formation of the liver and pancreas

MEDICAL CHEMISTRY

Institute of Biochemistry and Molecular Biology
Department of Molecular Biology
EOK Building, H-1094 Budapest, Tüzoltó u. 37-47.

Lecturer of the course: Csaba Sóti MD, DSc
(soti.csaba@semmelweis.hu)

Course coordinator: Gergely Keszler MD, PhD
(keszler.gergely@semmelweis.hu)

Credit: 4

Lessons (in hours): 28 lectures and 28 practicals

Subject code: FOKOMBT304_1A

The principal aim of the course is to prepare students for the understanding of the subjects of Biochemistry, Molecular cell biology, Physiology and Pharmacology. This requires a firm knowledge of the foundations of general, organic and inorganic chemistry.

Lectures:

General chemistry

1. Atomic structure; the periodic table of elements
2. Primary chemical bonds
3. Secondary bonds and interactions
4. Chemical equilibria
5. Electrolytes; ionization of water
6. Acid-base theories, pH of strong acids and bases
7. pH of acids and bases
8. The theory of buffers
9. Buffers of physiological importance, cation and anion hydrolysis, pH of salt solutions
10. Solubility of salts and bases, the solubility product
11. Laws of dilute solutions. Specific and equivalent conductivity
12. Thermodynamics 1 – Enthalpy
13. Thermodynamics 2 – Entropy
14. Thermodynamics 3 – Direction of reactions
15. Electrochemistry 1
16. Electrochemistry 2
17. Reaction kinetics
18. Complex compounds, reactive oxygen species

Organic chemistry

1. Foundations of organic chemistry; the hybrid states of carbon
2. Nomenclature and constitution of organic compounds
1. Configuration and conformation of organic compounds
2. Saturated and unsaturated hydrocarbons
3. Reactions of alkyl halides and aromatic compounds
4. Classification and reactions of hydroxyl compounds
5. Classification and reactions of oxo compounds
6. Structure, function and reactions of organic acids
7. Nitrogen-containing organic compounds
8. Sulphur or phosphorus-containing organic compounds

Practicals:

1. Introduction, acid-base titration 1 (titration of strong acids)
2. Concentration and pH problems
3. Acid-base titration 2 (titration of weak acids).
4. Salts
5. Titration curves, consultation (buffers)
6. Physiological buffer systems
7. 7. Electrochemistry
8. Thermochemistry, thermodynamics
9. Permanganometry
10. Theoretical midterm exam
11. Determination of the ionization constant of phenol red by photometry
12. Electrochemistry
13. Complexometry. Precipitation titration
14. Isomers, molecule models

Lectures and practical lessons

Two lectures are held every week; practical lab lessons (duration: 2×45 min) and seminars (2×45 min) are held in alternating weeks. For detailed schedules see the Moodle website of the subject.

Acknowledgment of the semester:

1.

Attendance of at least 75% of the practical lessons is prerequisite of acknowledging the semester. Missed practicals and seminars can only be made up in the same week with another group; certificate of participation issued by the host teacher needs to be presented by the student to his/her own teacher. However, only one missed class can be made up during the semester.

Students earn a lab point in each practical lesson they participate and perform the experiment in a proper way.

2. One has to pass the theoretical midterm exam.

Theoretical midterm examination

The midterm will take place in week 10, during the regular practical lesson. Passing the theoretical midterm is a **prerequisite** for receiving the end-of-semester **signature**.

The written test must be completed within 90 minutes and includes 4 calculation problems and 2 theoretical topics from the midterm topic list. Students earning an excellent grade (5) on the midterm will receive a **bonus** in the semifinal exam: they do not have to solve the **calculation** question. Failed or missed midterm exams can be retaken twice, but the best grade one can get in the retake is a pass (2). The latter restriction does not apply to students having missed the midterm due to illness (medical certification is to be presented).

Practical midterm examination (lab test)

An optional written practical midterm test (30 min) is held online, on the Moodle platform, in week 14. The test consists of 10 short questions which are based on the laboratory experiments performed during the semester. Performance in the laboratory work during the whole semester is also taken into account at the evaluation. Scores earned in the lab test (max. 10) will be added to the practical points (max. 6) earned during the practicals. Students who collect at least 12 points (out of the maximum 10 + 6 = 16) will receive a **bonus**: they do not have to pick a **practical question** in the exam.

Examination and grading:

The oral and written exam is based on the topic list announced in the beginning of the semester, and it takes place before a two-member committee (examiner and co-examiner). The exam can be passed if all these topics are sufficiently answered. Students pick 3 questions (general chemistry, organic chemistry, practice) and a calculation problem to be solved in writing. Students, who achieve at least 12 points at the practical midterm and at the labs during the semester, get exempted from picking the practical question. The bonus is valid during the whole exam period (in case of an unsuccessful exam) and in CV exams too.

Exemption from attending the course

Students who learned general, and organic chemistry at university levels prior to the commencement of their studies at Semmelweis University might be exempted from attending the Medical Chemistry course. Students are kindly asked to present their official documents (academical transcripts and a detailed syllabus on the courses they have completed) to the tutor (Gergely Keszler).

Recommended textbooks

Ebbing-Gammon: General Chemistry, latest edition

Hrabák-Csermely-Bauer: Principles of Organic Chemistry (2nd edition, 2007, editor: A. Hrabák)

Hrabák: Selected Collection of Chemical Calculations and Biochemical Exercises (latest edition)

E-learning system (Moodle) (<https://itc.semmelweis.hu/moodle>)

Topic list:

I. General chemistry

1. The covalent bond, the molecular geometry of inorganic molecules (e.g. carbon monoxide, carbon dioxide, ammonia). Ionization energy, electron affinity, electronegativity. The ionic bond, hydroxylapatite and fluoroapatite
2. The structures of polyatomic ions, the complexes
3. The secondary bonds and interactions between molecules
4. Laws of dilute solutions: vapor pressure, freezing point depression, boiling point elevation
5. The phenomenon of osmosis, its biological significance, isotonic, hypotonic and hypertonic solutions
6. Chemical equilibria, the equilibrium constant and the degree of dissociation, their correlation. The Le Châtelier principle (example: formation, properties, salts, practical use of hypochlorous acid.)
7. Gas mixtures: partial pressure, volume %. The composition of the air. Dissolution of gases in liquids, Henry's law, the decompression sickness
8. The structure and dissociation of water. Acid-base theories. The pH and pOH concept, calculation of the pH of strong acids or bases, and their titration curves. Acid-base indicators
9. The dissociation of weak acids and bases, the concept of specific and equivalent conductivity, their correlations with the dissociation. Titration curves of weak acids
10. The buffers: principle, mechanism of action, calculation of the pH. The titration curves of polyprotic acids (phosphoric acid)
11. Buffers of physiological importance
12. The first law of thermodynamics. Heat of reaction, combustion heat, heat of formation. Hess' law
13. The second law of thermodynamics. The direction of the chemical reactions, Gibbs free energy
14. Oxidation, reduction, oxidation number, standard reduction potential
15. The galvanic cells: arrangement, reactions, calculation of the electromotive force
16. Types of electrodes, redox systems of biological importance
17. The concentration cells, the principle of measuring the pH

II. Organic chemistry

18. The concept of isomerism, types of structural isomerism, nomenclature of organic compounds
19. Geometric isomerism in unsaturated and cyclic compounds
20. Stereoisomerism, chiral compounds, optical activity, D-L and R-S nomenclature
21. Conformations of organic compounds, examples with open chain and cyclic molecules
22. Properties and reactions of alkenes
23. Characteristics, reactions and biological roles of aromatic compounds
24. Alcohols, enols, phenols
25. Oxo compounds: aldehydes and ketones. Their chemical reactions, the mechanism of the nucleophilic addition. Oxo-enol tautomerism
26. Properties and reactions of compounds containing a carboxyl group
27. Substituted carboxylic acids (Halogenated, oxo-, hydroxy-; aromatic; mono-, di- and tricarboxylic acids)
28. Nitrogen-containing organic compounds: classification and properties of amines
29. Carboamides, amides of the carbonic acid, imines

III. Laboratory

30. Principle of concentration determination by volume measurement: titrations
31. Titration of strong acids and bases
32. Titration of weak acids and bases
33. Titration of gastric juice
34. Titration curves of mono- and polyprotic acids
35. Titration based on redox reaction: permanganometry
36. Complexometry: determination of copper concentration
37. Electrochemical measurements: the Daniell cell, concentration cell, redox and non-polarizable electrodes
38. Principle of spectrophotometry, areas of application: determination of the K_d value of the phenol red indicator
39. Precipitation titration

MEDICAL TERMINOLOGY

Institute of Languages for specific purposes

Lecturer: **Dr. Fogarasi-Nuber Katalin**

Subject name: Medical Terminology; Dental Medical Terminology

Code: FOKVNYE396_1A; FOKVNYE397_1A

Credit value: 2 / 1

Thematics:

The aim of this course is to help students understand English, Latin and Greek medical and dental medical terms used in Hungary and worldwide. The material implies anatomical and clinical vocabulary adjusted to the schedule of the anatomy course. Terms for diagnoses and procedures are demonstrated by authentic medical documents. In addition, students get acquainted with the basic linguistic phenomena required for diagnostic skills.

Attendance and absence:

Attendance of lessons is obligatory. Students are allowed to have maximum 3 absences a semester. In case of more absences, the teacher may deny giving the signature. Students who miss a class, can make up for it (max. once a semester).

Certifying absence:

A medical certificate is required if the student has been absent more than 3 times.

Requirements:

midterms (week 6), practical examination, moodle homeworks
Topics of midterms: based on the curriculum

Semester signature:

Attendance of lessons is obligatory. Students are allowed to have maximum 3 absences a semester. In case of more absences, the teacher may deny giving the signature. Students who miss a class, can make up for it (max. two times a semester).

Evaluation:

The method of assessment is a practical exam. This includes the following sections with the following weighting. The minimum pass mark for the practical examination to be taken during the examination period is 50%.

- practical exam (in the examination period) 60%
 - final test (midterm test) 30%
 - Moodle quizzes (during the semester) 10%
- 0–50 % = 1
51–60 % = 2
61–75 % = 3
76–89 % = 4
90–100 % = 5

Textbooks:

Teaching material

1. Andrea, Barta – Éva Katalin, Varga – Ákos, Zimonyi: Medical terminology for students of dentistry. Bp., 2019 (e-book, available at the Department for Languages for specific purposes).

Excerpts of the following optional textbooks (chapters containing the basic vocabulary of dentistry):

2. Donáth Tibor (szerk.): *Anatómia szótár - Lexicon Anatomiae - Anatomical dictionary - Anatomisches Wörterbuch*. Budapest, Semmelweis Kiadó.
3. Paulsen F. - Waschke J.: *Sobotta Atlas of Human Anatomy*. Munich-Jena.

Week 1:

Skills: Communication between medical professionals, distinguishing medical English and Latin-Greek medical terminology
Vocabulary: parts of the human body, anatomical planes and directions
Linguistic phenomena: pronunciation, alphabet, basic form and dictionary entry of medical nouns and adjectives

Week 2:

Skills: Part-whole theory in anatomical nomenclature
Vocabulary: general terms of skeletal system
Linguistic phenomena: possessive phrases in anatomy and in elemental diagnostics

Week 3:

Skills: Part-whole theory in diagnostics adjusted to anatomical studies
Vocabulary: bones of the upper and lower extremities
Linguistic phenomena: nouns and their adjectives in anatomy

Week 4:

Skills: Attribution in anatomical nomenclature and maxillofacial diagnoses
Vocabulary: bones and joints of skull, terms used in maxillofacial surgery
Linguistic phenomena: nouns and their adjectives

Week 5:

Skills: Attribution in dental and clinical diagnostics adjusted to anatomical studies
Vocabulary: oral and nasal cavity, related clinical terms
Linguistic phenomena: nouns and their adjectives in possessive phrases

Week 6: 1st midterm

Skills: Understanding complex anatomical and diagnostic phrases
Vocabulary: tooth names, parts of teeth
Linguistic phenomena: nouns and their adjectives in possessive phrases of anatomy and elemental dental and clinical diagnostics

Week 7:

Skills: Distinguishing types of medical and dental medical documentation
Vocabulary: pectoral girdle
Linguistic phenomena: common endings of anatomical and clinical terms

Week 8:

Skills: Understanding plural forms in anatomy and in clinical documentation
Vocabulary: bones, joints and muscles of hand and elbow, Greek and Latin endings of clinical terms
Linguistic phenomena: plural phrases in anatomy

Week 9:

Skills: Describing symptoms and locations in dental and clinical diagnoses
Vocabulary: pelvic girdle
Linguistic phenomena: possessive phrases of anatomy and dental diagnostics

Week 10:

Skills: Understanding plural forms in clinical diagnostics
Vocabulary: joints and muscles of lower extremity
Linguistic phenomena: complex phenomena of anatomical phrases and accident surgical diagnoses

Week 11:

Skills: Understanding plural forms in clinical diagnostics
Vocabulary: joints and muscles of lower extremity
Linguistic phenomena: complex phenomena of anatomical phrases and accident surgical diagnoses

Week 12:

Skills: Describing common facial and dental lesions
Vocabulary: muscles of neck and face
Linguistic phenomena: complex phenomena of diagnostic phrases

Week 13:

Skills: Describing common facial and dental lesions
Vocabulary: muscles of neck and face
Linguistic phenomena: complex phenomena of diagnostic phrases

Week 14:

Revision

Physical Education

Physical Education and Sportcenter

Subject: Physical Education I

Type of Subject: Obligatory

Code of Subject: _1A FOKOTSI380_1A

Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

The syllabus (preferably a week and numbered):

1st year semester I:

1st Week: General information

Health and Safety, Fire and Environmental protection. The mid-year adoption requirements, the construction of the classes and the presentation of the university recreational and sports opportunities for extra – curricular activities. Heart rate measurements, Ruffier test and evaluation of the results.

2nd Week: Athletic

Exercises to improve stamina. Preferably outdoors, on grass ground running, with the aim of developing good running and breathing techniques.

3rd Week: Flying disc

Introduction the basic of Frisbee rules and practicing the basic technical elements in pairs and game situation.

4th Week: Tennis

Introducing the basis technical elements of tennis (forehand and backhand shot), improving hand-eye coordination.

5th Week: Agility ladder

Introducing different running, skipping techniques using agility ladder.

6th Week: Football

Introducing the basic technical elements of football. Single exercises and exercises in pairs to improve the ball skill development.

7th Week: Badminton

Introducing the basic technical and tactical elements of badminton. Introducing the basic rules and game.

8th Week: Circuit training

Bodyweight exercises and exercises with basic equipment to learn the correct functional movement pattern.

9th Week:

Completing a practical exercise and ball skill developing exercises

10th Week: Meta

Introducing the game and the basic rules. Aim to improve the ball skill development, improve reaction time, speed and explosiveness.

11th Week: Obstacle course

To complete a built up obstacle course using different creeping-climbing, hovering, pulling, skipping, throwing techniques for general skill development.

12th Week: Core training

Postural correction exercises using the own bodyweight especially to strengthen the core muscles to prevent the health of the vertebrae.

13th Week: Skipping rope

Endurance and coordination developing exercises at different levels using skipping rope.

14th Week: Dumbbell exercises

Strengthening exercises with dumbbells.

Requirements to participate in the sessions and the potential for absences:

Active participation in sport classes.

The method of proof for the workshops and the exam absence:

The absence cannot be proved, should make up for the lost lessons

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

Active participation in 10 classes approved by the staff.

How to prove absence regarding the exam:

Absence must be retaken!

Subject: Physical Education II

Type of Subject: Obligatory

Code of Subject: FOKOTSI380_2A

Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

The syllabus (preferably a week and numbered):

1st year semester II:

1st. week: General information:

Accident, fire and environmental knowledge. Requirement for acceptance of the semester system, the structure of the classes and the presentation of the university recreational sports opportunities for extra-curricular activities.

2nd. week: Basketball:

Dribbling, passing and shooting drills in order to improve fine motor skills.

3rd. week: Bench exercises:

Using the dimensions of the sport bench by running, skipping, jumping, lifting etc. exercises.

4th. week: Rubber band exercises:

Strength and coordination training by taking advantage of the elastic features of the object.

5th. week: Floorball:

Introducing the sport to the Students by exposing the major rules, proper technique of stick handling. Passing and shooting drills.

6th. week: “Double-trouble”:

Strength and stretch training in pairs by applying different starting positions. Functional movements executed in pairs.

7th. week: Volleyball:

Introducing the fundamental elements of the game (serves, hits, digs etc.) Exposing the major rules and techniques.

8th. week: Frisbee:

Taking the next step into the game by applying tactical elements in match situations. Passing and catching drills in different moving forms.

9th. week: Completing a practical exercise and ball skill developing exercises

Sport games on the side (Dodge-ball, King of the court etc.)

10th. week: Circuit training:

General strengthening drills at each stations. Applying different intensity level, regarding the various conditions of the Students.

11th. week: Tennis:

Involving the new strokes into the learning process: form of serves, the volleys, the smash etc.

12th. week: Badminton:

Introducing the new technical and tactical elements of the game (drop shots, lobs, smash etc.) Exposing the rules of doubles.

13th. week: Core exercises:

Relative (own body) weight exercises applying different equipment (hand weights, rubber band etc.) with the aim of postural correction, by strengthening the core muscles in order to avoid spinal deformations.

14th. week: Box exercises:

Applying the sport box by jumping, lifting, slaloming, carrying (etc.) it by this enhance the level of strength and stamina.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins/week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball)

Requirements to participate in the sessions and the potential for absences:

Active participation in sport classes.

The method of proof for the workshops and the exam absence:

The absence cannot be proved, should make up for the lost lessons.

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

Active participation in 10 classes (15 times for trainings!) approved by the staff.

How to prove absence regarding the exam:

Absence must be retaken!

PHYSICAL FOUNDATIONS OF DENTAL MATERIALS SCIENCE

Tutor: Dr. István Voszka

First Semester

Lecture (2 hours/week)

1. Basic forms of material, atoms, interactions, bonds
2. Multiatomic systems. Gases. Interpretation of temperature. Boltzmann-distribution. Fluids. Interface phenomena. Liquid crystals.
3. Solid materials.
4. Methods for structure examination (diffraction, microscopic, spectroscopic methods)
5. Crystallisation. Metals, alloys.
6. Ceramics, polymers, composites.
7. Mechanical properties of materials 1. Elasticity.
8. Mechanical properties of materials 2. Plasticity, hardness.
9. Mechanical properties of materials 3. Rheological properties, viscoelasticity.
10. Other physical (optical, electrical, thermal) properties of materials
11. Comparison of the properties of dental materials
12. Bases of biomechanics. Structure, mechanical and other properties of tissues.
13. Physical bases of implantology.
14. Physical bases of orthodontics.

DENTAL BIOCHEMISTRY I

Department of Medical Biochemistry

Credits: 4

Total number of hours: 56; **lectures (hours):** 28;

practices (hours): 28

Type of the course: obligatory

Academic year: 2023/2024

Code of the course: FOKOBMT305_1A

Course Director: Dr. Kraszimir Kolev

Contact details: H-1094 Budapest, Tűzoltó u. 37-47. Phone: +36-1-

459-1500#60010 e-mail: Kolev.Krasimir@semmelweis.hu

Position: Professor

Date of habilitation: 2008 Ref.: 266

Aim of the course:

The aim of this course is to examine biologically important molecules - namely amino acids, carbohydrates, lipids and nucleotides - identify their contributions to metabolic processes emphasized from a medical point of view, examine the structure and function of proteins, and address mechanisms of catalysis performed by enzymes. Furthermore, three basic biochemistry modules are outlined: The enzymology module, encompassing general principles of enzyme kinetics and how enzymes influence efficiency and controllability of chemical processes in biological systems, as well as how they affect structure and regulation of metabolic pathways; the bioenergetics module, addressing the relationships between mass-energy conversions in the human body emphasizing nutritional aspects, also elaborating on thermodynamic aspects of metabolism; and the 'first' intermediary metabolism module, presenting the salient features of carbohydrate and lipid metabolism which are essential for understanding physiological and pathological processes of the human body. During practices, students apply the theoretical

knowledge acquired at lectures as part of case-oriented discussions in an effort to interpret - from a molecular point of view - relevant conditions.

Location of the course (lecture hall, practice room, etc.):

Premises located in the Basic Medical Sciences building (laboratory rooms located on the first floor and lecture halls located on the ground floor).

Upon the successful completion of the curriculum, the student should be able to:

Identify biochemical structures, know and understand the reactions in which medically important molecules participate; know and understand inter-organ biochemical processes; know and understand integrated metabolic functions of the human body. Overall, such knowledge is essential for understanding physiological and pathological processes and, consequently, for making sound professional decisions.

Prerequisite (s) for admission to the course: None

Terms and Conditions for Starting Student Course (Minimum, Maximum), Student Selection Method: Not applicable for obligatory subjects

How to apply for the course: Application is through the Neptun online system

The course in thematic details:

Lectures: weekly 1×90 min (2 hours)

Practices (P): 2 hours every week

Lecturers: Dr. Komorowicz Erzsébet (KE), Dr. Szöllősi András (SZA), Dr. Bak Judit (BJ), Dr. Iordan Iordanov (II)

Week	Lectures: weekly 1×90 min (2 hours)	Practices (P): 2 hours every week
1	The chemical structure of proteinogenic amino acids. The peptide bond. The primary, secondary and tertiary structure of proteins. (SZA)	P: Structural and chemical characteristics of amino acids; pH and temperature dependent properties.
2	The quaternary structure of proteins. Covalent modifications of proteins. Comparison of the structure-function aspects of myoglobin and haemoglobin. (SZA)	P: Structural and chemical characteristics of amino acids; pH and temperature dependent properties. Gel electrophoresis of LDH subunits.
3	Thermodynamic and structural aspects of enzyme function. Fundamentals of enzyme kinetics. Regulation of enzyme activity. Enzymes as components of physiological systems. Mechanisms of serine proteases. (SZA)	P: Interpretation of pathological conditions stemming from alterations in protein structure, elucidated by atomic resolution techniques.
4	Kinetic models of enzymatic function. Michaelis-Menten kinetics. Significance of the Michaelis constant (K_m). Inhibition of enzymatic reactions. Allostery and cooperativity in enzymatic reactions. Levels of regulation of enzymatic reactions: compartmentalization, altering gene expression, reversible modification of the catalytic activity of enzymes. Enzymatic control by proteolytic activity. (SZA)	P: Determination of kinetic parameters of trypsin
5	The thermodynamics of biochemical pathways. Reversible and irreversible reactions. The coupling of endergonic and exergonic reactions in the human body. High energy compounds. The central role of ATP in the energetics of cells. Reducing equivalents. (BJ)	P: Regulation of enzyme activity. Identification of metabolic pathways.
6	Reactions and control of the citric acid cycle. Sources of citrate. The pyruvate dehydrogenase complex. The synthesis of ATP. ATP production by oxidative phosphorylation in mitochondria. Redox reactions of terminal oxidation (electron transport chain, ETC). The enzyme complexes of ETC. (BJ)	P: Bioenergetics. Determination of P/O ratio
7	Carbohydrates. Digestion and absorption of carbohydrates, cellular glucose uptake, glucose transporters. Glycolysis. (BJ)	P: Carbohydrates in the diet. Food fibers and additives.
8	Gluconeogenesis. Regulation of glycolysis and gluconeogenesis. Cori-cycle. Metabolism of glycogen. Mobilization of glycogen in liver and muscle. (BJ)	P: Lactic acidosis
9	Blood glucose level and its regulation: hyperglycaemia. Insulin release, insulin receptors. Phosphorylation cascade. Lactate synthesis. Effects of glucagon. Biochemistry of diabetes mellitus. (BJ)	P: Determination of blood glucose level.
10	Metabolism of lipids – overview. Absorption of lipids. Metabolism of chylomicrons. (II)	P: Structure and function of the most important lipids in the body and in the diet.
11	Mobilization of fatty acids in adipose tissue, its regulation. Transport in the circulation. Free fatty acids, VLDL, IDL. (SZE)	P: Membrane-forming lipids and their pathologies. Precursor molecules for signal transduction.
12	Oxidation of fatty acids. Ketone bodies. Synthesis of fatty acids. Biosynthesis of triacylglycerol, phospholipids, their regulation. (II)	P: Tissue-specific aspects of lipoprotein lipase (LPL); LPL deficiency.
13	Metabolism of cholesterol, cholesterol transport in circulation. (KE)	P: Determination of triglycerides and cholesterol in blood plasma.
14	Biosynthesis and metabolism of bile acids, the importance of bile acids in lipid digestion. Cholesterol uptake and release by cells. (KE)	P: Signal transduction of insulin

Requirement for special study: not applicable

Policy regarding attending practice; policy regarding absences:

Practices are mandatory. It is not possible to make up for missed practices. In case of absences amounting to more than 3 practices, the semester is not acknowledged. Arriving to a practice with a delay of more than 10 minutes is considered an absence. Practice/seminar participation performance will be evaluated by the tutors: as such, maximum 10 points per semester can be obtained that may count towards the examination grade, see under "Grading system" for further details.

Means of assessing acquired knowledge during the semester:

Midterms: A midterm will take place in the 6th and another in the 11th week, during the practice/seminar (allocated time per midterm: 30 minutes). Each midterm will consist of multiple choice questions (MCQs) from which max 30 points can be obtained (15 points per midterm).

It is obligatory to gather 15 points from both midterms in order to be allowed to sit for the exam. For those students who fail to amass ≥ 10 points from both midterms, one or both midterms can be retaken in the last week during the practice/seminar (allocated time per midterm: 30 minutes). The midterm points will be added as "points" to the result of the exam, as detailed in "Grading system", see below.

Lectures: At the end of some lectures, there will be a Kahoot on the topic of the lecture and the correct answers are registered as bonus points from lectures in the Moodle system. These points are taken into consideration at the oral exam.

Requirement for acknowledging the semester, and for allowing the student to take the exam: Attendance of at least 75 % of the practical classes. and at least 15 points from both midterms.

Competition: The competition is held on the last week during the practice/seminar (allocated time: 40 minutes) and consists of 70 multiple choice questions (MCQs). Only students who amass 21 or more points from the midterms (not the retakes) can participate in the competition. Points obtained from midterms or practice/seminar performance do not count to the score of the competition. Students who score at least 90% of the best result achieved by any student in the course will be invited for the oral exam; this short oral exam will take place in the last day of the last week (after 2 pm, exact time and place will be announced in the last week). On the basis of the written and oral part exemption from the semifinal exam may be granted with a grade of 5 (top 5 % scorers) or 4 (top 5.1-10% scorers).

Exam Type: Colloquium (examination), Form: written test and oral exam, based on material of the official textbook, lectures and practices published at the department's Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>).

Exam Requirements: The material for the written test exam is the material of the lectures and practices in the subject, with the corresponding textbook chapters.

Types and modes of grading:

Grading system:

If the score of the MCQ exam is 49 or below, then the grade of the final exam is 'fail'.

If students reach 50 points on the MCQ exam, the midterm points, practice/seminar performance points and lecture Kahoot points (total max. 40 points) will be added to the MCQ score.

Grade calculation of the final exam from the total points (MCQ+semester):

95–140:	grade 5 (excellent)
86–94:	grade 4 (good)
71–85:	grade 3 (satisfactory)
50–70:	grade 2 (pass)

The grade of the final exam is based on the points obtained at the written MCQ semi-final exam, the two midterms, the practice points, and the oral exam following the written MCQ exam as detailed below.

Grading of the written part:

- Block1: 30 MCQ (30 min) on proteins and enzymes (threshold to pass 12 points)
- Block2: 30 MCQ (30 min) on bioenergetics and carbohydrate metabolism (threshold to pass 12 points)
- Block3: 30 MCQ (30 min) on lipid metabolism (threshold to pass 12 points)

Subtotal threshold: the sum of scores from Block1, Block2, and Block3 should be at least 45 points Total grade of the written part: if the subtotal threshold is achieved, the points of the midterms (max. 30 points) and practices (max. 10 points) are added and the grade is determined as follows:

Fail (1): if the score in any block is less than 12, OR the subtotal is less than 45, OR the total is less than 60

Pass (2): 60 - 74 points

Satisfactory (3): 75 - 89 points

Good (4): 90 - 109 points

Excellent (5): 110 - 130 points

Oral part

Only students who pass the written part proceed to the oral part held on the same day. The examiner chooses 5 MCQ that have been correctly answered by the student in the written part, and the student should interpret them. If the student has achieved amass 15 or more points from the two midterms, they need to answer only 3 oral questions.

Final grade

The final grade is based on the total written grade weighted by a factor determined by the examiner based on the student's performance in the oral part. In case of retake exams students must repeat both the written and oral parts (successful partial results cannot be transferred to subsequent exams).

How to apply for the exam: The exam dates are announced on the 12th week of the semester. We provide at least one exam date each week. Applications are made in the Neptun system in accordance with the University Study and Exam Rules.

Opportunities to repeat the exam: A retake is possible on the closest announced exam date at least one day after an unsuccessful exam.

Printed, electronic and online notes, textbooks, tutorials, and literature for online learning (html for online material):

Harper's Biochemistry (30th edition, or latest)

Online material published in the department's Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>).

DENTAL MEDICAL TERMINOLOGY

Week 1:

Skills: Distinguishing pharmaceutical products
Vocabulary: musculoskeletal system, composition, diseases and injuries
Linguistic phenomena: *gramma*, *litra*, *gutta*; numerals

Week 2:

Skills: Understanding medical prescriptions, factory products
Vocabulary: circulatory system, composition, diseases
Linguistic phenomena: Using Genitive and Accusative in prescriptions

Week 3:

Skills: The use of anatomical and clinical word stems, pre- and suffixes
Vocabulary: gastrointestinal tract, composition, symptoms, diseases
Linguistic phenomena: splitting terms in pre- and suffixes and stems

Week 4:

Skills: Understanding terms related to caries; ICD-10 in use
Vocabulary: respiratory system, composition, significance, symptoms and diseases, terms used in conservative dentistry
Linguistic phenomena: Prepositional phrases in diagnostics and prescriptions

Week 5:

Skills: Use of terms pertaining to diseases of pulp and periapical tissues, phrases on surgical procedures due to a condition, conditions after a procedure
Vocabulary: urinary passages, pelvis, ureter, and bladder, endodontic terms
Linguistic phenomena: instructions in prescriptions (Imperative, passive and active voice)

Week 6:

1st midterm

Week 7:

Skills: Use of terms related to the developmental disorders of dentition and craniofacial malformations, phrases on surgical procedures due to a condition, conditions after a procedure
Vocabulary: urogenital apparatus, terms used in oral pathology
Linguistic phenomena: instructions in prescriptions; packaging materials used in pharmacology

Week 8:

Skills: Understanding terms of drugs types, prescribing magistral products
Vocabulary: terms of drug types and effects
Linguistic phenomena: Greek and Latin roots of pharmacological terms, prepositional phrases in diagnostics and prescriptions

Week 9:

Skills: Use of terms related to gingival, tongue and periodontal diseases, terms pertaining to sensory organs
Vocabulary: anatomical and clinical terms of sensory organs in medical documentation, parodontological terms, terminology of maculopapular rash
Linguistic phenomena: Analysis of metaphorical terms describing sensory organs

Week 10:

Skills: Understanding terms related to salivary gland disorders, writing diagnoses and prescriptions
Vocabulary: endocrinological terms, terms pertaining to endocrine and exocrine glands
Linguistic phenomena: complex phenomena of medical terminology

Week 11:

Skills: Understanding terms related to diseases of the lips and oral mucosa. Infectious diseases
Vocabulary: nomenclature of microorganisms, terms describing forms of cheilitis and stomatitis
Linguistic phenomena: Latin terms and constructions used in clinical and dental infectology

Week 12:

Skills: Use of terms describing tumour diseases of the oral cavity, dental lesions
Vocabulary: histopathological findings, attrition of teeth
Linguistic phenomena: Latin-Greek terms combined in complex diagnoses

Week 13:

Revision

Week 14:

Sample tests for the practical examinations

DENTAL PSYCHOLOGY

Institute of Behavioural Sciences

Code: FOKVMAG019_1A

Credit: 2

Head of the Department: Prof. Dr. József Kovács

Tutor: Dr. Gyöngyvér Salavecz

Second Semester

Course objectives:

- to introduce the concepts of stress, emotions, states of consciousness, and their role in pain perception
- to emphasize suggestive communication and therapeutic methods that may be used to improve doctor-patient relationship in dental practice
- to enable students to recognize and understand psychological and psychopathological issues when encountered in everyday dental practice

Topics:

- 1-2. Control problems and their relations to dental practice
- 3-4. Principles of perception, pain, consciousness, emotions and communication -and their relations to dentistry.
- 5-6. Stress and stress management in dental practice
- 7-8. Psychological crisis, presuicidal syndrome, and burn-out prevention
- 9-10. Role of psychological factors in producing and enhancing pain.
Psychological interventions for pain suppression.
- 11-12. National holiday
- 13-14. Psychotherapeutic methods
- 15-16. Fables and imagination in dental practice
- 17-18. Substance misuse and surrounding areas in dentistry
- 19-20. Dental consequences of eating disorders
- 21-22. Hypnosis and relaxation therapies, and their possible use in dental practice
- 23-24. Conscious states, sleep, dreaming, general anesthesia
- 25-26. Affects, emotion and motivation
- 27-28. Review

Department:

Institute of Behavioural Sciences

Department of Psychology

NET Building, 20th floor

1089. Budapest, Nagyvárad tér 4.

Phone: 210-2953

Secretary: NET Building, 20th floor, Room-2005. Phone: 2102930/ 56114.

Lecturers:

Dr. György Purebl e-mail: purebl.gyorgy@semmelweis.hu

Dr. Róbert Bódizs e-mail: bodizs.robert@semmelweis.hu

Dr. Adrienne Stauder e-mail: stauder.adrienne@semmelweis.hu

Dr. László Harmat e-mail: laszloharmat@yahoo.com

Éva Pollák e-mail: evipoll@yahoo.com

Gabor Suhai e-mail: shgabor@gmail.com

Participation and making up for absences:

Participation list will be recorded at the end of every lecture. To participate on at least 75% of the total number of lessons is a prerequisite for getting the signature. Maximum number of absences in a semester is 3.

Certifying absence from lesson and exam:

Medical certificate presented to the course leader.

Semester requirements:

Course will conclude with a written **examination** in the examination period.

Requirement of semester signature:

A signature will be given with the prerequisite of participation. One absence can be overlooked by the teacher if the student writes an essay. The topic of the essay must be discussed with the course leader in advance.

Method of granting grade: The result of the **examination**.

Type of exam: written **examination**

Exam requirements: Content of the lectures

Sign up for exam: through the Neptun system

Modifying sign up for exam: through the Neptun system

Certifying absence from exam:

A telephone message to the secretary of the Institute or an email message to the course leader.

Recommended text books:

- 1 Behavioral dentistry. Mostofsky DI, Forgione AG, Giddon DB (eds.), Blackwell Munksgaard, 2006.
- 2 Behavior & Medicine. 4th Edition, Danny Wedding, Hogrefe & Huber Publishers, Seattle, 2006.
- 3 Fadem B: Behavioral Science, Lippincott Williams & Wilkins, 5th ed., 2008.
- 4 Sarafino E.P.: Health Psychology. Biopsychosocial interactions. 6th ed., New York, Wiley, 2008.
- 5 Kopp M. - Skrabski Á.: Behavioural Sciences Applied in a Changing Society, Corvina, 1996.

FIRST AID

Department of Oxyology and Emergency Care Faculty of Health Sciences

1088 Budapest, Vas u. 17., room 145

Phone: +(36-1)486-5840

Head of the Department: Andrea Szekely, MD, PhD, DEAA

Teacher: Istvan Hornyak associate professor

Second Semester

Topics

- Principles of first aid. Recognition of an emergency. Assessment of the scene.
- Dangerous scene. Safety measurements on the scene. Call for an ambulance.
- Emotional viewpoints of managing emergencies.
- Assessment of the patient with ABCDE approach. Responsiveness – unresponsiveness. Assessment of the responsive patient: complaints, signs for the severe condition. Positioning of the patient in specific conditions.
- The unconscious patient. Airway management. Assessment of the vital signs.
- Recovery position.
- Heart attack. Sudden death. Chain of survival.
- BLS (Basic Life Support)
- BLS
- AED (Automated External Defibrillator). PAD (Public Access Defibrillation)

- BLS + AED
- BLS + AED
- Chocking. Drowning. Electrocutation.
- Injuries. Extrication of the patient: Emergency lifting. Helmet removal. Mobilization and immobilization of injured patients.
- Bleeding control. Bandages. Burns. Fractures, dislocation, sprain.
- Fainting. Shock. Allergy
- Stroke. Convulsions. Diabetes mellitus: Hypoglycaemia. Shortness of breath.
- Poisoning. Drugs. Drunkenness.

Note: Participation at 75% of practices is necessary. Compensation of absences is possible in subsequent practices. Development in learning skills will be controlled all the time during the practices in the semester.

Mode of certifying absences: oral – referring to practices

Requirements: The student should be able to recognize emergencies, and call for help start with BLS + AED

provide airway management in unconscious patients
provide first aid for patients complaining for chest-pain, shortness of breath, signs for hypoglycaemia and having suffered from fainting, shock condition, convulsion, injuries.

The practical exam on the last practical lesson is evaluated with 5 grades method.

GENERAL DENTAL MATERIALS

Lecturer: Dr. Judit Borbély D.M.D., PhD – associate professor

Second Semester

Lectures (1 hour/week)

Topics of the lectures (weekly, numbered):

1. History of dental education
2. Impression materials I
3. Impression materials II
4. Casts, models and dies
5. Metals, technologies
6. Investment materials, flasking methods
7. Precious alloys, non-precious alloys
8. Dental resins

9. Dental ceramics
10. Dental cad/cam technology
11. Implant materials
12. Luting materials
13. Filling materials
14. Tooth whitening materials

Department of Prosthodontics, Faculty of Dentistry, Semmelweis University

Detailed information on the subject is available on our website under <https://semmelweis.hu/fogpotlastan/en/angol/>

HISTORY OF MEDICINE

Institute of Public Health

Lecturer: Dr. Fazekas-Pongor Vince

The history of medical science, considered as a part of the general history of civilization. The study of the history of medicine helps us to describe and understand how people in different times and cultures experienced and dealt with these fundamentals of human existence. This knowledge can inform debate about the present and the future, and help to bring medicine and science to a wide audience. All human societies have medical beliefs that provide explanations for birth, death, and disease. Many cultures in ancient times treated illnesses with magic and herbal remedies. Ancient Egyptians thought that their gods healed them. The ancient Greeks pursued medicine as a science. Hippocrates, the most famous physician of the time (c. 400 B.C.), believed that diseases had natural causes, not supernatural ones. By the Middle Ages, Europe was hit with a terrible epidemic that killed millions of people called the plague, or Black Death. The Renaissance marked a new period of interest in art and science throughout Europe. Despite new medical discoveries, many doctors still practiced old ways. Most sick people could not afford to see a trained physician. Instead, they consulted midwives who assisted with childbirths and made herbal remedies to treat illnesses. Minor surgeries were not done in the hospital but at the local barbershop. Medical research and training improved in the 18th century but there were still no cures for diseases like smallpox, a disease that killed millions of people over thousands of years. Middle Eastern doctors gave people mild doses of the smallpox to combat the disease. The portrayal of the history of medicine becomes more difficult in the 19th century. Discoveries multiply, and the number of eminent doctors is so great that the history is apt to become a series of biographies. Nevertheless, it is possible to discern the leading trends in modern medical thought. In the beginning of 20th century the research and technology have expanded medical knowledge and improved medical practices like surgery. Today, doctors are able to perform less invasive surgical procedures. The science of medicine has progressed dramatically in just the last 50 years. Career opportunities in health care have also expanded. There is a need for more skilled medical professionals, not only in hospitals, but in dentist and doctors' offices, research labs, rehabilitation centres, mental health clinics, nursing homes and even schools.

Topics/week

1. Introduction. What is Medicine? Methods and sources of Medical History. The birth of paleomedicine (bones teeth, mummies). Prehistoric medicine. Far East.
2. Far East Medicine. Chinese civilization, Japan, India.
3. Medicine of ancient civilizations, rivers valley's culture: Mesopotamia, Egypt, and the medicine knowledge. Medicine - in the Bible time - Heritage of the empirical knowledge. Practitioners. Theories of diseases.
4. Greco-Roman Medicine. Homeric medicine. Asclepius, Hippocrates. Corpus Hippocraticum- the concept and doctrine of his theories about the nature and diseases (the four humors). The Oath. Hygiene and health education. Post-Hippocratic schools – the golden heritage in the school of Alexandria. The roman physicians, diseases. Advance of public health. Water supply and sanitation, climate, soil and health, diseases, endemics. The workers' health, provision of medical care. (Celsus, Galenus)
5. Medieval medicine. Byzantine Healers, Arabian Hakims, Monks, Crusaders and medieval „doctors.“ The Arabian medicine:

chemistry, pharmacy, hospitals. Razes, Avicenna, Abulcasis. The medieval Monasteries (Monte Cassino). The growth of European cities, sanitary problems of urban life. The first religious medical school in Salerno. Medieval Universities, medical humanists, and Christian caritas.

6. Medicine in the Renaissance. The Arts and the humanism. The new mentality of medicine: Paracelsus. The revolution of anatomy: Vesalius and his contemporaries. The first step toward the specialization. Botany and mineralogy. The printing of book's role in medicine. Foundation of the administration of Public Health. Epidemic diseases: communicable and non-communicable diseases. Theories, therapies, and medical care, hospital. Quarantine.
7. Experimenters, Teachers and Theoreticians in the Sixteenth and Seventeenth Centuries. Body as machine -old schools: iatrochemical, iatrophysical theories. New schools: animism, tonus, vitalism, stimulation, homeopathy. The circulation of the blood. Harvey's methodology Malpighi. Microscopy. Birth of modern clinical medicine: Sydenham. Boerhaave and his pupils.
8. Industrialism in the Eighteenth Century. Clinical medicine-schools of clinical (French, English, German, and Habsburg). The first Vienna School: van Swieten. surgery (Hunter, Valsalva), pathology (Morgagni, Bichat). Public health and hygiene. Occupational health, prison reform, general health (death rate, statistics), Ramazzini, Frank. Smallpox. Infant mortality. Nursing, dispensaries and hospitals, development of obstetrics. Sanitary conditions – filthy towns.
9. Clinical medicine in the second half of the eighteenth Century. Bacteriology a new science in medicine. Revolution, concepts and theories under the microscope. New discoveries Pasteur, Koch. Social revolution, industrialism, public health. National and international movements and health reforms, and medical care. Period of great epidemics. International health organization. The Red Cross.
10. Development of surgery and gynaecology. The man-midwife (Smellie, Hunter), History of anaesthesia. General and local possibilities. Wells, Morton, Simpson, Jackson). Asepsis and antisepsis. Early efforts to develop aseptic techniques. Semmelweis, Lister. Progress in surgery, Billroth. Cholecystostomy, appendectomies.
11. Emergence of specialism. Logical outgrowth of locality pathology, new instruments. Initially the medical professions: Paediatrics, Psychotherapy, Ophthalmology, Otology, Rhinology and Laryngologist, Dentistry, Neurology and Psychiatry, Dermatology and Venerology.
12. From the black death to the AIDS. The history of epidemics. The theories and therapies. Tropical medicine. The development of epidemics, the bacteriology and immunology. The new medicaments. Ehrlich and the chemotherapy, sulphonamides, antibiotics. Virology. Salk and Sabin. New diseases and screenings methods.
13. Consultation

Important: 3 absences are allowed. Doctor's certificate is required to certify absence from the exam.

Exam requirement: written test

Textbook:

Chrestomathy on the History of Medicine. Ed. Dr. Forrai J., Dr. Ballér P., Budapest, 1992. SOTE

Hungarian for Dental Medical Purposes I

Hungarian for Dental Medical Purposes I. is a course for students who completed the course Introduction to the Hungarian Language in the first term.

Course objectives are to acquire basic knowledge and skills in order to understand general medical communication, apply the acquired skills freely and creatively to minimize communication problems with Hungarians and use medical language correctly in practice.

Week 1.

Revision, dialogues (common verbs, interrogatives)

Week 2.

Possessive form in the Hungarian language; body parts
adjectives: healthy, sick, weak, having a fever, having a cold
verbs: cough, sneeze, stay, examine, take (medications)

Week 3.

At the pharmacy 1.

Week 4.

At the pharmacy 2. How long? Since when?

Week 5.

Internal medicine chart 1. (patient data, family & social history)
Past tense

Week 6.

Internal medicine chart 2. (medications, allergies, past surgeries, present complaint) Comprehension: coherent, lengthy text in 3rd person singular (3SG)

Week 7.

Revision, oral test

Week 8.

Introduction to Dental English; names of teeth. Which tooth hurts? Where exactly does it hurt?

Week 9.

Questions about pain 1. Practice (pronunciation, grammatical explanations)

Week 10.

Questions about pain 2. Practice (pronunciation, grammatical explanations)

Week 11.

Questions about pain 3. Practice (discussing possible answers, practicing listening comprehension, targeted questions)

Week 12.

Reading and discussing sample dialogues
History taking (questions on charts – complaint, pain)

Week 13.

Revision

Week 14.

Oral test

Textbooks

Halász Hortenzia: Kurzusjegyzet fogorvostan-hallgatók részére

Teaching materials and audio recordings using authentic medical documentation, edited by the instructors of the Institute of Languages for Specific Purposes.

Name of the educational organizational unit: SE EKK Institute of Digital Health Sciences

Name of the subject: Medical Informatics

Type of the subject: 2 practice / week

code: FOKVDEI316_1A

credit value: 2

Name of the lecturer of the subject: Dr. Miklós Szócska

Teachers: Dr. Ádám Zoltán Tamus (PhD, associate professor)

Tamás Tóth PhD, senior lecturer

Zoltán Sándor (PhD, senior lecturer)

Zoltán Tóth (PhD, senior lecturer)

Administrator: Ms. Júlia Nagy

Term: spring

The exercise of the subject in the in the realization of the aim of the education:

To introduce the students to the medical application of informatics, the characteristics of modern, integrated information systems with respect to quantitative aspects and to decision demands of the modern sciences.

The medical informatics leans on methods of mathematics, statistics and computer sciences and it also includes from the different engineering, management and informatics procedures.

Topics of the subject:

Topic of the practical practices: 2×14 practices = 28 practices

1. MS Excel – basics of data storage
2. MS Excel – processing of data
3. MS Excel – data representation, diagrams
4. MS Excel – advanced level exercises
5. Collection and processing of medical data
6. Practice, preparation for the test

1. test (Excel exercises)

7. Basics of databases
8. Data extraction from databases, performing queries
9. Online health information sources
10. Presentation techniques and tools
11. Data security, data protection
12. The future of health informatics

2. test (computer-based test)

Requirements of participation of the lessons and the possibility of substitution of the absence:

- According to rules of the Study and Examination Regulations. Attendance at min. 75% of the classes
 - o Max. 3 absence allowed from practices
- A practical grade will be assigned based on the results of the two tests

The mode of the certificate in case of absence from the lessons and from the exams:

According to rules of the Studies and Exam Code. No certificate accepted.

The requirements of signature at the end of the term:

Attendance of at least 75% of the practices, at least 50% result of both tests

Type of the exam:

Practical mark

Exam requirements:

The practical note is determined based on the results of the two mid-term examinations.

List of lecture notes, course books, study-aids and literature which can be used to acquisition of the syllabus:

The educational materials are available at <http://dei-cloud.semmelweis.hu>. Username and password are announced at the first practice.

Recommended literature:

Meskó Bertalan: The Guide to the Future of Medicine, Webicina 2014 ISBN 9789631200072

Microsoft Office Help and Training Center: <https://support.office.com/> he educational materials are available at <http://dei-cloud.semmelweis.hu>

Username and password is announced at the lecture/first practice.

Second Semester

Hour/semester: 28

Credit: 1

Code: FOKVMAG382_1A

Lecturer of the course: Prof. Dr. Purebl György

Contact details: SE ÁOK Magatartástudományi Intézet, 1089. Nagyváradi tér 4, (36-1)210-2930/ext.56199, or (36-1) 210-2940/ext.56199; or (36-1)210-2953; purebl.gyorgy@semmelweis.hu

Position: Professor, Director of the Institute of Behavioural Sciences, Semmelweis University—Budapest.

Date of habilitation and reference number: 05/2019 Semmelweis University, Budapest

Course leader: Bence Döbrössi dobrossy.bence@semmelweis.hu

Teachers: Bence Döbrössi e-mail: dobrossybence@gmail.com
Dr. Edmond Girasek email: girasek.edmond@gmail.com

Location of the course (address of lecture hall, seminar room etc.): Nagyváradi téri Elméleti Tömb, 1089 Budapest Nagyváradi tér 4.
Elméleti Orvostudományi Központ 1094 Budapest Tűzoltó utca 37-47
FOOC, 1088 Budapest, Szentkirályi u. 47.

Goals of the subject:

The aim of this course is to help students realise that social factors have a considerable influence on oral/ dental health and dentistry. Social, economic and cultural factors have a great effect on the dentist-patient relationship, the way people make sense of their symptoms and seek dental help, their oral/ dental health related behaviour as well as on the aetiology of oral and dental conditions.

By understanding how different societies are structured and organised and how the categories people belong to (gender, ethnicity, occupation, educational level, financial situation to name but a few) shape all aspects of their lives and opportunities, our hope is that students will better comprehend the social reality influencing the dental health status of people and the practice of dentistry for dentists.

Syllabus of the subject:

Week		
1	Introduction to sociology, basic concepts and principles.	Practice
2	General health and oral health status through history	Lecture
3	Social determinants of oral health and oral health related behaviour	Lecture
4	Intercultural dentistry	Lecture
5	Patient expectations regarding dentistry: the theory and practice of dental patient satisfaction studies.	Lecture
6	Norms, deviance and dentistry	Lecture
7	Covid and Sociology- a summary class.	Lecture
8	Introduction to practicals. Project work discussion	Practice
9	Social inequality and health inequality	Practice
10	Health Care Systems workshop	Practice
11	21st century dentistry technological and socio-cultural changes	Practice
12	Dental help seeking behaviour, illness behaviour	Practice
13	Medicalisation in dentistry, cosmetic dentistry	Practice
14	Project reports	Practice

Courses (obligatory and elective) which in part or entirely overlap the topics of above course:

Public Health

The Basics of Digital Healthcare

Special academic work required for completion of the course:

Project work done in the practicals

Attendance on practices and lectures, replacement in case of missed sessions:

75% of practicals must be attended. One practical absence can be made up by undertaking an extra task set by the practical leader or by participating in the practical with another group

Consequences of absence from sessions and exams:

No signature is given if 75% of the practicals is not attended, the project work is not done

Method of checking acquired knowledge during the study period:

Completion of project work is required for getting a signature. The project work is graded and makes up 40% of the final grade.

Requirements of an accepted semester (signature of the lecturer):

Completion of project work and 75% practical attendance is required for getting a signature

Type of the exam:

written exam in the examination period (60% of the final grade)

Requirements of the exam:

- The written exam will consist of multiple choice questions and an essay type case analysis where students are required to understand, explain and apply to the given case concepts and knowledge acquired in the course.
- In order to undertake the exam successfully, students must know the material made available to them on the departmental home page as well as the textbook.
- The material covered in the exam:
 - 21st century dentistry technological and socio-cultural changes
 - Dental help seeking behaviour
 - Intercultural aspects of dentistry
 - Medicalisation in dentistry, cosmetic dentistry
 - Patient expectations regarding dentistry
 - Social determinants of oral health and oral health related behaviour
 - Social inequalities and inequalities in dental health
 - Socio-cultural aspects of pain
 - Systems of dental health care provision
 - The profession of dentistry

Grading of courses:

40%- project work

60% -written examination

Grades:

0-50 points – 1

51-60 points – 2

61-74 points – 3

75-84 points – 4

85 points and over 5

All lecture notes and slides are made available on Moodle (<https://itc.semmelweis.hu/moodle/>)

textbook: Graham Scrambler (ed) Sociology as Applied to Health and Medicine, Palgrave Macmillan 2018

Exam sign up: Through the Neptun System

Modifying: Through the Neptun System

Absence from the exam: With medical document submitted to the course director

MICROSCOPIC ANATOMY AND EMBRYOLOGY I

Department of Anatomy, Histology & Embryology

Lecturer of the Course: Prof. Dr. Gábor Gerber

Course Director: Dr. Andrea D. Székely

LEARNING OBJECTIVES

Aims of the lectures in histology: Presentation of the cell, basic principles in cell biology (mitosis, cytoskeleton, cellular motility), detailed presentation of the basic (epithelial, connective, muscle and nervous) tissues. Complementing gross anatomy with a detailed presentation of the fine structure of organs, including the ultrastructural details together with the molecular background. Important chapters: basic tissues, viscera, central nervous system.

Aims of the practical sessions in the histology room: Facilitate the understanding of ground (epithelial, connective, muscle and nervous) tissues and the fine structure of the organs through the observation and interpretation of histological specimens.

LECTURES: 2 × 45 min in both semesters

PRACTICAL CLASSES: I: 2 × 45 min; II: 2 × 45 min.

ECTS CREDITS: Altogether 8 (I: 4; II: 4).

MIDTERM TESTS: written (e-learning type)

ACCEPTENCE OF THE SEMESTER:

Active participation in lectures, and dissection room sessions is obligatory for every student. Students should attend at least 75% of the scheduled practical classes to gain a signature proving the validity of the semester. Absences are therefore limited in **25%**. Attendance will be recorded in the Histology classes.

Students are obliged to participate in and successfully pass the midterm test or their semester would not be accepted. Missed midterms should be retaken at the given retake timepoints the department offers during the last two weeks of the semester.

TYPE OF EXAMS: oral and written

I: semifinal examination (written exam), II: final exam (written and oral exam)

In the semifinal examination if the result is a fail (1) or a pass(2) students will have to continue with an oral examination (slides and

theory topic). Those who achieve a mark 3 or above are exempted from the oral part.

Final examinations consist of written and oral parts

1. Written pretest (e-learning module – access to SeKA account is obligatory)

2. Oral test in Microscopic Anatomy: identification of structures on virtual histological specimens including relevant theoretical questions

LIST OF TEXTBOOKS

1. **The Developing Human – Clinically Oriented Embryology**, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384
2. **Histology: A Text and Atlas:** With Correlated Cell and Molecular Biology; 7th Edition by MH Ross and W Pawlina; Wolters Kluwer 2015, ISBN 9781451187427
3. **Wheater's Functional Histology, A Text and Colour Atlas**, 6th Edition by B Young, G O'Dowd and P Woodford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473
4. **Oral Anatomy, Histology and Embryology**, 4th Edition, by B. Berkovitz Paperback with STUDENT CONSULT Online Access and e-book ISBN: 9780723434115 Copyright: 2009

Recommended textbooks:

5. **Langmann's Medical Embryology**, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
6. Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033
7. Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O'Dowd and P Woodford ISBN 9780702047473, Churchill Livingstone, Edinburgh, 2013.
8. **Langmann's Medical Embryology**, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
9. **Illustrated Dental Embryology, Histology, and Anatomy**, 3rd Edition by Mary Bath-Balogh ISBN: 9781437717303, 2011.

Microscopic Anatomy and Embryology I.

Department of Anatomy, Histology & Embryology
Lecturer of the Course: Prof. Dr. Gábor Gerber
Course Director: Dr. Andrea D. Székely

Lectures in Histology; practical classes in Histology

Subject matter

Histology: Microscopy of the ground (basic) tissues (epithelia, glandular tissues, connective and supporting tissues, types of muscle tissues. Histology of the corpuscular elements of the blood, cells of the red bone marrow. Microscopical strucure of the internal organs (cardiovascular, gastrointestinal, respiratory and the urogenital systems)

Credits: 5

Prerequisite: Cell Science

Week	Lectures	Histology laboratory
1	1. Epithelial tissues, cell contacts, intercellular connections 2. Glandular epithelium	Simple and stratified epithelial tissues
2	3. Connective tissue cells and fibres. 4. Connective tissue fibres. Types of connective tissue	Transitional epithelium Glandular epithelium
3	5. Supporting tissues (cartilage, bone) 6. Ossification, bone remodelling	Connective tissue fibres and cell types
4	7. Muscle tissues I 8. Muscle tissues II	Supporting tissues (cartilage, bone) Types of bone formation
5	9. Histology of vessels 10. Histology of the tongue and salivary glands	Types of muscle tissues Histology of the peripheral nervous system Histology of vessels
6	11. Tooth development, malformations 12. Histology of teeth I Enamel and dentine	Midterm (basic tissues, nerve tissue, vessels) Tooth development, tooth
7	13. Histology of teeth II Cementum and dental pulp 14. Histology of teeth III Parodontal tissues	Salivary glands, lip, tongue, lingual papillae
8	15. Histology of the esophagus and stomach 16. Microscopical anatomy of the small intestines	Esophagus, cardia Stomach, small intestine, large intestine
9	17. Histology of the liver, gall bladder and pancreas 18. Microscopical anatomy of the large intestines	Liver, gall bladder and pancreas
10	19. Histology of the airways 20. Histology of the kidney	Larynx, trachea, lung
11	21. Histology of urinary passeges 22. Histology of the testicle	Histology of the urinary system (kidney, ureter, urinary bladder)
12	23. Histology of the spermatic cord, seminal vesicle and prostate 24. Histology of the ovary, oogenesis	Male genital system 1.
13	25. Histology of the Fallopi an tube, uterus and the vagina 26. Histology of the placenta, umbilical cord and the mammary gland	Male genital system 2. Female genital system 1.
14	27. Histology summary I 28. Histology summary II	Female genital system 2 Placenta, umbilical cord, mammary gland

Topic list for the semifinal examination

Microscopic Anatomy and Embryology I.

General Histology, Histology of Organs

- Definition and classification of epithelial tissues
- Simple epithelia
- Stratified epithelia
- Membrane specializations of epithelia
- Glandular epithelia
- Cells of connective tissue
- Ground substance and fibres of connective tissue
- Types of connective tissue
- Histology of cartilage
- Histology of the bone tissue
- Intramembranous ossification
- Endochondral ossification
- Growth and remodeling of bone
- Smooth muscle and myoepithelial cells
- Skeletal muscle tissue
- Cardiac muscle tissue
- Histological structure of arteries and arterioles
- Composition of capillaries and veins
- General composition of parenchymal (solid/compact) organs
- Wall structure of hollow organs
- Fine structure of the intestinal villi, enteroendocrine system
- Lip and tongue
- Histological structure of the esophagus
- Histological structure of the stomach

- Histological structure of the small intestine (duodenum, jejunum, ileum)
- Histological structure of the large intestine
- Histological structure of the liver
- Histological structure of the gall bladder, extrahepatic bile ducts and pancreas
- Histological structure of the larynx, trachea and lung
- Histology of kidney
- Histological structure of the ureter and urinary bladder
- Histological structure of the male genital apparatus (testicles, epididymis, spermatic cord, seminal vesicle, prostate and penis)
- Histological structure of the female genital apparatus (ovary, uterine tube, vagina and the mamary gland)
- Uterus (prolipherative, secretory phases) menstrual cycle
- Placenta and umbilical cord

Maxillofacial histology

- Structure of enamel
- Amelogenesis
- Structure of dentin
- Dentinogenesis
- Fine structure of the dental pulp
- Structure and formation of cementum
- Parodontal tissues
- Parts and structure of gingiva
- Tooth eruption
- Histology of the palate
- Histology of the tongue
- Fine structure of salivary glands

SUMMER PRACTICE OF DENTAL ASSISTANCE

I.

Department of General Dental Preclinical Practice

Address: Budapest, 1088, Szentkirályi u. 47

Tel: 459-1472; 459-1500/59112; 59322

Head and tutor of department: Prof. Dr. Krisztina Márton D.M.D., Ph.D

Lecturer: Dr. Tamás Demeter Ph.D.

Assistant lecturer: Dr. Anna Júlia Dézsi (tutor)PhD, Dr. Csilla Erdei

Clinical specialist: Dr. Dávid Jelencsics, Dr. Dávid Szilárd Kovács, Dr. Éva Zsófia Vincze, Dr. Fanni Andrea Vass

Resident: Dr. Ágnes Heizer

Credit value: 0

Dental Assistant Practice – 2 weeks (60' hours)

Week 1 Introduction of the Practice, administration. Fire and Job Security Rules for Students, Code of Conduct.

Lecture: Introduction of the Dental Clinical and Training Centre, patient check in.

General tasks of the dental assistants, main parts of their profession and responsibilities in the different departments. Structure of the patient administration system

Practice: Basic and auxiliary materials used in the dental office: Phosphate cements, polycarboxylate cements, calcium-hydroxide

Lecture: Infection control, documentation and quality assurance. Contamination, disinfection, principles of sterilization, chairside assistant responsibilities.

Hand hygiene, avoidance of pinprick accidents

Practice: Hand hygiene practice.

Visiting the Central Sterilization Unit.

Lecture: Environmental aspects in dentistry.

Practice: Basic and auxiliary materials used in the dental office: mixing procedures of different types of impression materials: alginate. Impression taking on phantom heads

Lecture: Ergonomics and four-handed dentistry, dentist work position, patient position on upper and lower arch

Practice: Presentation of four-handed dentistry and practicing four-handed treatment on phantom heads.

Presentation of manual and machine mixing of impression materials, mixing procedures of different types of impression materials: silicone, polyether
Presentation of the Dental Clinical and Training Centre
Interactive quiz

Week 2 (practicing the things learnt the previous week)
Clinical assistant practice in the clinical Department

II.

Dental Laboratory Technical Practice (60 hours)

Topics of the practical sessions:

1. week: visiting of a dental laboratory

- Introduction of the laboratory, of its structure. Demonstration of the cast making, metal casting and porcelain veneering.
- Getting acquainted with the making of fixed and removable dental appliances.
- Presentation of a specific odontotechnological workphase, as a group assignment (8 minute ppt presentation).

2. week:

- Introduction to the training laboratory, handing out of the instruments, demonstration of the instruments
- Cast making
- Wax pattern making of an incisor and a premolar tooth.
- Waxing up of an occlusal surface.
- Artificial teeth

Important note: Document certifying the completion of the practice must be handed in at registration! Registration to the next year is not allowed without it!



Faculty of Medicine
3rd–4th semester

FACULTY OF DENTISTRY

BASIC MODULE

3rd Semester

	Subject	Subject code	CREDITS	Hours per semester	Lecture (hr/semester)	Seminar (hr/semester)	Practice (hr/semester)	Lecture (hr/week)α	Seminar (hr/week)α	Practice (hr/week)α	Prerequisite(s)	Evaluation
Obligatory	Basic Immunology	FOKOGEN347_1A	3	42	28	0	14	2	0	1	Cell Science, Dental Biochemistry I.	Examination
Obligatory	Dental Biochemistry II.	FOKOBMT305_2A	3	42	28	0	14	2	0	1	Dental Biochemistry I.	Comprehensive examination #
Obligatory	General Dental Preclinical Practice	FOKOPRT231_1A	4	56	14	0	42	1	0	3	Physical Foundations of Dental Materials Science, Macroscopic anatomy and embryology I.	Examination*
Obligatory	Hungarian for Dental Medical Purposes II.	FOKONYE398_2A	0	56	0	0	56	0	0	4	Hungarian for Dental Medical Purposes I.	End-term examination
Obligatory	Medical and Dental Physiology I.	FOKOELT349_1A	9	70	70	0	49	5	0	3,5	Microscopic anatomy and embryology I., Macroscopic anatomy and embryology II., Biophysics II.	Examination
Obligatory	Microscopic anatomy and embryology II.	FOKOANT339_2A	4	56	28	0	28	2	0	2	Microscopic anatomy and embryology I., Macroscopic anatomy and embryology II.	Comprehensive examination #
Obligatory	Molecular Cell Biology I.	FOKOMBT306_1A	3	42	14	0	28	1	0	2	Medical chemistry, Dental Biochemistry I.	Examination
Obligatory	Odontotechnology and Prosthodontics Pre-clinical I.	FOKOFPK365_1A	4	42	0	14	28	0	1	2	General Dental Materials, Macroscopic anatomy and embryology II.	Term grade
Obligatory	Physical Education III.	FOKOTSI380_3A	0	14	0	0	14	0	0	1		Term grade
	Sum of credits in the semester:		30									

4th semester

	Subject	Subject code	CREDITS	Hours per semester	Lecture (hr/semester)	Seminar (hr/semester)	Practice (hr/semester)	Lecture (hr/week)α	Seminar (hr/week)α	Practice (hr/week)α	Prerequisite(s)	Evaluation
Obligatory	General and Oral Microbiology	FOKOMIK350_1A	4	56	28	0	28	2	0	2	Molecular Cell Biology I., Medical and Dental Physiology I.	Examination*
Obligatory	Genetics and Genomics	FOKOGEN240_1A	2	14	21	0	14	1,5	0	1	Cell Science, Dental Biochemistry II.	Examination
Obligatory	Hungarian for Dental Medical Purposes III.	FOKONYE398_3A	0	56	0	0	56	0	0	4	Hungarian for Dental Medical Purposes II.	End-term examination
Obligatory	Medical and Dental Physiology II.	FOKOELT349_2A	8	119	70	0	49	5	0	3.5	Microscopic anatomy and embryology II., Molecular Cell Biology I., Medical and Dental Physiology I.	Comprehensive examination #
Obligatory	Molecular Cell Biology II.	FOKOMBT306_2A	4	56	28	0	28	2	0	2	Molecular Cell Biology I., Dental Biochemistry II.	Comprehensive examination #
Obligatory	Odontotechnology and Prosthodontics Pre-clinical II.	FOKOFPK365_2A	4	56	0	14	42	0	1	3	Macroscopic anatomy and embryology II., Odontotechnology and Prosthodontics Pre-clinical I.	Term grade
Obligatory	Physical Education IV.	FOKOTSI380_4A	0	14	0	0	14	0	0	1		Term grade
Obligatory	Restorative Dentistry, Preclinical I.	FOKOKFK355_1A	4	42	0	0	42	0	0	3	General Dental Preclinical Practice, Odontotechnology and Prosthodontics Pre-clinical I. Macroscopic anatomy and embryology II.	Term grade
	Sum of credits in the semester:		26									

LIST OF TEXTBOOKS (The list may change!)

- 1 Textbook: Koeppen-Bruce M- Stanton- Bruce A: Berne & Levy Physiology (7th edition).
- 2 Practice book: Practices in Medical Physiology (Edited by: Péter Enyedi and Levente Kiss, 2017)
- 3 Harper's Illustrated Biochemistry (30th edition). ISBN-13: 978-0071825344
- 4 Wilson, Mansfield, Heath, Spence: Dental Technology and Materials for Students. Backwell Scientific Publications. ISBN 0-632-01763-5
- 5 A.Newbrun: Cariology Quintessence. ISBN 0867152052
- 6 C.M.Sturdevant: Operative Dentistry. Mosby ISBN 0-80166366-0
- 7 Herbert T. Shillingburg: Fundamentals of Fixed Prosthodontics – Quintessence 4th ed. 2012. ISBN 931386500
- 8 R.M. Basker, J.C. Davenport: Prosthetic Treatment of the Edentulous Patient – McMillan Press Ltd 5th ed. 2011. ISBN 978-1405192613
- 9 Lodish: Molecular Cell Biology (8th edition)
- 10 Abul Abbas, Andrew Lichtman, Shiv Pillai, Basic Immunology 6th Edition, Elsevier, 2019.
- 11 Immunology seminars (e-book)
- 12 Szabó: Basics of Medical Microbiology. E-book, Semmelweis; 2022

Recommended textbooks:

- 1 Murray,Robert K.-Granner,Daryl K-Mayes,Peter A.-Rodwell,Victor W: Harper's Illustrated Biochemistry. 26th Ed. McGraw-Hill. ISBN 0-07-138901-6 (Online version: www.lib.sote.hu)
- 2 G.Nikiforuk: Understanding Dental Caries (1-2) Karger. ISBN 3-8055-3906-1(set)
- 3 Biochemistry Laboratory Manual. Ed.Gy.Szabados. Bp. Semmelweis Univ.
- 4 Field, James: PreClinical Dental Skills at a Glance, Blackwell Publishers (Wiley) ISBN-13: 9781118766675
- 5 Hermann Péter, Szentpétery András: Gnatológia (Semmelweis Kiadó, 2018)

BASIC IMMUNOLOGY

Department of Genetics, Cell and Immunobiology

Course director: **Prof. Dr. Edit Buzás**

Tutor: **Dr. Marianna Csilla Holub**

Subject code: FOKGEN037_1A

Prerequisite subject: Anatomy (Maxillofacial Anatomy) IV., Biochemistry, Molecular and Cellbiology III; Medical and Dental Physiology II

Credits: 3

	Lectures (2 hr / week)	Practicals / Seminars (1 hr / week)
1.	The role, processes, organs and cells of the immune system	Basic terms
2.	Principles of natural immunity	The immune system in the lab
3.	The complement system	Methods based on antigen-antibody interactions I: Immunoserology
4.	Inflammation and acute phase reaction	Methods based on antigen-antibody interactions II: Immunassays
5.	Antigen, antigen presentation and MHCs	Methods based on antigen-antibody interactions III: Flow cytometry
6.	Antigen receptors and their formation	Complement assays
7.	T lymphocytes and cell-mediated immune response	HLA typing
8.	B lymphocytes and humoral immune response	Vaccination I
9.	Mucosal immunity	Vaccination II
10.	Immune response in infections	Biological therapies I
11.	Immunodeficiencies	Biological therapies II
12.	Hypersensitivity	Hypersensitivity I
12.	Tolerance and autoimmunity	Hypersensitivity II-IV.
13.	Antitumor immunity	Screening methods for autoantibodies
14.	Immunology of transplantation	Case studies II

The sequence of lessons may change.

Attendance of a minimum of 75% of the practices is necessary for the end-term signature. The presence at the seminars (practices) are registered weekly, more than three absences from the seminars invalidate the semester as well. The sessions can be attended in an appropriate mental and health condition.

Semi-final exam: written/Moodle test. Students have to reach more 50 % of the exam scores (30 out of 60) to pass.

Bonus points can be collected during the semester in lectures and by the midterm(s). Students who achieve the threshold by collecting bonus can take a simplified exam.

Literature:

Abul Abbas, Andrew Lichtman, Shiv Pillai, Basic Immunology 6th Edition, Elsevier, 2019.

Immunology seminars (e-book): <http://gsi.semmelweis.hu> (The user name and password is on the course datasheet of the Neptun.)

DENTAL BIOCHEMISTRY II

Department of Medical Biochemistry

Credits: 3

Total number of hours: 42; lectures (hours): 28;

practices (hours): 14

Type of the course: obligatory

Academic year: 2021/2022

Code of the course FOKOMBT305_2

Course Director: Dr. Kraszimir Kolev

Contact details: H-1094 Budapest, Tűzoltó u. 37-47.

tel: +36-1-459-1500#60010 email: Kolev.Krasimir@semmelweis.hu

Position: Professor

Date of habilitation: 2008 Ref.: 266

Aim of the course:

The aim of the course is to comprehensively describe metabolic processes in the human body, from a medical point of view. The main theme of the semester is to elaborate further on carbohydrate and lipid metabolism commenced in Medical Biochemistry I, elaborate on amino acid and nucleotide metabolism, examine more thoroughly intermediary metabolism including the integration of processes throughout the organs and the human body as a whole. Furthermore, this course aims to afford to medical students the skills of being able to interpret complex physiological processes in the human body at a molecular level. During practices they discuss rapidly developing, promising areas of medicine („tomorrow's medicine"). The medical biochemical orientation of the course is based on the presentation of molecular bases of diseases that pose serious public health problems (cardiovascular, neurodegenerative, cancer states), with particular emphasis on discussing potential molecular targets of therapy.

Location of the course (lecture hall, practice room, etc.):

Premises located in the Basic Medical Sciences building (laboratory rooms located on the first floor and lecture halls located on the ground floor).

Upon the successful completion of the curriculum, the student should be able to:

Identify biochemical structures, know and understand the reactions in which medically important molecules participate; know and understand inter-organ biochemical processes; know and understand integrated metabolic functions of the human body. Overall, such knowledge is essential for understanding physiological and pathological processes and, consequently, for making sound professional decisions.

Prerequisite (s) for admission to the course: Medical Biochemistry I

Terms and Conditions for Starting Student Course (Minimum, Maximum), Student Selection Method: Not applicable for obligatory subjects.

How to apply for the course: Application is through the Neptun online system.

The course in thematic details:

Lectures: weekly 1x90 min (2 hours)

Lecturers: Dr. Dóra Ravasz (RD), Prof. Krasimir Kolev (KK), Dr. Komorowicz Erzsébet (KE), Dr. Törőcsik Beáta (TB)

Week	Lectures: weekly 1x90 min (2 hours)	Practices (P): 2 hours every other week
1	Nitrogen balance. Digestion of proteins. Function of proteases, their regulation. Absorption of amino acids, amino acid transporters. (RD)	P: Determination of transaminases and creatine kinase activity
2	Catabolism of amino acids. Elimination of ammonia, reactions and regulation of ornithine cycle. Degradation of amino acids: fate of their carbon skeleton. The role of vitamins in amino acid metabolism. (RD)	P: Determination of transaminases and creatine kinase activity
3	Biosynthesis and degradation of heme. Iron homeostasis (RD)	P: Vitamin B12 deficiency and methylmalonic acidemias
4	Structure and function of nucleotides. The fate of nucleotides obtained through diet. Formation and elimination of uric acid; its metabolic role in humans. Synthesis and degradation of purine and pyrimidine nucleotides. Effects of cytostatic drugs on nucleotide metabolism. (KK)	P: Vitamin B12 deficiency and methylmalonic acidemias
5	Integration of metabolism. Metabolism of red blood cells. Red blood cell enzymopathies. Kidney metabolism, and dependence on fasting and acidosis. Metabolism of muscle and heart. Comparison of kidney and liver gluconeogenesis. Metabolic adaptation to physical effort. (TB)	P: Acute and chronic liver disease
6	The starvation-feeding cycle and its regulation. Regulation of hepatocyte metabolism in starvation. (TB)	P: Acute and chronic liver disease
7	General overview of blood clot formation and elimination. Fibrinogen and fibrin. Prothrombin activation and regulation of thrombin activity. Triggers of blood clotting, amplification of the initiation. (TB)	P: Tumor metabolism
8	Fibrinolysis. Activation of plasminogen. Inhibitors of plasmin. (KE)	P: Tumor metabolism
9	Inhibitors of blood coagulation and negative feedback mechanisms. (KE)	P: Prothrombin time and activated partial thromboplastin time. Molecular background of inherited thrombophilia

Week	Lectures: weekly 1x90 min (2 hours)	Practices (P): 2 hours every other week
10	Cellular elements of the haemostatic system. Platelets and von Willebrand factor. Neutrophils and endothelial cells in haemostasis. Hemodynamic and biochemical interactions in haemostasis. The role of endothelial dysfunction in atherosclerosis. LDL oxidation and pattern-recognition receptors (TLR, scavenger receptors). (KE)	P: Prothrombin time and activated partial thromboplastin time. Molecular background of inherited thrombophilia
11	Membrane transporters. Na ⁺ /K ⁺ ATPase isoforms. (TB)	P: Measurement of fibrin stabilization and soluble fibrin monomers. Molecular background of acquired thrombophilia
12	Chemical neurotransmission. Cholinergic neurotransmission. Biosynthesis of acetylcholine. receptors, acetylcholine esterase. Molecular mechanism of exocytosis. (TB)	P: Measurement of fibrin stabilization and soluble fibrin monomers. Molecular background of acquired thrombophilia
13	Noradrenergic neurotransmission. Synthesis and metabolism of norepinephrine. Synaptic uptake. Adrenergic receptors. Molecular mechanism of epinephrine and norepinephrine effects on various organs. (TB)	P: The relationship between metabolism and the functions of the nervous system
14	Glutamatergic and GABA-ergic neurotransmission. (TB)	The relationship between metabolism and the functions of the nervous system

Potential overlap(s) with other topics: none
Requirement for special study: not applicable

Policy regarding attending practices; policy regarding absences: Practices are mandatory. It is not possible to make up for missed practices. In case of absences amounting to more than 2 practices, the semester is not acknowledged. Arriving to a practice with a delay of more than 10 minutes is considered an absence. Practice/seminar participation performance will be evaluated by the tutor: as such, maximum 10 points per semester can be obtained that may count towards the final grade, see under “Grading system” for further details. **Lectures:** At the end of each lecture, there will be a Kahoot on the topic of the lecture, consisting of 5 questions; 20 secs are allocated per question. Points can be earned by correctly responding to at least 4 out of 5 Kahoot questions. Maximum 1 point can be earned per lecture, as outlined by the lecturer. Through the Kahoots, students may obtain points that will be added to the points earned at the final exam, as detailed in “Grading system”, see below.

Means of assessing the students’ progress during the semester: A midterm will take place in the 6th and another in the 11th week, during the practice/seminar (allocated time per midterm: 30 minutes). Each midterm will consist of multiple choice questions (MCQs) from which max 30 points can be obtained (15 points per midterm). It is obligatory to gather ≥15 points from both midterms in order to be allowed to sit for the exam. For those students who fail to amass ≥10 points from both midterms, one or both midterms can be retaken in the last week during the practice/seminar (allocated time per midterm: 30 minutes). The midterm points will be added as “points” to the result of the exam, as detailed in “Grading system”, see below.

Lectures: At the end of some lecture, there will be a Kahoot on the topic of the lecture and the correct answers are registered as bonus points from lectures in the Moodle system. These points are taken into consideration at the oral exam.

Requirement for acknowledging the semester, and for allowing the student to take the final exam: Attendance of at least 75 % of the practical classes and at least 15 points from both midterms.

Competition: The competition is held on the last week during the practice/seminar (allocated time: 40 minutes) and consists of 70 multiple choice questions (MCQs). Only students who amass 21 or more points from the midterms (not the retakes) can participate in the competition. Points obtained from midterms or practice/seminar performance do not count to the score of the competition. Students who score at least 90% of the best result achieved by any student in the course will be invited for the oral exam; this short oral exam will take place in the last day of the last week (after 2 pm, exact time and place will be announced in the last week). On the basis of the written and oral part exemption from the semifinal exam may be granted with a grade of 5 (top 5 % scorers) or 4 (top 5.1-10% scorers).

Exam Type: Final. Form: written test and oral exam, based on material of the official textbook, lectures and practices published at the department’s Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>).

Exam Requirements: The material for the written test exam is the material of the lectures and practices in the subject, with the corresponding textbook chapters.

Method and type of evaluation *(written plus oral):*

Written part: this part consists of 120 Multiple Choice Questions (MCQs) to be answered within 120 minutes. It will consist of 4 blocks: Block I: 30 points; protein structures, enzymology, bioenergetics. Threshold for passing block I:12 points
Block II: 30 points; carbohydrates, lipids
Threshold for passing block II: 12 points
Block III: 30 points; amino acids, nucleotides, metabolic integration
Threshold for passing block III: 12 points
Block IV: 30 points; blood coagulation, membrane biochemistry, neurobiochemistry, signal transduction
Threshold for passing block IV: 12 points
A fifth block (block V) comprised of the points obtained by the mid-terms is also added (see below).
Bonus points from practice/seminars performance is added to the five blocks (see below).

Seminar/practice points: maximum 10 points.

Two midterms: maximum 30 points (15+15).

The mark for the written part is determined as follows:
Mark 1 (fail): Total points for the five blocks of the examination if < 74 points, or a score < 12 in any of the blocks I-IV, or < 60 points in [Block I+ Block II+ Block III+ Block IV]
Mark 2: 75-95 (including the bonus points from midterms and practices/seminars)
Mark 3: 96-110 (including the bonus points from lectures and practices/seminars)
Mark 4: 111-125 (including the bonus points from lectures and practices/seminars)
Mark 5: 126-160 (including the bonus points from lectures and practices/seminars)
Those students who amass ≥ 75 points in the written part, may proceed to the oral part.

Oral part:
During the oral part of the examination, the examiner will select 4 test questions which the candidate has answered correctly in the written examination of the day. The candidate must interpret his/her answers to these questions.

The final grade is determined on the basis of the written and oral parts of the examination. No mark of the written part guarantees passing the exam.

How to apply for the exam: The exam dates are announced on the 12th week of the semester. We provide at least one exam date each week. Applications are made in the Neptun system in accordance with the University Study and Exam Rules.

Opportunities to repeat the exam: A retake is possible on the closest announced exam date at least one day after an unsuccessful exam.

Printed, electronic and online notes, textbooks, tutorials, and literature for online learning (html for online material):
Harper’s Biochemistry (30th edition, or latest)
Online material published in the department’s Moodle e-learning system (<https://itc.semmelweis.hu/moodle/>).

GENERAL DENTAL PRECLINICAL PRACTICE

Department of Preclinical Dentistry

Head: Prof. Dr. Krisztina Márton D.M.D., Ph.D.

Second Semester

Lectures (1 hour/week) **Practices** (3 hours/week)

The **Department of General Dental Preclinical Practice** is responsible for the preparation of dental students for the practical stages of the clinical practice requiring high precision and excellent manual skills. The aim of this special education is to provide the students with a professional preclinical conservative dentistry, prosthodontics, periodontology, oral surgery and orthodontics manual and theoretical training, which will be used in the clinical treatment procedures. It consists of the simulation of the clinical stages on phantom heads, but furthermore students also have the opportunity to study the basics of minimal- and micro invasive dentistry and the most important rules of infection control.

Theoretical lessons:

1. Oral Diseases
2. Oral Health Status Of Hungary At The Beginning Of The 21-St Century
3. Consequences of Loss of Teeth. Types of Prosthetic Appliances
4. Role Of Dentistry In The Health Sciences. The Dental Team. Environmental aspects in dentistry.
5. Establishment And Instrumentation Of The Dental Clinic
6. Minimally Invasive And Micro-Invasive Dentistry. Digital Dentistry
7. Preparation Techniques In Dentistry: Restaurative and Endodontic Treatments
8. Preparation Techniques In Dentistry: Prosthodontics
9. Contamination And Infection Control In Dentistry
10. Disinfection And Sterilization Methods In Dentistry
11. Morphology Of The Teeth. Guide-Planes And Cephalometric Landmarks
12. Operative Techniques In Dentistry: Periodontology
13. Operative Techniques In Dentistry: Oral And Maxillofacial Surgery
14. Operative Techniques In Dentistry: Paedodontics And Orthodontics

Practicals:

1. Pick-Up Of The Instruments. Instrumentation Of The Dental Clinic
2. Preparation Techniques In Dentistry. Practicing Cavity Preparation On Training-Plates
3. Preparation Techniques In Dentistry. Practicing Cavity Preparation On Training-Plates.
4. Preparation Techniques In Dentistry. Practicing Cavity Preparation On Training-Plates
5. Preparation Techniques In Dentistry. Practicing Cavity Preparation On Training-Plates
6. Minimally Invasive And Micro-Invasive Dentistry techniques.
7. Class I Cavity Preparation on the Artificial 36 Tooth. AI and Digital Dentistry
8. Preparation of Artificial 46 Tooth for a Full Crown 1
9. Preparation of Artificial 46 Tooth for a Full Crown 2, Digital impression taking with intraoral scanner.
10. Establishment And Instrumentation Of The Dental Clinic. Clinical Practical Introduction, Fluid Control, Four-Handed Dentistry In Practice. Contamination And Infection Control In The Dental Practice. Disinfection And Sterilization In Dentistry. Central Sterilization Unit Of The Teaching Centre.
11. Wax-modelling of the 46 tooth.
12. Periodontology Practice. Role Of Oral Hygiene In The Health Of The Oral Cavity. Oral Hygiene Techniques.
13. Oral Surgery Practice. The Oral Surgery Operation Unit. Basics Of The Dental Anaesthesia
14. Paedodontics And Orthodontics. Introduction Into The Orofacial Anomalies In Children.

Recommended textbook:

Field, James: PreClinical Dental Skills at a Glance, Blackwell Publishers (Wiley) ISBN13: 9781118766675

HUNGARIAN FOR DENTAL MEDICAL PURPOSES II

Institute of Languages for specific purposes

Hungarian for Dental Medical Purposes II is a course for students who completed the course Hungarian for Dental Medical Purposes I. Course objectives are to extend the range of basic knowledge and skills, as well as to improve the ability to use what has been learnt so far. Students are introduced to dental language to ensure that they use it correctly in practice.

Attendance and absence:

A maximum of 7 absences is allowed; if the number of absences exceeds this, students may make up missed classes in another group (maximum two times) in agreement with the instructor. Students who miss more than 25% of the classes will not be allowed to get a signature.

Certifying absence:

For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required.

Requirements:

Two oral tests in weeks 7 and 14

Topic: the material covered

Make-up and upgrade opportunities: to be arranged outside of class

with the instructor.

Semester signature:

A maximum of 7 absences is allowed; if the number of absences exceeds this, students may make up missed classes in another class (maximum two times) in agreement with the instructor. Students who miss more than 25% of the classes will not be allowed to get a signature; attendance in classes; attendance in both oral tests.

Evaluation:

Students will receive a grade and a percentage evaluation for both oral tests. If students achieve a minimum of 80% on both the first and second oral test, the instructor will offer them a grade. If the average of the two midterm results is between 80% and 90%, a grade of four will be offered; if it is above 90%, a grade of five will be offered. In this case, there is no need to take an exam during the exam period. Those whose performance is below the criteria will have to demonstrate their knowledge during the exam period at the times announced in Neptun, in front of a two-member committee.

Assessment of oral tests:

0-49%	= fail (1)
50-59%	= pass (2)
60-74%	= fair (3)
75-89%	= good (4)
90-100%	= excellent (5)

Detailed course/lecture description:

Week	Topics
1.	Revision: internal medicine chart
2.	Revision: complaint, pain (location, timing, character, etc.)
3.	The tooth. Tooth material and parts Names of teeth What is DMF?
4.	Number of decayed, missing and filled teeth (listening and reading comprehension) Dialogues
5.	Tooth decay / Caries 1
6.	Tooth brushing
7.	Revision, oral test
8.	Basics of dentist-patient dialogues 1. Introduction, short history-taking
9.	Basics of dentist-patient dialogues 2. Instructions during examination, diagnosis
10.	Basics of dentist-patient dialogues 3. Treatment, saying goodbye
11.	Tasks and exercises in the topics above (e.g., comprehension) Revision: the tooth, tooth decay, tooth brushing
12.	Listening comprehension exercises in the topics above Improvised dialogues, vocabulary building based on possible answers, strategies to improve comprehension
13.	Revision
14.	Oral test

Textbooks

Halász Hortenzia: Kurzusjegyzet fogorvostan-hallgatók részére
Teaching materials and audio recordings using authentic medical documentation, edited by the instructors of the Institute of Languages for Specific Purposes.

HUNGARIAN FOR DENTAL MEDICAL PURPOSES III

Hungarian for Dental Medical Purposes III is a course for students who completed the course Hungarian for Dental Medical Purposes II. Course objectives are to extend the range of basic knowledge and skills, as well as to apply creatively what has been learnt so far. Students focus on professional communication and learn expressions of dental documentation.

Attendance and absence:

A maximum of 7 absences is allowed; if the number of absences exceeds this, students may make up missed classes in another group (maximum two times) in agreement with the instructor. Students who miss more than 25% of the classes will not be allowed to get a signature.

Certifying absence:

For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required.

Requirements:

Two oral tests in weeks 7 and 14

Topic: the material covered

Make-up and upgrade opportunities: to be arranged outside of class with the instructor.

Semester signature:

A maximum of 7 absences is allowed; if the number of absences exceeds this, students may make up missed classes in another class (maximum two times) in agreement with the instructor. Students who miss more than 25% of the classes will not be allowed to get a signature; attendance in classes; attendance in both oral tests.

Evaluation:

Students will receive a term grade based on the average of their oral tests and their class work. The second oral test is marked by two teachers on separate mark sheets and an average is calculated. An unsatisfactory oral answer must be repeated – the 'fail' (1) grade for these students will also count towards the end-of-term grade.

Assessment of oral tests:

0-49%	= fail (1)
50-59%	= pass (2)
60-74%	= fair (3)
75-89%	= good (4)
90-100%	= excellent (5)

MEDICAL AND DENTAL PHYSIOLOGY I-II

Department of Physiology

Head of the Department: Dr. Attila Mócsai, Full Professor

Course Director: Dr. András Balla, Associate Professor

Tutor: Dr. András Balla

Aim of Medical and Dental Physiology course:

The goal of Medical and Dental Physiology course is to give the students the understanding of the concepts and principles of medical and dental physiology. The lectures provide the information base while the seminars and practices provide the student with an opportunity to assimilate and integrate the material. Appropriate clinical perspectives are presented throughout the course.

First semester

1. Introduction, body fluids. Functions of cellular membranes, transport across membranes. Transepithelial transports.
2. Signal transduction: receptors, G proteins, second messengers. Cellular calcium metabolism, receptors of growth factors and cytokines. Membrane trafficking and vesicular transport.
3. Ion channels and resting membrane potential. Action potential. Physiology of nerve cells, synaptic transmission in the central nervous system.
4. Neuromuscular junction and physiology of skeletal muscle. Autonomic neurotransmitters and physiology of smooth muscle.
5. Physiology of the blood.
6. Physiology of the heart I: origin and spread of cardiac excitation. Cardiac cycle. Regulation of cardiac output.
7. Electrocardiography (ECG). Physiology of blood circulation: introduction.
8. Hemodynamics, systemic circulation. Microcirculation.
9. Venous circulation and lymph flow. Local control of circulation. Reflex control of circulation.
10. Circulation of blood in the brain and coronary circulation. Splanchnic circulation, circulation of skin and skeletal muscle.
11. Respiration: pulmonary ventilation. Gas exchange in the lungs. Pulmonary circulation, ventilation-perfusion relationship.
12. Gas transport, hypoxias. Regulation of respiration. Adaptation of cardiovascular and respiratory system.
13. Renal function: renal circulation, glomerular filtration. Tubular functions. Concentration, dilution.
14. Regulation of body fluids and osmotic concentration. Introduction to acid-base balance. Acid-base balance: role of lungs and kidneys.

Second semester

1. General principles of regulation in the gastrointestinal tract. Motor functions of the gastrointestinal tract.
2. Secretory functions of the gastrointestinal tract. Digestion and absorption of food.
3. Endocrine regulations. The hypothalamo-adenohypophyseal system; growth hormone, somatomedins.
4. Function of the adrenal cortex. Function of the thyroid gland. Energy balance, quality and quantity requirement of food.
5. Hormonal regulation of intermediary metabolism.
6. Calcium metabolism, bone tissue, growth. Function of the reproductive system: endocrinology of the sexual differentiation and development.
7. Function of the reproductive system: male sexual function; female sexual function; endocrinology of pregnancy, parturition, and lactation.
8. Introduction to neurophysiology. Physiology of nerve & glia cells.
9. Sensory functions.
10. Physiology of hearing and equilibrium.
11. Physiology of vision.

12. Motor functions.
13. Integration of autonomic responses.
14. Electroencephalogram (EEG); sleep phenomena. Learning and memory. Regulation of behavioural mechanisms, motivation; emotion.

Practices, semester I:

- Typing of Blood Groups, Blood Coagulation Test
- Blood cell counting, determination of hemoglobin concentration and hematocrit.
- Leukocyte differential count on peripheral blood smear
- Recording and analyzing the human ECG
- Blood pressure measurement in humans
- Computer simulation: Skeletal and smooth muscle
- Evaluation of acid-base parameters with the Siggaard-Andersen nomogram

Practices, semester II:

- Human pulmonary function tests
- Smooth muscle of rabbit small intestine
- Oral glucose tolerance test (OGTT)
- Electrooculography (EOG) and investigation of the vestibular system
- Reflex function
- Computer simulation: Studies on circulatory reactions of a virtual rat
- Computer simulation: Neuromuscular junction

Attendance on practices and lectures, replacement in case of missed sessions:

The lecture hours per week are 5; the practice hours per week are 3.5. Students must write a lab report for each practice using the Practical Book. The Practical Book should be signed by the teacher not later than one week after the practice. Participation in the practices is obligatory. No more than three absences or no more than 10.5 practice hours from practices are allowed for any reason; otherwise the semester will not be credited. There are no extra practices and missed practices cannot be retaken.

Consequences of absence from sessions and exams:

No more than three absences from practices are allowed for any reason; otherwise the semester will not be credited. There are no extra practices and missed practices cannot be retaken. Failing to certify absence from an exam causes registering "absence" = "nem jelent meg" in the NEPTUN system.

Method of checking acquired knowledge during the study period:

The knowledge of the students is tested in a written form on a weekly base. The short tests cover the material of lectures of the previous week. Missed tests cannot be repeated. The evaluation of the weekly written test will be expressed as a percentage. The average of percentages of the nine best written tests results in a five-point scale: 0-50% = 1, 51-60% = 2; 61-70% = 3, 71-85% = 4, 86-100% = 5. This grade (lab grade) is taken into account in the exams.

Requirements of an accepted semester (signature of the lecturer):

- 1) The attendance in minimum 75% of practices is necessary for the end-term signature. Students must write a lab report for each practice using the Practical Book. The Practical Book should be signed by the teacher not later than one week after the practice. Participation in the practices is obligatory. No more than three absences from practices are allowed for any reason; otherwise the semester will not be credited.
- 2) The average of the taken in account weekly tests must be above 50% to obtain the end-term signature. Students who do not meet this requirement need to take a written test covering the material of the semester in the 14th week of the semester during the "Competition exam", and achieving a result of 50% or higher is necessary to obtain the end-term signature.

Grading of courses:

Exam of the Medical and Dental Physiology I: The students need to bring ID card and the laboratory report book to participate in the exam. The oral exam consists of two theoretical questions (I-II). Grouping of questions, the topics of the exam can be found in the webpage of the Department of Physiology.

I: 1 and 2 topics of the semifinal exam

II: 3, 4 and 5 topics of the semifinal exam

The overall result of the oral exam is based on the two theoretical grades but a failed (1) theoretical question results in an overall failed (1) exam. The mathematical average of three partial grades (lab grade and two oral exam grades) gives the grade of the exam:

Excellent (5): 4.51 - 5.00

Good (4): 3.51 - 4.50

Satisfactory (3): 2.51 - 3.50

Pass (2): 2.00 - 2.50

Fail (1): below 2.00 or in case of failed (1) theoretical question.

The following rules will be enforced during the exam: electronic devices must be kept in the baggage; baggage and coats should be placed next to the wall of the lecture halls or the practice rooms; any form of communication is disallowed; students not complying with these rules will be disqualified immediately.

Final exam: The final exam consists of a written and an oral part. The written and oral part of the final exam starts at 8:45 by showing up in the selected exam place. Your exam place and examiners are announced in written form at 8:30 (attached to the front door of the corridor of the Physiology Practice Rooms). The students need to bring ID card and the laboratory report book to participate in the exam. The written part consists of 30 questions and takes 45 minutes. Grading of the written part:

0-14 correct answers = 1

15-18 correct answers = 2

19-22 correct answers = 3

23-26 correct answers = 4

27-30 correct answers = 5

The oral exam starts at 9:45 and consists of two theoretical questions (I-II). Grouping of questions, the topics of the final exam can be found in <http://semmelweis.hu/elettan/teaching/second-semester>.

I: 1, 2, 3, 4 and 5 topics of the final exam

II: 6, 7 and 8 topics of the final exam

The overall grade of the final exam is the mean of four (lab grade, written exam grade, two oral exam grades), but a failed (1) theoretical question results in an overall failed (1) exam.

Excellent (5): 4.51 - 5.00

Good (4): 3.51 - 4.50

Satisfactory (3): 2.51 - 3.50

Pass (2): 2.00 - 2.50

Fail (1): below 2.00 or in case of failed (1) theoretical question.

The following rules will be enforced during the exam: electronic devices must be kept in the baggage; baggage and coats should be placed next to the wall of the lecture halls or the practice rooms; any form of communication is disallowed; students not complying with these rules will be disqualified immediately.

Exam registration:

Registration for the exam must be recorded through the NEPTUN system.

Rules of repeating exams:

Repetition of the exam is possible at least three days after the unsuccessful trial.

List of textbooks:

Textbook: Koeppen-Bruce M- Stanton- Bruce A: Berne & Levy Physiology (7th edition). 2017. ISBN: 9780323393942

Practice book: Practices in Medical Physiology (Edited by: Péter Enyedi and Levente Kiss). 2017. ISBN: 9789633314159.

MICROSCOPIC ANATOMY AND EMBRYOLOGY II

Department of Anatomy, Histology & Embryology

Lecturer of the Course: Prof. Dr. Gábor Gerber

Course Director: Dr. Andrea D. Székely

LEARNING OBJECTIVES

Aims of the lectures in histology: Presentation of the cell, basic principles in cell biology (mitosis, cytoskeleton, cellular motility), detailed presentation of the basic (epithelial, connective, muscle and nervous) tissues. Complementing gross anatomy with a detailed presentation of the fine structure of organs, including the ultrastructural details together with the molecular background. Important chapters: basic tissues, viscera, central nervous system.

Aims of the practical sessions in the histology room: Facilitate the understanding of ground (epithelial, connective, muscle and nervous) tissues and the fine structure of the organs through the observation and interpretation of histological specimens.

LECTURES: 2 × 45 min in both semesters

PRACTICAL CLASSES: 2 × 45 min in both semesters

ECTS CREDITS: Altogether 8. 4 credits in both semesters

MIDTERM TESTS: written (e-learning type)

ACCEPTANCE OF THE SEMESTER:

Active participation in lectures, and dissection room sessions is obligatory for every student. Students should attend at least 75% of the scheduled practical classes to gain a signature proving the validity of the semester. Absences are therefore limited in **25%**. Attendance will be recorded in the lectures and in the histology classes.

Students are obliged to participate in the midterm test or their semester would not be accepted. Missed midterms should be retaken at the given retake timepoints the department offers during the last two weeks of the semester.

TYPE OF EXAMS: oral and written

I.: semifinal examination, II.: final exam

Semifinal and final examinations consist of written and oral parts

1. Written pretest (e-learning module – access to SeKA account is obligatory)
2. Oral test in Microscopic Anatomy: identification of structures on virtual histological specimens including relevant theoretical questions

LIST OF TEXTBOOKS

1. **The Developing Human – Clinically Oriented Embryology**, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384
2. **Histology: A Text and Atlas:** With Correlated Cell and Molecular Biology; 7th Edition by MH Ross and W Pawlina ; Wolters Kluwer 2015, ISBN 9781451187427
3. **Wheater's Functional Histology, A Text and Colour Atlas**, 6th Edition by B Young, G O'Dowd and P Woodford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473
4. **Oral Anatomy, Histology and Embryology**, 4th Edition, by B. Berkovitz Paperback with STUDENT CONSULT Online Access and e-book ISBN: 9780723434115 Copyright: 2009

Recommended textbooks:

5. **Langmann's Medical Embryology**, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
6. **Junqueira's Basic Histology: Text and Atlas**; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033
7. **Wheater's Functional Histology, A Text and Colour Atlas**, 6th Edition by B Young, G O'Dowd and P Woodford ISBN 9780702047473, Churchill Livingstone, Edinburgh, 2013.
8. **Langmann's Medical Embryology**, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
9. **Illustrated Dental Embryology, Histology, and Anatomy**, 3rd Edition by Mary Bath-Balogh ISBN: 9781437717303, 2011.

MICROSCOPIC ANATOMY AND EMBRYOLOGY II

Department of Anatomy, Histology & Embryology

Lecturer of the Course: Prof. Dr. Gábor Gerber

Course Director: Dr. Andrea D. Székely

Lectures in Histology and Embryology; practical classes in Histology

Subject matter

Histology: Microscopical structure of the CNS and PNS (cerebrum, cerebellum, brain stem, spinal cord, ganglia) organs of special senses (apple of eye, inner ear), endocrine glands (pineal, pituitary, thyroid, suprarenal glands) skin and appendages, lymphatic system and the mammary gland.

Embryology: Development of the central and peripheral nervous systems, development of the organs of senses together with their malformations

Credits: 4

Prerequisites: Macroscopic Anatomy II (successful final examination)
Microscopic Anatomy and Embryology I (successful examination)

Week	Lectures	Histology laboratory*
Week 1	1. Blood, corpuscular elements of blood. Bone marrow, erythropoiesis, leukopoiesis 2. Cellular components of lymphatic tissue. Thymus, tonsils, MALT	Lymphatic system, PNS and CNS
Week 2	3. Structure and circulation of lymph nodes and spleen 4. Nerve tissue	Lymphatic system, PNS and CNS
Week 3	5. Development of the neural tube. Cranio-caudal and dorso-ventral differentiation. 6. Structure of CNS 6. Formation and derivatives of the neural crest and placode ectoderm	PNS and CNS
Week 4	7. Fine structure of the spinal cord. Spinal reflexes, receptors, effectors, monosynaptic/ 8. proprioceptive reflexes 8. Brain tracts, neurotransmitters, neuronal circuits, "connectomics"	PNS and CNS
Week 5	9. Central autonomic nervous system. Monoaminergic and cholinergic neurones and 10. pathways. „Ascending Reticular Activating System” (ARAS) 10. Somato- and viscerosensory systems. Sensory pathways.	PNS and CNS
Week 6	11. Functional connectivity of the sensory cortex, thalamus and insula 12. Neuroanatomy of pain.	Microscopy of the CNS - consultation
Week 7	13. Neuroanatomy of movements/locomotion I. Somatomotor cortical tracts. 14. Visceromotor system, control of micturition 14. Structure of the cerebellum, cerebellar connections	Microscopy of the CNS - consultation
Week 8	15. Neuroanatomy of movements/locomotion II. Planning /programming of and 16. eliciting movements. Gait control mechanism. The role of cerebellum and basal 16. ganglia 16. External ear, middle ear.	Microscopy of the CNS - consultation
Week 9	17. Inner ear. Bony and membranous labyrinth. Development of the organ of hearing. 18. Control of balancing and posture together with the movements of the eye and 18. head. Awareness of spatial position.	Midterm test Histology of endocrine organs, skin and organs of special senses
Week 10	19. Spiral organ of Corti. Auditory pathway. Neuroanatomy of hearing, understanding 20. and control of speech. 20. Fibrous and vascular coats of the eyeball. Lacrimal gland, lacrimal apparatus.	Histology of endocrine organs, skin and organs of special senses
Week 11	21. Inner coat of the eyeball, retina. Development of the eye 22. Neuroanatomy of vision. Visual pathway, visual recognition, orientation in space.	Histology of endocrine organs, skin and organs of special senses
Week 12	23. Circadian rhythm, sleep/wake cycle; neuroanatomy of resting state and activation 24. Endocrine system I, Hypothalamus, the hypothalamo-hypophyseal system, 24. epiphysis	Histology of endocrine organs, skin and organs of special senses
Week 13	25. Taste sensation and olfaction. Limbic system 26. Neuroanatomy of energy metabolism, food intake, hedonism and addiction	Midterm test Histology of endocrine organs, skin and organs of special senses
Week 14	27. Neuroanatomy of emotions, motivation, aggression, empathy and behaviour. The 28. reward system 28. Neuroanatomy of stress, fear, anxiety and depression. Determination, alertness together with personality, consciousness and well-being.	Histology of endocrine organs, skin and organs of special senses

*The topics of the Histology laboratories together with the accurate time and topics of the MIDTERM tests are going to be announced in the departmental homepage (as well as in the Handbook)

Requirements for acceptance of the semester:

Active participation in practical lessons/consultations, including the midterm tests, is obligatory for every student. Students should attend at least 75% of the scheduled hours to gain a signature proving the validity of the semester. Absences cannot be made up for.

Methods to assess knowledge acquisition during term time:

During the semester the knowledge of the students will be evaluated in one written (e-learning type) midterm test. Attendance and passing of the midterm test is obligatory. Students absent from or being unsuccessful at the midterm test should reattend at a given timepoint or their semester will not be accepted. The time and topics of the midterm tests will be announced in the departmental homepage/moodle at the beginning of the semester.

Type of examination:

Final (written and oral) examination, topics: subject matter of the subjects Microscopic Anatomy and Embryology I-II. Final examinations consist of written theoretical and oral practical parts.

1. Written pretest (e-learning module)
2. Microscopic Anatomy - identification of structures on digitized tissue slides - including relevant theoretical questions from the subject matter of the semester

Final examinations are composed of written theoretical and oral practical parts. The written theoretical examination is done using an e-learning module while the practical examination is conducted with the help of digitized histological tissue slides. Students will receive two separate marks for the two parts of the examination. Students may continue with the oral examination even if the written part was unsuccessful. In case of an unsuccessful (fail = 1) oral examination part, the whole final examination needs to be retaken. Those with a 4 (good) or 5 (excellent) written examination mark are exempted from rewriting the written pretest in the retake examination in case failing during the practical part of the given semifinal examination. The final mark is calculated on the basis of the results (marks) gathered during the written and oral parts of the given examination by the president of the examination committee.

Topic list for the final examination:

Microscopic Anatomy and Embryology I

(see there)

Microscopic Anatomy and Embryology II

Development of the nervous system and organs of special senses

- Development and primary differentiation of the neural tube
- Development of telencephalon
- Development of the peripheral nervous system (neural crest, placodes)
- Development of the organ of vision
- Development of the organ of hearing&equilibrium

Histology

- Histology of the neurons developing from the neural tube
- Glial cells
- Histology of the neurons and supporting cells developing from the neural crest
- Fine structure of peripheral nerves
- Receptors and effectors
- Interneuronal synapses
- Microscopical anatomy development of the pituitary gland with special relevance to the posterior lobe
- Blood supply, histology and development of the anterior and intermediate lobes of the pituitary gland
- Microscopical anatomy of the pineal gland
- Microscopical anatomy and the development of the thyroid gland
- Microscopical anatomy and the development of the parathyroid gland
- Microscopical anatomy and the development of the cortical layering of the suprarenal gland
- Microscopical anatomy and the development of the suprarenal gland
- Histology of the islands of Langerhans
- Histological structure of lymph nodes
- Spleen (fine structure and circulation)
- Thymus
- Tonsils, MALT
- Microscopical structure of the skin
- Histology of the mammary gland (lactating and non-lactating)

Organs of special senses

- Coats of the eyeball (tunica fibrosa, vasculosa, nervosa)
- Lens, accommodation
- Light reflex of the pupil
- Chambers of the eye, vitreous body
- Eyelids, conjunctiva, lacrimal apparatus
- Cornea reflex
- Visual pathway, optic nerve (CN 2)
- External ear, tympanic membrane.
- Tympanic cavity, auditory tube,
- Hearing ossicles, their joints and muscles
- Bony and membranous labyrinth
- Cochlea and cochlear duct
- Organ of Corti. Auditory pathway, vestibulocohlear nerve (CN 8)
- Vestibular system
- Taste sensation, taste buds, tracts
- Organs of olfaction and taste, olfactory nerve (CN 1)

Microscopy of the central nervous system

- Fine structure (microscopy) of the spinal cord
- Proprioceptive reflexes
- Nociceptive reflexes
- Autonomic reflexes
- Fine structure of the medulla oblongata
- Fine structure of the pons
- Fine structure of the midbrain
- Classification of cranial nerve nuclei
- Tracts of the brain stem
- Reticular formation, monoaminergic systems
- Fine structure of the cerebellum
- Cerebellar afferents and efferents
- Fine structure of the thalamus
- Hypothalamo-hypophyseal system
- Fine structure of the basal ganglia
- Fine structure of the cerebral cortex, cortical fields
- Tracts of the protopathic sensibility (anterolateral system)
- Tracts of the epicritic sensibility (posterior funiculus/medial lemniscus)
- Pyramidal (tract) system
- Extrapyramidal system
- Limbic system (nuclei and tracts)
- Reflex arc of mastication
- Anatomical bases for trigeminal pain
- Autonomic innervation of salivary glands

Literature, i.e. printed, electronic and online notes, textbooks, tutorials (URL for online material):

List of textbooks

1. The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384
2. Histology: A Text and Atlas: With Correlated Cell and Molecular Biology; 7th Edition by MH Ross and W Pawlina ; Wolters Kluwer 2015, ISBN 9781451187427
3. Wheater’s Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O’Dowd and P Woodford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473
4. Oral Anatomy, Histology and Embryology, 4th Edition, by B. Berkovitz Paperback with STUDENT CONSULT Online Access and e-book ISBN: 9780723434115 Copyright: 2009
5. Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.
6. Langmann’s Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
7. Junqueira’s Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033
8. Wheater’s Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O’Dowd and P Woodford ISBN 9780702047473, Churchill Livingstone, Edinburgh, 2013.
9. Illustrated Dental Embryology, Histology, and Anatomy, 3rd Edition by Mary Bath-Balogh ISBN: 9781437717303, 2011.

Further study aids:

To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology or from Moodle

MOLECULAR CELL BIOLOGY I

Institute of Biochemistry and Molecular Biology
Department of Molecular Biology
EOK Building, H-1094 Budapest, Tűzoltó u. 37-47.

Lecturer of the course: Miklós Csala MD, DSc
(csala.miklos@semmelweis.hu)

Course coordinator: Gergely Keszler MD, PhD
(keszler.gergely@semmelweis.hu)

Credit: 3

Lessons (in hours): 14 lectures and 28 practicals

Subject code: FOKOMBT306_1A

This subject focuses on the main procedures in molecular biology and cell biology. It serves as a base for several fields in medicine, such as molecular pathology, molecular diagnostics, pharmacology, gene therapy and medical biotechnology.

Lectures:

1. Introduction to molecular cell biology. Structure of nucleotides and nucleic acids. Packaging of DNA into chromatin
2. Structure of the human genome
3. Principles of DNA replication
4. DNA repair
5. PCR, investigation of genetic polymorphisms
6. Transcription in pro- and eukaryotic cells; mRNA processing
7. Regulation of prokaryotic transcription
8. Regulation of eukaryotic transcription
9. The genetic code and translation
10. Posttranslational modification, folding and quality control of proteins
11. Protein targeting into metabolic compartments
12. MicroRNAs, epigenetic regulation of transcription
13. Gene expression analysis, real-time PCR
14. Molecular cloning

Practicals: (4x45 min every other week):

1. Column chromatography
2. Genotyping of a taste receptor polymorphism (PCR-RFLP I)
3. PCR-RFLP II
4. PCR-RFLP III
5. Midterm examination
6. Induction of beta-galactosidase in *E. coli*
7. Biuret test, Ellmann's reaction

Acknowledgment of the semester:

1. Attendance of at least 75% of the practical lessons is prerequisite of acknowledging the semester. In case of more than two missed labs the semester cannot be acknowledged and the student is not going to be allowed to sit for the terminal exam. Missed practicals can be made up only in the same week with another group; certificate of participation issued by the host teacher has to be presented by the student to his/her own teacher. However, only one make-up class can be attended during the semester. Students can collect "practical points" during the labs. These points are taken into account at the Molecular cell biology II final exam at the end of the academic year.
2. It is obligatory to pass the theoretical midterm.

Theoretical midterm examination

The theoretical midterm exam will take place during weeks 9–10. The midterm exam is oral; one has to pick just one question from the topic list. The examiner cannot be your own lab teacher. Passing the midterm is prerequisite of getting the signature at the end of the semester. Students earning "excellent (5)" or "good (4)" midterm marks will earn 2 or 1 practical points, respectively, to be added to the practical points collected during the semester. Failed or missed midterms can be made up twice. In case of medically certified absence one may receive any grade in the retake midterm. In the case of retaking a failed or unexcusedly missed midterm, the maximum grade one can receive is a "pass (2)".

Examination and grading:

The oral exam is based on the topic list announced in the beginning of the semester, and it takes place before a committee of two (examiner and co-examiner). Students pick three random questions from the DNA, RNA and Protein group of the following topic list. The exam can be passed if all three topics are sufficiently answered.

Topic list:

I. DNA

1. Chemical structure of nucleotides; primary and secondary structures of nucleic acids (DNA and various RNAs)
2. Condensation levels of DNA in the eukaryotic cells; the role of topoisomerases and chromatin proteins
3. Structure of the human genome: coding and gene regulatory sequences; non-coding genomic sequences: introns, pseudogenes, repetitive sequences
4. Principles of the semiconservative DNA replication; replication fork, leading and lagging strand
5. DNA replication in the pro- and eukaryotic cells; comparison of the enzymes, proteins involved
6. The telomere; function and significance of the telomerase; biological and medical significance of its presence or absence
7. Common types of DNA damage and repair mechanisms; DNA lesions versus mutations
8. Formation of spontaneous point mutations
9. Possible effects of point mutations or single nucleotide polymorphisms on the encoded proteins
10. The principles and mechanisms of PCR and real-time PCR; their application in research and medicine

II. RNA

1. Structure and function of RNA polymerase of *E. coli*; initiation of transcription in prokaryotes; the prokaryotic transcription unit
2. Termination of transcription in prokaryotes; post-transcriptional RNA modifications in prokaryotic cells
3. The eukaryotic transcription unit; initiation and termination of transcription in the eukaryotic cells
4. Regulation of transcription in eukaryotes
5. Maturation of mRNA
6. Formation and regulatory functions of microRNAs in eukaryotic cells
7. Significance of DNA methylation and histone modifications
8. Alternative maturation of eukaryotic mRNA
9. In vitro analysis of gene expression by reverse transcription real-time PCR and DNA microarray
10. DNA-binding proteins and their characteristic structural motifs with examples

III. Proteins

1. The genetic code; codon-anticodon interaction; function and role of aminoacyl-tRNA synthetases
2. Structure and function of the ribosome; the ribosome cycle; role of tRNA in translation
3. Initiation of translation in pro- and eukaryotic cells
4. Regulation of eukaryotic translation; the role of eIF2 α phosphorylation
5. Elongation and termination of translation in pro- and eukaryotic cells; pharmacological inhibitors of translation
6. Post-translational modifications of proteins, characteristic modifications in the endoplasmic reticulum
7. Maturation and quality control of proteins; ERAD
8. Intracellular protein trafficking by gated transport
9. Intracellular protein trafficking by transmembrane transportThe role of genetic variations in the development of diseases, the importance and possibilities of identifying genetic factors
10. Production of recombinant DNA (cloning), and its main applications (reporter and expression vectors)

MOLECULAR CELL BIOLOGY II

Institute of Biochemistry and Molecular Biology

Department of Molecular Biology

EOK Building, H-1094 Budapest, Tűzoltó u. 37-47.

Lecturer of the course: Miklós Csala MD, DSc (csala.miklos@sem-melweis.hu)

Course coordinator: Gergely Keszler MD, PhD (keszler.gergely@sem-melweis.hu)

Credit: 4

Lessons (in hours): 28 lectures and 28 practicals

Subject code: FOKOMBT306_1A

This subject focuses on the main procedures in molecular biology and cell biology. It serves as a base for several fields in medicine, such as molecular pathology, molecular diagnostics, pharmacology, gene therapy and medical biotechnology.

Prerequisites for subject registration:

Successful exams in Molecular Cell Biology I and Dental Biochemistry II

Lectures:

1. Control of the cell cycle 1
2. Control of the cell cycle 2
3. Control of the cell cycle 3
4. Control of the cell cycle 4
5. Programmed cell death – apoptosis 1
6. Programmed cell death – apoptosis 2
7. Molecular basis of tumorigenesis
8. Types of non-apoptotic programmed cell death
9. Proteostasis, the ubiquitin–proteasome system
10. Mechanisms of autophagy
11. Molecular biology of viruses 1
12. Molecular biology of viruses 2
13. Methods in molecular biology 1: knock-out techniques
14. Methods in molecular biology 2: gene therapy
15. Nuclear receptors. Transcriptional factors, DNA-binding domains
16. Signal transduction 1
17. Signal transduction 2
18. Signal transduction 3
19. transduction 4
20. Intracellular signals: mTOR, AMP kinase, hypoxia
21. Mechanisms of ageing
22. Components of the cytoskeleton. Molecular motor proteins
23. Vesicular transport. Mechanisms of exo- and endocytosis
24. Formation of the metabolome of cellular compartments 1
25. Formation of the metabolome of cellular compartments 2
26. Endoplasmatic and mitochondrial stress response
27. Extracellular matrix, tissue architecture, adhesion molecules
28. Methods in cell biology (cell cultures, cell fractionation, in vivo microscopy)

Practicals: (4x45 min every other week):

1. Molecular cloning and in vitro protein synthesis 1: recombinant DNA construction, bacterial transformation
2. Molecular cloning and in vitro protein synthesis 2: analysis of the DNA construct, in vitro mRNA synthesis
3. Molecular cloning and in vitro protein synthesis 3: protein expression by in vitro translation
4. Purification of a bacterially expressed protein by affinity chromatography
5. Theoretical midterm exam
6. SDS-page and western blot
7. Analysis of subcellular fractions

Acknowledgment of the semester:

Attendance of at least 75% of the practical lessons (i.e. not missing more than two labs) is prerequisite of acknowledging the semester. It is also obligatory to pass the theoretical midterm exam (see below).

Theoretical midterm examination

The theoretical midterm exam will take place during weeks 9–10. The midterm exam is oral; one has to pick just one question from the topic list. The examiner cannot be your own lab teacher. Passing the midterm is prerequisite of getting the signature at the end of the semester. Students earning “excellent (5)” or “good (4)” midterm marks will earn 2 or 1 practical points, respectively, to be added to the practical points collected during the semester. Failed or missed midterms can be made up twice. In case of medically certified absences one may receive any grade in the retake midterm. In the case of retaking a failed or unexcusedly missed midterm, the maximum grade one can receive is a “pass (2)”.

Practical midterm examination

An optional, written practical midterm online Moodle test can be taken at the end of the semester. The test consists of 20 questions (each question worth 1 point) covering the experiments performed in the 1st and 2nd semesters. The questions are to be answered in the (random) order as they appear; i.e. it is not possible to page back or forth. Performance at the laboratory activity during both semesters and theoretical midterm scores are also taken into account in the evaluation. Scores earned in the practical midterm (max. 20) will be added to the max. 6–6 practical points and max. 2–2 theoretical midterm points that could be collected during both semesters. Students who have earned at least 25 points (out of a possible maximum of 36) will receive exemption from the practical topics in the comprehensive exam.

Examination and grading:

The oral exam is based on the topic list announced in the beginning of the semester, and it takes place before a two-member committee of two (examiner and co-examiner). Students pick five random questions from each group of the following topic list. The exam can be passed if all five topics are sufficiently answered. Students who have achieved at least 25 practical points during the two semesters, receive a bonus: no practical question has to be answered. This bonus is valid during the whole exam period (in case of a retake exam), as well as in the next semester (in a “CV”-course).

Topic list:

I. DNA and RNA

1. Chemical structure of nucleotides; primary and secondary structure of nucleic acids (DNA and different types of RNA)
2. Condensation of the genetic material in pro- and eukaryotic cells; the role of topoisomerases and chromatin proteins
3. The role of genetic variations in the pathogenesis of diseases; methods to study genetic factors
4. Principles of the semiconservative DNA replication; replication fork, leading and lagging strand synthesis
5. Comparison of DNA-replication in pro- and eukaryotes
6. Telomeric repeat sequences: replication of the telomeric regions of eukaryotic chromosomes; functions and importance of the telomerase
7. Types of point mutations; mechanisms of their development; possible effects of DNA sequence variations on the corresponding protein
8. Structure and function of the RNA-polymerase of E. coli; initiation and termination of transcription in prokaryotes
9. Characterization, role and synthesis of different types of RNA
10. Structure of the eukaryotic genes, initiation and termination of transcription in eukaryotes
11. Processing of the eukaryotic mRNA
12. Function and application of PCR and real-time PCR
13. Methods for the investigation of genetic mutations and polymorphisms (RFLP, allele-specific PCR, DNA-sequencing and primer extension)
14. Generation and application of recombinant DNA, reporter- and expression vectors

II. Post-transcription

1. Regulation of eukaryotic gene expression by RNA interference (miRNA, siRNA)

- Epigenetic regulation of eukaryotic transcription: the role of DNA methylation and histone modifications
- The genetic code; structure and function of tRNAs; aminoacyl-tRNA synthetases; codon-anticodon connections
- The structure of prokaryotic and eukaryotic ribosomes; the ribosome cycle; binding of tRNA to ribosomes
- Initiation of the translation in pro- and eukaryotes; regulation of eukaryotic translation; the role of phosphorylation of eIF2 α
- Elongation and termination of pro- and eukaryotic translation; pharmacological inhibitors of translation
- Post-translational modifications of proteins
- Types, structure and synthesis of collagen
- Investigation of gene expression by real-time PCR and DNA-microarray methodology
- Definition of proteostasis; types of intracellular protein degradation
- Types, mechanism and role of autophagy

III. Signal transduction and cell cycle

- Nuclear receptors: steroid, thyroid, retinoid and Ah receptors
- Classification and function of membrane receptors
- Types and functions of GTP-binding proteins in signaling
- Activation mechanisms of serine / threonine protein-kinases with examples
- cAMP signaling pathway; regulation of gene expression by cAMP
- Phosphatidylinositol signaling pathways
- NF κ B and TGF β signaling
- Structure and function of tyrosine kinase receptors, the Erk1 / Erk2 MAP kinase cascade
- Insulin signaling
- Integrating role of mTOR, and its effects on translation
- Role of AMPK in the regulation of the metabolism and autophagy
- Mechanisms of cellular oxygen sensing; adaption to hypoxia
- Regulation of the cell cycle in the G1 phase, transition to S phase
- Regulation of the cell cycle in the G2 and M phases
- Molecular sensors detecting DNA damage and completion of DNA replication during the cell cycle
- Molecular background of tumor generation

- Structure and function of the apoptosome, DISC and PIDDosome complexes
- Members of the Bcl-2 superfamily and their roles in various apoptotic pathways, the „survival signal“
- Function and activation of apoptotic caspases, role of granzyme B
- Regulation of p53 levels and activity; role of p53 in determining the cell's fate

IV. Cell Biology

- Principles of the organization of the eukaryotic cells; compartmentation; main features of subcellular organelles
- Structure of cytoskeleton; structure and function of motor proteins
- The protein secretory pathway; role of the rab cycle in the regulation of vesicular transport
- Endo- and exocytosis
- Endoplasmic reticulum stress, connection between the Unfolded Protein Response (UPR) and apoptosis
- Protein quality control in the endoplasmic reticulum; the fate of misfolded proteins; ERAD
- Characteristics of the proteome of subcellular organelles; maintenance of the internal milieu of subcellular organelles

V. Lab

- Quantification of proteins by biuret reaction and Ellmann-method
- Investigation of subcellular cell fractions
- Investigation of the gene expression in prokaryotes: induction of β -galactosidase in E. coli
- Purification of a bacterially expressed protein by affinity chromatography
- SDS-polyacrylamide gel electrophoresis and Western blot
- In silico tools in molecular biology
- Genotyping of the TAS2R38 tasting receptor by PCR-RFLP
- Analysis and generation of a recombinant DNA
- In vitro transcription and translation

ODONTOTECHNOLOGY AND PROSTHODONTICS

PRE-CLINICAL COURSE I-II

Department of Prosthodontics

Head of Department: Prof. Dr. Péter Hermann

Lecturer: Dr. Ida Barbara Kispélyi

Since the creation of an independent training, the Stomatological curriculum has put great emphasis on a preclinical foundation course, the Prosthodontics Propaedeutic course, the syllabus of which has also included mastery of dental techniques, indispensable for a dentist. Until the visit of the EU Committee in the late 90s, the course was structured in such a manner that in the first and second semester of the second academic year students had 3 hours of practices and one hour of lecture per week; during the first semester treatment of complete edentulousness was simulated through fabrication of complete dentures, while in the second semester students prepared 3-unit bridges and single crowns on partial edentulous mouldages. During both semesters, medical and dental laboratory steps followed each other just like in real life, and students performed alternatively medical work phases and dental laboratory tasks, for one week each. After the proposal of the EU Committee on the amendment of several courses (including the Prosthodontics Preclinical course), dental laboratory and medical work phases had to be separated sharply, while an independent Odontotechnology course had to be included in the curriculum. According to the request, this Odontotechnology course was built into the theoretical module in order to provide the earliest possible recognition and consolidation of the chosen profession.

Taken more than ten years of experience into account, while maintaining the values that undoubtedly resulted from these changes, we wish to modify those controversial points that in our opinion can be still improved. A sharp separation of the two disciplines (dental techniques and dentistry) rather confuses students, thus they

fail to get a grip of the process, and it is the essence that is lost, since these processes are based each on the other. The essence of the new syllabus is the integration of the two courses that are currently taught separately, and thus new and crucial areas (not taught so far) can be emphasized, with concomitant reduction of teaching hours and credit points.

The curriculum of the course concludes with a comprehensive examination at the end of the first semester of the third academic year.

Timing of the Odontotechnology and Prosthodontics Preclinical course:

3rd, 4th and 5th Semester

Preliminary studies requested for the course of Odontotechnology and Prosthodontics Preclinical course module I:

General Dental Material Science, Macroscopic Anatomy II, General Dental Preclinical Practice

Preliminary studies requested for the course of Odontotechnology and Prosthodontics preclinical course module II:

Odontotechnology and Prosthodontics preclinical course module I, Macroscopic Anatomy II

Preliminary studies requested for the course of Odontotechnology and Prosthodontics Preclinical course module III:

Odontotechnology and Prosthodontics Preclinical course module II, Conservative Dentistry and Endodontics, Preclinical I, Molecular Cell Biology II

Odontotechnology and Prosthodontics preclinical course I

Topics of the lectures:

1. Primary impression, primary cast
2. Special trays
3. Labside and chairside steps of making complete denture
4. Types of casts, casting as a kind of information transfer
5. Secondary impression
6. The occlusal rim, centric occlusion
7. Articulators, jaw registration
8. Fabrication of the trial denture, and the try in procedure
9. Fitting of dentures, Short time and long time recall procedures.
10. Types of the prosthetic appliances
11. Gnatological aspects in making complete denture
12. Partial edentulousness, and partial dentures (RPD)
13. Labside and chairside steps of making partial and complex denture
14. Consultation

Topics of the Practices:

1. Introduction, Instrument Delivery
2. Impression Taking for Maxillary and Mandibular Complete Dentures
3. Impression Taking for Maxillary and Mandibular Complete Dentures
4. Outlining The Borders of The Special Trays,
5. Fabrication of Special Trays
6. Secondary Impressions. Fabrication of Maxillary and Mandibular Occlusal Rims
7. Fabrication of Maxillary and Mandibular Occlusal Rims
8. Jaw Registration
9. Mounting of Articulators
10. Setting Up Teeth
11. Setting Up Teeth
12. Setting Up Teeth
13. Processing Dentures, Insertion
14. Consultation

Odontotechnology and Prosthodontics Preclinical II

Topic of the lectures (weekly, numbered):

1. Types of the fixed dental restorations
2. Labside and chairside steps of making fixed appliances
3. Fundamentals of tooth preparation, periodontal aspects
4. Impression taking for fix appliances, sectional models, and dies
5. Fabrication of wax pattern, casting of fix appliances, trial of the metal framework of the fix appliances
6. Dowel core restorations
7. Tooth Shade Determination
8. Temporary Dental Restorations
9. Veneering of fixed appliances
10. Metal free fixed restoration, CAD/CAM technology
11. History of implant dentures, labside and chairside steps
12. Explanation of different kind of implant systems. Impression methods of implant cases
13. Dental cements
14. Consultation

Practical sessions

1. Handing out of the instruments introduction
2. Tooth preparation 24 and 27 for fixed partial denture
3. Tooth preparation 24 and 27 for fixed partial denture
4. Tooth preparation 24 and 27 for fixed partial denture
5. Tooth preparation 24 and 27 for fixed partial denture
6. Two-phase impression
7. Antagonistic impression, bite-registration
8. Preparation of the sectional model, mounting of the average value articulator
9. Waxing up of the four-unit bridge: Adapta deep drawing
10. Wax pattern fabrication of the four-unit bridge: outlining and shaping of the occlusal surface
11. Wax pattern fabrication of the four-unit bridge
12. Spruing of the wax pattern, preparation for investing
13. Wax pattern fabrication for a four-unit porcelain fused to metal four-unit bridge
14. Instrument collection, consultation

PHYSICAL EDUCATION III.

Physical Education and Sportcenter

Type of Subject: Obligatory

Code of Subject: FOKOTSI380_3A

Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

THE SYLLABUS (PREFERABLY A WEEK AND NUMBERED):

2nd year, semester I:

1st Week: General information

Health and Safety, Fire and Environmental protection. The mid-year adoption requirements, the construction of the classes and the presentation of the university recreational and sports opportunities for extra – curricular activities. Heart rate measurement exercises. Ruffier test and evaluation of the results.

2nd Week: Athletic

Different athletic exercises like throwing, shot put. Preferably outdoors with the aim of learn how to execute the exercise with a proper form and breathing technique.

3rd Week: Tennis

Introducing and learning advanced technical elements (serve, volley) and game.

4th Week: Agility ladder

To perform different exercises to improve speed, balance and concentration. Preferably outdoors, on grass ground.

5th Week: Relay race and competitive games

To improve explosiveness, skills and experience good team spirit.

6th Week: Football

Practicing the technical elements of football in pairs and game situation.

7th Week: Circuit training

Functional exercises with bodyweight and exercises with basic equipment to improve general coordination skills.

8th Week: Badminton

Introducing the technical and tactical elements of doubles game. Game applying all the previously known rules.

9th Week: Completing a practical exercise

10th Week: Meta

Reminders of the basic need to know about META. Learn tactical elements of the game and using them. Aim to improve ball skill development, reaction time, explosiveness and collective gaming experience.

11th Week: Obstacle course

To complete a built up obstacle course using different creeping-climbing, hovering, pulling, skipping, throwing techniques for general skill development.

12th Week: Mobilisation

Dynamic stretching exercises with and without equipment to prevent the health of the joints by maintaining and developing the mobility of it.

13th Week: Skipping rope

Skill developing exercises with skipping rope individually and in pairs, in place and in motion at different levels.

14th Week: Kettlebell

Different kind of strengthening exercises with kettlebell.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball)

Requirements to participate in the sessions and the potential for absences:

Active participation in sport classes.

The method of proof for the workshops and the exam absence:

The absence cannot be proved, should make up for the lost lessons.

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

Active participation in 10 classes (15 times for trainings) approved by the staff.

How to prove absence regarding the exam:

Absence must be retaken!

Physical Education IV.

Type of Subject: Obligatory

Code of Subject: FOKOTSI380_4A

Credit: 0

Name of the Lecturer: Várszegi Kornélia

The objectives of Physical Education:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

THE SYLLABUS (PREFERABLY A WEEK AND NUMBERED):

2nd year, semester II:

1st week: General information

Accident, fire and environmental knowledge. Requirement for acceptance of the semester system, the structure of the classes and the presentation of the university recreational sports opportunities for extra-curricular activities.

2nd week: Basketball

Dribbling and shooting skill improving drills. Games: 1 on 1; 2 on 2; shooting contests, king of the court. Scrimmage.

3rd week: Wall-bar exercises

Enhance strength and balance by climbing, declining, hanging, skipping, pulling, pushing etc. exercises.

4th week: Circuit training

A chain of compete drills in a certain time period with and without equipment. The aim is to improve the general level of strength and stamina.

5th week: Floorball

Passing and receiving skill improving drills. Exposing shots on goal (wrist- slap- and snapshots). Scrimmage.

6th week: Drills in pairs

Strength, agility, coordination and battling skill improving exercises with a partner incorporated.

7th week: Volleyball

Introducing the defensive elements of the game (receiving serves, blocks). Exposing unknown rules. Games.

8th week: Game-day

Introducing and practicing different kind of cohesion enhancing games (Tick-Tac-Toe, etc.)

9th Week: Completing a practical exercise

10th week: Circuit training

Specialized chain of drills for strengthen the shoulder, back, chest, arm and leg muscles, considering the fitness level of the Students.

11th week: Tennis

Introducing variations of ground strokes and grip types (slice, topspin, lobs etc.) Exposing the rules of doubles. Games (all around the world, etc.)

12th week: Badminton

Exposing the rules and the basic tactical elements of the doubles game. Scrimmage.

13th week: Core exercises

Body-weight exercises targeting to strengthen the muscles of the trunk thus develop a strong fascia to protect it from the harmful effects of overdose sitting (studying)

14th week: Medicine-ball exercises

Strength and coordination (complex) skill developing exercises by throwing, rolling, passing, lob, shot-put, etc. with a partner incorporated.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball)

Requirements to participate in the sessions and the potential for absences:

Active participation in sport classes.

The method of proof for the workshops and the exam absence:

The absence cannot be proved, should make up for the lost lessons.

Requirements for signature at the end of semester (including the number of tasks to be solved learning outcomes and type):

Active participation in 10 classes (15 times for trainings) approved by the staff.

How to prove absence regarding the exam:

Absence must be retaken!

GENERAL AND ORAL MICROBIOLOGY

Department of Medical Microbiology

Program Director: Dr. Dóra Szabó

Tutor: Dr. Ágoston Ghidán

First Semester

Lectures (2 hours per week)	Practices (2 hours per week)
Introduction to microbiology. General bacteriology (morphology, physiology and cultivation of bacteria) Bacterial genetics.	Introduction to basic microbiology. Microscopic examination of bacteria (staining procedures).
Infections and diseases (pathogenesis of bacterial infection, virulence, importance of biofilm formation). Specific and non-specific host defences. Active and passive immunization.	Cultivation of aerobic and anaerobic bacteria (culture media, colony morphology of bacteria).
Sterilization and disinfection. Antibacterial chemotherapy (mode of actions, resistance, side effects).	Methods used for sterilization and disinfections (physical and chemical possibilities).
Gram-positive facultative and obligate anaerobic cocci. Gram-negative facultative anaerobic, microaerophilic and obligate anaerobic cocci and coccobacilli.	Antibiotic susceptibility of bacteria
Gram-positive aerobic and anaerobic rods. Gram-positive spore-forming rods.	In vitro antigen-antibody reactions (serological methods).
Gram-negative facultative anaerobic rods. Gram-negative anaerobic rods.	Gram-positive and -negative cocci and coccobacilli
Mycobacteria. Rickettsia, Chlamydia. Mycoplasma.	Gram-positive rods (Corynebacterium, Lactobacillus, Actinomyces).
Spirochetes. Importance of bacterial infections involving the oral, perioral tissues and salivary glands.	Gram-negative rods (Enterobacteriaceae)
Medical importance of fungi (general mycology, chemotherapy of fungal infections). Importance of fungal infections involving the oral and perioral tissues.	Gram-negative anaerobic rods (Bacteroides, Prevotella, Porphyromonas, Fusobacterium, Leptotrichia). Gram-positive spore-forming aerobic and anaerobic rods (Bacillus, Clostridia)
Protozoa (general characterization and the most important human pathogenic protozoa). Helminths (general characterization and the most important human worms).	Mycobacteria. Spirochetes. Rickettsiae. Chlamydiae. Mycoplasma.
General properties of viruses. Antiviral chemotherapy. Adeno- and Poxviruses.	Medically important fungi
Important respiratory pathogen viruses. Important enterally transmitted viruses.	Medically important protozoa. Medically important helminths.
Hepatitis viruses. Retroviruses (AIDS). Viruses and cancer.	General virology (cultivation of viruses, cell-virus interactions, serological tests and molecular techniques used in laboratory diagnosis of viral diseases)
Arbo- and reovirus infection. Rabies. Slow viruses. Viral infections involving the oral, perioral tissues and salivary glands.	Pathogenesis and symptomatology of viral diseases.
Normal oral flora. Oral ecosystem and dental plaque. Microbiology of dental caries, periodontal diseases. Dentoalveolar infections.	Summary of microbiological laboratory techniques and diagnostic procedures. Consultation.

Note: Three delay of less than 5 minutes will be considered as one absence. Delay of more than 15 minutes from the practice will also be considered as absence. There is no possibility to make up the practice. More than 3 absences invalidate the semester. During the semester two midterm tests must be passed. Examination procedure: written test from minimum questions followed by an oral exam. Written test: from each topic (general microbiology, systemic bacteriology, mycology, parasitology, virology) the candidate will get 4-4 questions and 50% per topic must be achieved in order for the candidate to proceed to the oral exam. If any part of the examination is unsatisfactory, the mark, is unsatisfactory.

GENETICS AND GENOMICS

Institute of Genetics, Cell- and Immunobiology

Course director: Prof. Dr. Edit Buzás

Course coordinator: Dr Hegyesi Hargita

Subject code: FOKGEN240_1A

Prerequisite subject: Medical Biochemistry, Molecular and Cell Biology III, Medical and Dental Physiology II

Credit: 2

Lectures (1,5 hours per week):

1. Introduction to human genetics, the human genome
2. Genetic variations
3. Chromosomal aberrations I
4. Chromosomal aberrations II
5. Epigenetics
6. Monogenic inheritance (Autosomal dominant)
7. Monogenic inheritance (Autosomal recessive)
8. Role of sex in inheritance
9. Introduction to genomics. Methods in genomics
10. Genomic approach of complex inheritance
11. Pharmaco- and nutrigenomics
12. Gene and genome manipulation
13. Genetics of biological processes
14. Population genetics and genomics; Genome and environment

Practices (1 hour per week):

1. Genetic aspects of cell cycle and cell division disorders
2. Cytogenetics I
3. Cytogenetics II
4. Pedigree analysis:
5. Autosomal inheritance I (AD)
6. Autosomal inheritance II (AR)
7. Sex-linked inheritance I (XR)
8. Sex-linked inheritance II (XD, mitochondrial)
9. Complex inheritance I
10. Complex inheritance II.
11. Meiosis, gametogenesis; pre-implantation genetic testing
12. From genes to bedside

Important notes:

Students must visit at least 75% of the practices. More than three absences from the practice or more than three absences from the lecture invalidate the semester, no signature is given. There are no extra practices.

During the semester, written tests will be given on the material covered during the practical and lecture sessions to help you master the material. Completion and passing of the test is not a prerequisite for the end-of-semester signature. Based on the total score of the test, you may be invited to the end-of-semester competition and, as an exam facilitation, you will not be asked questions on two items (cytogenetics and epigenetics).

Core text: Medical Genetics and genomics (e-book)

Lecture and practice presentations and additional texts are available on the homepage: <http://gsi.semmelweis.hu> (The user name and password is on course datasheet of the Neptun)

RESTORATIVE DENTISTRY PRE-CLINICAL I

Department of Restorative Dentistry and Endodontics

Head of Department: **Professor János VÁG DMD, PhD.**

Second Semester

Phantom-course (Pre-clinical laboratory course)

Lecturer of course: Beáta KERÉMI DMD, PhD

Manual training (3 hours per week)

Introduction to practice: general Department's policy. Rules of the house. Distribution of instruments. Handing over of instruments.

- General dental anatomy, Mühldreiter's signs, tooth marking systems, instruments for dental hard tissue preparation
- Black classification, general rules of preparation, tooth preparation terminology (nomenclature), Preparation of Class I cavity -1st part
- Caries – definition, clinical characteristics, progression, histopathology, zones; Class I cavity preparation-2nd part
- Position of patient and practitioner during treatment, Class V cavity preparation

- Class II cavity preparation
- Midterm test I – cavity preparation, matrix systems and wedges,
- Isolation (relative and absolute)
- Minimal invasive preparation, preparation of foramen coecum
- Composite filling in the posterior region, steps of treatment (adhesive technique)
- Instruments and methods of finishing and polishing
- Midterm test II – making of filling, removing amalgam fillings, preparing modified conventional cavities, treatment of discoloured dental hard tissue
- Class III and Class IV cavities preparation
- Anterior matrices, composite filling preparation in anterior region, steps of treatment (adhesive technique)
- Treatment of root caries, temporary fillings: materials and application

Note: The maximum number of absences in a semester is 3. During the semester 2 midterm examinations should be passed. Practical course grade.



Faculty of Medicine

5th–6th semester

FACULTY OF DENTISTRY PRE-CLINICAL MODULE

5th semester

	Subject	Subject code	CREDITS	Hours per semester	Lecture (hr/semester)	Seminar (hr/semester)	Practice (hr/semester)	Lecture (hr/week)α	Seminar (hr/week)α	Practice (hr/week)α	Prerequisite(s)	Evaluation
Obligatory	General and Oral Pathophysiology	FOKOOBT241_1A	3	56	28	0	28	2	0	2	General and Oral Microbiology, Molecular Cell Biology II., Medical and Dental Physiology II.	Examination*
Obligatory	Hungarian for Dental Medical Purposes IV.	FOKONYE398_4A	1	56	0	0	56	0	0	4	Hungarian for Dental Medical Purposes III.	End-term examination
Obligatory	Medical Aspects of Disaster Preparedness and Response I.	FOKOBVI385_1A	0	2	2	0	0					Signature
Obligatory	Odontotechnology and Prosthodontics Pre-clinical III.	FOKOFPK365_3A	3	42	0	0	42	0	0	3	Restorative Dentistry, Preclinical I., Odontotechnology and Prosthodontics Pre-clinical II., Molecular Cell Biology II.	Comprehensive examination #
Obligatory	Oral and Maxillofacial Surgery, Pre-clinical course	FOKOSZB041_1A	2	28	0	0	28	0	0	2	General and Oral Microbiology, Molecular Cell Biology II., Medical and Dental hysiology II.	Term grade
Obligatory	Pathology	FOKOPTK245_1A	4	70	42	0	28	3	0	2	Genetics and Genomics, Molecular Cell Biology II., Medical and Dental Physiology II.	Examination*
Obligatory	Physical Education V.	FOKOTSI380_5A	0	14	0	0	14	0	0	1		Signature
Obligatory	Preventive Dentistry	FOKOKFK384_1A	3	56	28	10	18				Restorative Dentistry, Preclinical I., Odontotechnology and Prosthodontics Pre-clinical II.	Examination*
Obligatory	Public Health	FOKONEI309_1A	2	49	21	0	28	1.5	0	2	General and Oral Microbiology, Molecular Cell Biology II., Medical and Dental Physiology II.	Examination
Obligatory	Restorative Dentistry, Preclinical II.	FOKOKFK355_2A	4	56	14	0	42	1	0	3	Restorative Dentistry, Preclinical I., Odontotechnology and Prosthodontics Pre-clinical II., Medical and Dental Physiology II.	Comprehensive examination #
Criterion requirement	Semmelweis Symposium	FOKOFRM359_1A	0	24	24	0	0					Signature
	Sum of credits in the semester:		22									

6th semester

	Subject	Subject code	CREDITS	Hours per semester	Lecture (hr/semester)	Seminar (hr/semester)	Practice (hr/semester)	Lecture (hr/week)¶	Seminar (hr/week)¶	Practice (hr/week)¶	Prerequisite(s)	Evaluation
Obligatory	Dento-Alveolar practice	FOKOEXT407_1A	1	30							Oral and Maxillofacial Surgery I.	Term mark (three-scale)
Obligatory	Endodontics, Preclinical	FOKOKFK356_1A	3	56	14	0	42	1	0	3	Restorative Dentistry, Preclinical II., Odontotechnology and Prosthodontics, Pre-clinical III., Preventive Dentistry	Examination*
Obligatory	Hungarian for Dental Medical Purposes V.	FOKONYE398_5A	1	56	0	0	56	0	0	4	Hungarian for Dental Medical Purposes IV.	Comprehensive examination #
Obligatory	Medical Aspects of Disaster Preparedness and Response II.	FOKOBVI385_2A	0	2	2	0	0				The Medical Basis of Disaster Management I.	Signature
Obligatory	Dento-Alveolar practice	FOKOEXT407_1A	1	30							Oral and Maxillofacial Surgery I.	Term mark (three-scale)
Obligatory	Endodontics, Preclinical	FOKOKFK356_1A	3	56	14	0	42	1	0	3	Restorative Dentistry, Preclinical II., Odontotechnology and Prosthodontics, Pre-clinical III., Preventive Dentistry	Examination*
Obligatory	Hungarian for Dental Medical Purposes V.	FOKONYE398_5A	1	56	0	0	56	0	0	4	Hungarian for Dental Medical Purposes IV.	Comprehensive examination #
Obligatory	Medical Aspects of Disaster Preparedness and Response II.	FOKOBVI385_2A	0	2	2	0	0				The Medical Basis of Disaster Management I.	Signature
Obligatory	Dento-Alveolar practice	FOKOEXT407_1A	1	30							Oral and Maxillofacial Surgery I.	Term mark (three-scale)
Obligatory	Endodontics, Preclinical	FOKOKFK356_1A	3	56	14	0	42	1	0	3	Restorative Dentistry, Preclinical II., Odontotechnology and Prosthodontics, Pre-clinical III., Preventive Dentistry	Examination*
Obligatory	Hungarian for Dental Medical Purposes V.	FOKONYE398_5A	1	56	0	0	56	0	0	4	Hungarian for Dental Medical Purposes IV.	Comprehensive examination #
Obligatory	Medical Aspects of Disaster Preparedness and Response II.	FOKOBVI385_2A	0	2	2	0	0				The Medical Basis of Disaster Management I.	Signature
Obligatory	Oral and Maxillofacial Surgery I.	FOKOSZB353_1A	4	56	14	0	42	1	0	3	General and Oral Pathophysiology, Pathology. Oral and Maxillofacial Surgery, Preclinical course	Term grade
Obligatory	Oral Biology	FOKOGBT249_1A	4	56	28	0	28	2	0	2	General and Oral Pathophysiology, Public Health, Pathology	Examination*
Obligatory	Oral Diagnostics	FOKOODT243_1A	3	42	14	0	28	1	0	2	Restorative Dentistry, Preclinical I., Odontotechnology and Prosthodontics Pre-clinical II.	Examination*
Obligatory	Oral Medicine I.	FOKOODT244_1A	1	14	0	0	14	0	0	1	Restorative Dentistry, Preclinical I., Odontotechnology and Prosthodontics Pre-clinical II.	Term grade
Obligatory	Oral Pathology	FOKOPTK352_1A	4	56	28	0	28	2	0	2	General and Oral Pathophysiology, Pathology, Public Health	Examination*
Obligatory	Physical Education VI.	FOKOTS1380_6A	0	14	0	0	14	0	0	1		Signature
Obligatory	Prosthodontics I.	FOKOFPK366_1A	4	56	0	14	42	0	1	3	Restorative Dentistry, Preclinical II., Odontotechnology and Prosthodontics Pre-clinical III., Preventive Dentistry	Term grade
Obligatory	Radiation protection	FOKOODT135_1A	2	35	21	0	14	1.5	0	1	Biophysics II.	Examination
Obligatory	Restorative Dentistry and Endodontics I.	FOKOKFK357_1A	3	42	0	0	42	0	0	3	Restorative Dentistry, Preclinical II., Odontotechnology and Prosthodontics Pre-clinical III., Preventive Dentistry	Term grade
	Sum of credits in the semester:		30									

IMPORTANT NOTE: Signing up for Physical Education (PE) V. in the 1st semester and for PE VI. in the 2nd semester is obligatory.

LIST OF TEXTBOOKS (The list may change!)

- 1 McCracken's Removable Partial Prosthodontics (10/e)
Glen P. McGivney-Alan B. Carr. Hardback Mosby, 1999. ISBN 0323006787
- 2 Schillenburg et al.: Fundamentals of Fixed Prosthodontics. Quintessence 4th ed. 1997. ISBN 93 13 86 500
- 3 Craig, R.G.: Restorative dental material. Mosby, 10th ed.
- 4 R.M. Basker-J.C. Davenport: Prosthetic Treatment of the Edentulous Patient. 5th ed. McMillan Press Ltd. ISBN 978-1405192613
- 5 C.M. Sturdevant: Operative Dentistry. Mosby. ISBN 0-80166366-0
- 6 A. Newbrun: Cariology Quintessence. ISBN 0-867152052
- 7 Walton, Torabinejad: Principles and Practice of Endodontics. W.B. Saunders Co. 2nd ed. 1996. ISBN 0-7216-4924-6
- 8 Primary Preventive Dentistry. Ed. by: Norman O. Harris, F. Garcia-Godoy. 5th ed. Appleton and Lange, Stamford. 1999. ISBN 0-8385-81293
- 9 Samaranayake et al.: Essential Microbiology for Dentistry. Edinburgh, Churchill Livingstone. ISBN: 0443049890
- 10 Sibernagl S.-Lang F.: Color Atlas of Pathophysiology. Thieme, Stuttgart, 2000. ISBN 0-86577-866-3 (TNY) ISBN 3-13-116551-0 (GTV)
- 11 Ferguson D.B.: Oral Bioscience. Churchill Livingstone, 1999. (Harcourt Publ. Ltd.) ISBN 0-443-05373-1
- 12 Heckner F: Practical Microscopic Hematology. 4th ed. Williams and Wilkins Trada Bldh. 1993. ISBN 0-8121-1711-5
- 13 Robbins: Basic Pathology, 2008. V. Kumar, A. K. Abbas, N. Fausto, R. Mitchell Saunders; 8 edition
- 14 Szende B.-Suba Zs: Introduction to histopathology. Bp. Medicina. 1999.
- 15 Szabó Gy: Oral and Maxillofacial Surgery. Bp. Semmelweis Publ. 2001.
- 16 Koesner K.R.: Manual of Minor Oral Surgery for the General Dentist. Blackwell Munsgaard, 2008
- 17 Worthington-Lang-LaVelle: Osseointegration in Dentistry. An Introduction. Quintessence, Chicago, 1994.
- 18 Sethi, A.-Kaus, Th: Practical implant dentistry. Quintessence, London. 2005.
- 19 Andreoli, T.E.-Bennett, J.C.-Carpenter, C.C.J.-Plum, F.: Cecil Essentials of Medicine. 4th ed. W.B. Saunders Co. 2000.
- 20 Medical Genetics and Genomics (e-book)
- 21 KUBY Immunology • W. H. Freeman and Company • New York • 2013
- 22 Immunology seminars (e-book)

Recommended textbooks:

- 1 Nikiforuk: Understanding Dental Caries. (1-2) Karger.
- 2 Murray, J.J.: The Prevention of Oral Disease. 3rd ed. Oxford Univ. Press 1996. ISBN 0 19 2624563 (Hbk) ISBN 0 19 2624571 (Pbk)
- 3 Fluoride in Dentistry. 2nd Ed.: Fejerskov, O.-Ekstrand, J.-Burt, B.A. Munksgaard, 1996. ISBN 87-16-11282-2
- 4 Preventív fogászat. Szerk. Bánóczy J.-Nyárasdy I. Bp. Medicina. 1999. ISBN 963-242-003-9
- 5 Pathophysiology and Disease. An Introduction to Clinical Medicine. Lange Medical Book. Prentice-Hall International Inc. ISBN 0-8385-8095-5
- 6 Jansen van Rensburg B.G: Oral Biology. Quintessence Publishing Co. Inc. 1995. ISBN 0-86715-271-0
- 7 Goldschlager N.: Principles of Clinical Electrocardiography. 3rd ed. Appleton and Lange, 1989. ISBN 0-8385-7951-5
- 8 Marsh, Ph.-Martin, M.V: Oral Microbiology. Oxford, Wright. ISBN: 0723610517
- 9 D.Tóth F.: Microbiology for Dentistry. Vol. I-II. University of Debrecen, 2002.
- 10 E.C. Combe: Notes on dental materials. Univ. Manchester, 1986.
- 11 J.F. McCabe: Applied dental materials. Univ. Newcastle, 1990.
- 12 Howe: A Minor Oral Surgery. Wright. 1987. ISBN 723608237.
- 13 Howe: The Extraction of Teeth. Wright. 1990. ISBN 723622310.
- 14 Seward et al.: An Outline of Oral Surgery. Wright. 1998. ISBN 0-7236-0735-4 és -0407-x
- 15 Hupp JR et al.: Contemporary Oral and Maxillofacial Surgery. Mosby, 2014
- 16 Peterson: Principles of Oral and Maxillofacial Surgery. Decker, 2004.
- 17 Robinson, Howe: Tooth Extraction. A Practical Guide. Oxford, 2000.
- 18 Harrison's Principles of Internal Medicine, Petersdorf, Adams, Braunwald, Isselbacher, Martin, Wilson, McGraw-Hill Book Company. 15th ed.
- 19 Ward Booth, Hausamen, Schendel: Maxillofacial Surgery, C. Livingston Elsevier, 2007
- 20 Neil-Nairne: Complete Denture Prosthetics. Wright. ISBN 72 36 20 636
- 21 Neil-Walter: Partial Dentures. ISBN 06 32 08 025 8
- 22 Moor UJ: Principles of Oral and Maxillofacial Surgery, 6th Edition, Wiley-Blackwell 2011.
- 23 Hermann Péter, Szentpétery András: Gnatológia (Semmelweis Kiadó, 2018)

GENERAL AND ORAL PATHOPHYSIOLOGY

Department of Oral Biology

Lecturer: Dr. Ákos Zsembery

Tutor: Dr. Kristóf Kádár

First Semester

Lectures (2 hours per week):

1. Pathophysiology of respiratory diseases
2. Acute and chronic heart failure
3. Causes and consequences of hypertension, effects of long-lasting antihypertensive therapy, atherosclerosis
4. Pathophysiology of circulatory shock
5. Acute and chronic kidney failures
6. Diseases of the esophagus and the stomach
7. Intestinal and pancreatic disorders
8. Acute and chronic disturbance of liver functions and bile secretion
9. Endocrine disorders
10. Diabetes mellitus
11. Symptoms and consequences of diabetes mellitus
12. Causes and symptoms of the most common neurological and psychiatric diseases
13. Pathophysiology of pain. Pain relief methods
14. Disorders of energy balance

Practicals (2 hours per week):

1. ECG 1 - Basics of ECG analysis
2. ECG 2 - Signs of excitation and conduction abnormalities in ECG
3. ECG 3 - Signs of ischemic heart diseases in ECG
4. Cardiology - case discussion
5. Asthma - case discussion
6. Laboratory test of salt-water/acid-base homeostasis
7. Urine analysis
8. Investigation of the GI tract
9. Gastroenterology - case discussion
10. Diagnostic tests of liver- & bile function
11. Endocrine laboratory diagnostics I.
12. Endocrine laboratory diagnostics II.
13. Diabetes mellitus - case discussion
14. Diagnostic methods of neuropsychiatric disorders
15. Laboratory tests of autoimmune diseases

Note:

The maximum number of absences in a semester is 3 (practices)

More than 3 absences invalidate the semester

Midterm test from the material of the lectures in the 11th week (1-9 lectures material)

Midterm is the qualification for the Competition (in the 14th week)

MEDICAL ASPECTS OF DISASTER PREPAREDNESS AND RESPONSE I-II.

Directorate for Safety Technology

Department for Disaster Management and Education

Supervisor: Simon Mátyás

Lecturer: Csaba Csendes

Type of Course: indispensable

Credit value: 0

First and Second Semester

Purpose of the lecture:

The goal of the subject is to provide basic knowledge of the definition, mission, reasons and circumstances of establishment of civil protection/disaster management, on its place and role in the country's defense/protection system; to provide information on the types of disasters and their features. Based on experience gained in real incidents, to provide information on the peculiarities of disaster management and the tasks of medical authorities in this context.

The syllabus:

5th semester, 2 teaching hours: (M1) Concept, mission, tasks and establishment of civil protection and disaster management in Hungary. Types and features of disasters, the disaster vulnerability of Hungary, the organizational system of the protection against disasters, command and control of protection, the role of medical authorities.

6th semester, 2 teaching hours: (M2) The early warning system and signals of disaster management. The elimination of the consequences of disasters, the staff work applied during protection. Features and activities of Hungarian disaster management organizations and authorities, international possibilities of disaster management and the lessons learnt, demonstrated by examples.

Requirements and the potential for absences to participate in the sessions:

The subject consists of 4 modules. Module 1 does not have any prerequisites; module 2 anticipates the fulfillment of module 1. Students must register to attend the course announced as required. Those who are unable to fulfill module 1 or 2 (do not attend), may participate in a supplementary lesson in the 1st semester of the following year.

The method of certificate for the workshops and the exam absences:

Certificate of absence: medical, official – court of justice, local government, Students' Union, etc.

The mid-term controls' (reports, midterm) number, topic and date, replacements and repairs:

Method of making up for the absence justified by certificate: participation in a supplementary lesson.

Requirements for the signature:

Students must participate in the lesson announced to acquire signature, or in case of absence justified by certificate, in a supplementary lesson. Only registered students may participate in a supplementary lesson announced.

The method of grading: signature

Type of examination: none

Requirements: none, students must fulfill the obligation to attend the lessons.

Application for exam: none

Changing procedure for exam application: none

Absence from the examination: none

Notes, textbooks, study aids and literature list:

László Major PhD, Ronald Barham PhD, Dr. György Orgován PhD:
Medical Aspects of Disaster Preparedness & Response

PREVENTIVE DENTISTRY

Department of Restorative Dentistry and Endodontics

Head of Department: **Dr. János Vág DMD, PhD**

Tutor: **Dr. Eszter Molnár DMD, PhD**

First semester

Lectures 2 hours/week, Practices/Seminars 2 hours/week

Detailed course/lecture description[i]: (to facilitate credit recognition in other institutions)

Lectures:

Week	Title	Lecturer
1.	Preventive dentistry- introduction	Molnár E.
	Dental caries, Etiology of caries. Dental plaque	
2.	Caries Epidemiology. Caries indices. Risk factors	Molnár E.
	Caries incipient and remineralisation	
3.	The Role of diet in the caries prevention	Molnár E.
	Cervical sensitivity, dentinal hypersensitivity and erosion	
4.	Fluorides in the cariesprevention	Molnár E.
	Toxicology of fluorides	
5.	Oral hygiene - Toothpaste	Molnár E.
	Oral hygiene - Toothbrush	
6.	Prevention in pregnancy and from the intrauterine life to the age of three	Németh F.
	Dental treatment and prevention in case of elderly patients	
7.	Gingivitis and periodontal disease. Epidemiological characteristics. Pathogenesis and diagnosis	Gera I.
	Strategy for prevention of periodontal diseases	Dobos A.
8.	Integrated preventive dentistry – prosthodontics	Szántai B.
	Integrated preventive dentistry – gnathology	Jász M.
9.	Integrated preventive dentistry – conservative dentistry	Lohinai Zs.
	Possibilities in prevention of orthodontic anomalies	Németh F.
10.	Oral cancer	Németh Zs.
11.	Environmental and iatrogenic damaging factors in dentistry	Daubner R.
	Infection control	
12.	Fissure-sealing	Molnár E.
	The role of dental hygienists in the dental practice	Németh R.
13.	Environmental protection.	Demeter T.
14.	Group-prophylaxis, Design, Organisation	Németh R.
	Profilaxis in the school	

Practices/Seminars:

1.	Clinical workplace (Seminar)
2.	Clinical workplace (practice)
3.	Dental status, medical/dental history (Seminar)
4.	Medical history, Dental status (practice)
5.	Dental status, Cariesdiagnostic (practice)
6.	DMF number/index, methods of Cariesdiagnostic (practice)
7.	Oral hygiene (Seminar)
8.	Oral hygiene indices (Seminar)
9.	Oral hygiene indices (practice)
10.	Plaque staining (practice)
11.	Periodontal Indexes, scaling, polishing (practice)
12.	Periodontal Indexes, scaling, polishing (practice)
13.	Caries Risk Test, Model tooth fissure sealing (practice)
14.	Consultation (Seminar)

Institute of Preventive Medicine and Public Health
1089 Budapest, Nagyvárad tér 4. 13. em.
Tutor: Dr. Ferenc Horváth
horvath.ferenc@semmelweis.hu

English Dental

Topics of theoretical classes (pro week):

- Week 1: History of Hungarian medicine/public health. Definition of health, levels of prevention. Theoretical foundations of health promotion. The concept and functioning of public health
- Week 2: Health determinants. Health status of the Hungarian population. Health determinants in Hungary. Principles of health policy
- Week 3: Epidemiology and prevention of smoking and smoking-related diseases
- Week 4: Epidemiology and prevention of cardiovascular diseases. Epidemiology and prevention of cancer
- Week 5: Epidemiology and prevention of respiratory diseases. Thyroid diseases. Vulnerable groups
- Week 6: Mental health. Ageing
- Week 7: Obesitas//Diabetes. Physical activity
- Week 8: Epidemiology of communicable diseases. Vaccinations
- Week 9: Infection control. Nosocomial infections
- Week 10: Nutritional status and dietary habits of the Hungarian population. Food safety
- Week 11: Environmental health: climate change, environmental health effects of air. Environmental health: soil, water
- Week 12: Chemical safety and toxicology. Ionising radiation, types, effects, limits
- Week 13: Occupational health. Maternal, infant, child and adolescent health, health inspector network and school health
- Week 14: Structure, financing and administration of health and public health in Hungary. Health policy. Quality assurance and quality improvement in health care

Topics of practical classes (pro week):

- Week 1: Introduction. Demography
- Week 2: Epidemiology. Morbidity measurement (incidence, prevalence). Risk and causality (risk indicators). Epidemiological study types (descriptive studies, analytical studies: cross-sectional, cohort, case-control)
- Week 3: Screening tests (population) for public health purposes. Evaluation of screening tests (sensitivity, specificity, predictive values, ROC curve)
- Week 4: Interventional studies (RCTs). Meta-analyses. Critical reading
- Week 5: Design, organisation and evaluation of health promotion programmes.
- Week 6: Smoking and minimal intervention
- Week 7: Alcohol SBI (screening and brief intervention)
- Week 8: Physical activity/movement recommendations.
- Week 9: Mental health, mental hygiene. Prevention of illicit drug use
- Week 10: Preparing an individual health plan
- Week 11: Epidemiological concepts. Epidemiology system. Epidemiological investigation
- Week 12: Practical knowledge of vaccination
- Week 13: Case studies in environmental and occupational health
- Week 14: Practical exam

RESTORATIVE DENTISTRY, PRE-CLINICAL II

Department of Conservative Dentistry

Head of Department: János Vág DMD, PhD

First semester

Lectures (1 hour per week):

1. Classification (inlay/onlay/overlay/endocrown/veneer/tabletop) and materials for indirect restorations. Indications, contraindications, materials, and clinical steps for metal inlays
2. Aesthetic (composite, ceramic, hybrid) indirect restorations. Dome concept
3. Application of liner, base, and temporary fillings. Polishing, removal, and toxicology of amalgam fillings
4. Glass ionomer cements and other polymeric materials (composition, indication, and application)
5. Analog and digital impression technique for single restorations. Indication and application of sulcus retraction. Chairside CAD/CAM technology. Basics of design and milling.
6. Fundamental concepts of the adhesive technique
7. Composites - material science (composition, classification, properties)
8. Practical considerations for the clinical use of composites and adhesive technique
9. Materials and cementation of indirect aesthetic restorations (material science of adhesive cement, surface treatments of the tooth and the restoration, clinical steps of cementation)
10. The concept, localization, and progression of caries in the anatomical crown
11. Caries diagnostic tools
12. Cervical lesion and its complex treatment
13. Patient admission and treatment plan (general rehabilitation and sequence of restorative and endodontic dental treatments)
14. The order of clinical practices, compilation of student case presentations, basic knowledge of dental photography

Manual training (3 hours/week):

Theoretical, practical steps of preparing inlays, onlays, overlays; steps of preparing them in the dental laboratory; use of the CAD/CAM systems; use of oral scanners; digital workflow of single restoration.

List of textbooks:

- 1 Sturdevant's Art And Science Of Operative Dentistry. Edited by T. Roberson, H. Heymann and E. Swift. Mosby, St Louis, 2006. ISBN 978-0-323-03009-0
- 3 Newbrun A.: Cariology Quintessence. ISBN 0867152052

Note:

Attendance at the practices is obligatory, and absences at any one practice may not exceed 25% of the total number of practices (the maximum number of absences is 3). Three delay of less than 15 minutes will be considered as one absence. Delay of more than 15 minutes from the practice will also be considered as absence. There is no possibility to make up the practice. More than 3 absences invalidate the semester. During the semester two midterm tests must be passed. The work done in the practicals is continuously monitored and evaluated by the practical supervisors. Completely missing a specific assignment/task will result in a refusal to sign the end-of-semester.

Final oral exam:

Comprise theoretical and practical parts with five partial marks. Based on random generation, two questions should be chosen and answered (two partial marks). The grades given for each theoretical topic must separately reach grade 2.0. In addition, correctly identifying an extracted human tooth (one partial mark), the instrument recognition&application (e.g., matrix placement) (one partial mark), and making rubber dam isolation (one partial mark) must also reach an average of 2.0, separately.

DENTO-ALVEOLAR PRACTICE

MINIMUM 1-WEEK (30 hours) – MAXIMUM 4-WEEK PROGRAM IN DENTO-ALVEOLAR SURGERY

Practicing tooth extractions
Practicing local anesthesia
Assisting at minor oral surgical procedures
Practicing post-surgical patients' management
Carrying out surgical tooth extraction under supervision
Carrying out minor dento-alveolar surgical procedures under supervision

Students should work at the assigned hospital or dental clinic 6 hours a day, five days a week.

Important note: Document certifying the completion of the practice must be handed in at registration! Registration to the next year is not allowed without it!

ENDODONTICS, PRE-CLINICAL

Department of Restorative Dentistry and Endodontics

Head of Department: **János Vág DMD, PhD**

Tutor: Beáta Kerémi DMD, PhD

Second semester

Lectures (1 hour per week):

1. Anatomy of the root apex. Preoperative radiography. Determination of working length by radiographic method and electronic measuring instruments.
2. Pulpal and periapical pathology
3. Concept, purpose, indication, contraindication, and limitation of root canal therapy. Emergency procedures in endodontics
4. Endodontic diagnostics
5. Preventive endodontics: the importance of pulp protection. Vital pulp therapy
6. Microbiological aspects of endodontics. Antiseptic solutions, drugs and their use in root canal treatment.
7. Procedural errors during root canal preparation. Hand and rotary root canal preparation techniques (beyond the step-back).
8. Evaluation of endodontic outcome. The revision of root canal treatment
9. Root canal obturation techniques (cold and warm gutta-percha techniques)
10. Aesthetic and functional restoration of root canal treated teeth (post and core buildup, single crown, endocrown, indirect restorations)

11. Endodontic treatment of accidentally damaged teeth; Resorption; Vertical root fracture
12. Surgical interventions in restorative dentistry and endodontics (crown lengthening, drainage, apicectomy, hemisection, bicuspidation, amputation)
13. Restorative and endodontic treatment for patients requiring special care. Odontogenic focal infection
14. Indications, contraindications and methods of tooth whitening. Possible side effects and their prevention.

Manual training (3 hours per week).

Anatomy of roots, root canals and periapical space; theoretical basics of endodontics; symptoms, diagnosis and therapy of pulpal diseases and their consequences; access openings of the pulp chamber, root canal preparation and obturation on plastic endodontic practice blocks and endodontic training tooth

Note:

Attendance at the practices is obligatory, and absences at any one practice may not exceed 25% of the total number of practices (the maximum number of absences is 3). Three delay of less than 15 minutes will be considered as one absence. The delay of more than 15 minutes from the practices will be considered as absence. There is no possibility to make up the practice. The work done in the practicals is continuously monitored and evaluated by the practical supervisors. Throughout the semester the students must complete weekly small tests. During the semester two midterm exam must be passed. Semi-final oral exam: questions from two topic groups and identification of an extracted human tooth and endodontic instruments.

HUNGARIAN FOR DENTAL MEDICAL PURPOSES

Institute for specific purposes

1st semester:

HUNGARIAN FOR DENTAL MEDICAL PURPOSES V.

Topics of the course

1. Week	Revision: tooth, tooth brushing, tooth decay, fillings, DMF, questions during case history taking, questions on pain, complaint (...)
2. Week	Revision: sentences required by the Faculty of Dentistry, which were studied so far (Part 15)
3. Week	Revision: General Health Questionnaire (Directed) situational game for developing speech comprehension, new strategies Sentences required by the Faculty of Dentistry 6. (vocabulary of taking dental impression, ...)
4. Week	Situation games, dentist-patient dialogues Sentences required by the Faculty of Dentistry 7. (filling change, light curing resin ...)
5. Week	Dialogues based on X-ray findings (eg. filling wearing down, etc.) Sentences required by the Faculty of Dentistry 8. (tooth extraction, I am removing the suture ...)
6. Week	Sentences required by the Faculty of Dentistry 9-10. (tooth colour, loose dental prosthesis, oral lesions caused by ill-fitting dentures...) Revision: clinical course, steps of medical treatment
7. Week	Summary, 1st written test – “sample final” based on Sentences required by the Faculty of Dentistry 1-10.
8. Week	Sentences required by the Faculty of Dentistry, 11-12.: presentation of items needed for care (saliva extractor, mask, Lidocain with short / long needle, upper left molar forceps, saliva scarf, coffer-dam, clasp, etc.) Asking for dental instruments: Sentences with I would like a ... (“Szeretnék egy...-t!”). New topic: dental calculus
9. week	Sentences required by the Faculty of Dentistry, 13-14. Revision of previous topics (cleaning teeth, tooth decay, fillings, gingivitis) New topic: root canal treatment (what does it mean, what are its steps, what does the dentist use, etc.)

10. week	Sentences of the Conservative Dentistry Final New topic: orthodontics.
11. week	Sentences required by the Faculty of Dentistry: „please + imperative” sentences, with grammatical explanations (eg. Please keep..., please help, please mix...).
12. week	Filling out a questionnaire based on a listening task + DMF (Repetition) Revision: topics of the final, Sentences accounted for by the Faculty of Dentistry, case history and treatment
13. week	Summary, 2nd written test
14. week	Oral test

Requirements

Attendance of lessons is obligatory. Students are allowed to have maximum 7 absences a semester. In case of more absences, the teacher may deny giving the signature. Students who miss a class, can make up for it (max. two times a semester). Students have to reach more than 50 % of the score from the 2 written tests and the oral exam.

Textbooks

Teaching material based on authentic dental documentation, compiled by the instructors of the Institute of Languages for Specific Purposes
I. Gera: Doctor – Patient, Doctor – Assistant Communication, compiled by Prof. Dr. I. Gera
I. Gera: Angol-magyar fogorvosi szótár
M. Putz: *Magyar fogorvosi szaknyelv I.*
A. Weidinger: Magyar fogorvosi szaknyelv ED III. (Kurzusjegyzet)
A. Weidinger: Nyelvtan

2nd semester:

HUNGARIAN FOR DENTAL MEDICAL PURPOSES VI.

Topics of the course

1. week	Revision: Final topics covered in previous semesters, sentences required by the Faculty of Dentistry
2. week	Prosthodontics, taking dental impression
3. week	Gingivitis
4. week	Dental calculus, removal of calculus
5. week	Oral hygiene, dental care
6. week	Tooth decay
7. week	Filling, filling replacement
8. week	1st test, Case reports based on clinical practice
9. week	Root canal treatment
10. week	Tooth extraction
11. week	Teeth whitening, Orthodontics
12. week	Dental implants
13. week	X-ray
14. week	week Sample final exam – oral interview

Requirements for signature: Attendance of lessons is obligatory. Students are allowed to have maximum 7 absences a semester. In case of more absences, the teacher may deny giving the signature. Students who miss a class, can make up for it (max. two times a semester).

Final: The comprehensive exam takes place during the exam period and is comprised of a listening comprehension test and an oral test; min. 50% must be achieved in both parts. Neither part can be failed. For the oral part, two teachers will assess the student's performance on separate marking sheets and an average will be calculated.

Textbooks

Teaching material based on authentic dental documentation, compiled by the instructors of the Institute of Languages for Specific Purposes
I. Gera: Doctor – Patient, Doctor – Assistant Communication, compiled by Prof. Dr. I. Gera
I. Gera: Angol-magyar fogorvosi szótár
M. Putz: *Magyar fogorvosi szaknyelv I.*
A. Weidinger: Magyar fogorvosi szaknyelv ED III. (Kurzusjegyzet)
A. Weidinger: Nyelvtan

Second Semester

Lectures

- Clinical examination, symptoms and diagnostics in oral surgery. Dentist-patient relationship.
- Local anaesthesia I. The history of local anaesthesia. Physiological and psychological aspects of pain. Technical possibilities.
- Local anaesthesia II. The pharmacological properties of local anaesthetic drugs. The mode of action of local anaesthetics. The composition of local anaesthetic preparations. Indications, contraindications.
- Local anaesthesia III. The technique of local anaesthesia. Generally used techniques for terminal (infiltrative) and block anaesthesia.
- Local anaesthesia IV. Special techniques for local anaesthesia. Ganglion blockade. Intraligamental anaesthesia. Anaesthesia of inflamed tissues.
- Local anaesthesia V. Complications of local anaesthesia. Active agent induced complications. Technical complications.
- Pathology and special aspects of wound healing in the oral cavity. Characteristics of bone and soft tissue wound healing.
- Operation technique in dentoalveolar surgery. (surgical tools, flaps, sutures)
- Written midterm.
- The operative technique of tooth removal I. Indications and contraindications of tooth removal. Biomechanical basis and surgical technique of tooth extraction.
- The operative technique of tooth removal II. Surgical removal of teeth and roots.
- The operative technique of tooth removal III. Complications.
- The importance of various risk factors during the tooth extraction (radiotherapy, antiresorptive therapy, haemostats).

Practices

1-5. week: Review of theoretical background. The theoretical background of local anaesthesia.

6. week: Oral test.

7-14. weeks: Anaesthesia, simple tooth removals (with forceps). Discussing the topics of the lectures. Continuous tracking of the students' progress (written and oral tests).

Note:

Lectures will be held in the lecture hall of the Department of Maxillofacial Surgery and Dentistry.

The maximum number of absences in a semester is 3. More than 3 absences invalidate the semester.

During the semester three midterm examinations should be passed.

Practical course grade (five-scale).

Lecturer: Dr. Ákos Zsembery
Tutor: Dr. Kristóf Kádár

Second Semester

Lectures (2 hours per week):

1. Matrix of mineralised tissues. Anorganic components, mineralisation and bioapatites
2. Osteogenesis, bone resorption
3. Development of the tooth germ
4. Dentinogenesis, cementogenesis. Dentin permeability
5. Amelogenesis
6. Hemopoietic stem cell transplantation
7. Bleeding disorders. Pathophysiology and its relevance in everyday dentistry
8. Morphology and function of salivary glands. Saliva, disorders of salivary secretion
9. Tooth eruption and tooth movement
10. Tumor formation in the oral cavity
11. Oral sensation, olfaction, deglutition
12. Morphology and functional properties of the pulp, circulation of the oral cavity. Pulpitis and dental pain
13. Inflammation - general features, pathomechanism, types
14. Wound healing. Ionizing radiation, oral consequences of therapeutic irradiation

Practices (2 hours per week):

15. Calcium homeostasis
16. Chewing
17. Hard tissue - fluoride
18. Hematology I.
19. Hematology II.
20. Hematology III.
21. Hemostasis
22. Measurement of salivary flow and salivary diagnostics
23. Dental plaque
24. Oral defence
25. Case presentation – periodontal diseases and systemic conditions
26. Oral clearance
27. Gingival sulcus and the crevicular fluid
28. Molecular diagnostics in dentistry, gene polymorphisms

The maximum number of absences from practice in a semester is 3!
More than 3 absences invalidate the semester.

Midterm from the material of the lectures in the 12th week (1- 10 lectures material)
Midterm is the qualification for the Competition (in the 14th week)

ORAL DIAGNOSTICS

Department of Oral Diagnostics

Address: Bp. VIII., Szentkirályi u. 47. 1088

Phone: 459-1500/59161, 317-1044

Lecturer: **Dr. Péter Vályi**

E-mail: oralis.diagnosztika@dent.semmelweis-univ.hu

Third year 2nd semester

Lectures (1 hour per week)

1. Introduction to Oral Diagnostics. Importance and rules of dental diagnostics and dental record.
2. Patient history. Risk patients
3. Extraoral and intraoral examination Stomato-oncological screening.
4. Detection and diagnosis of the carious lesions. Non-carious lesions of the tooth.
5. Principles of endodontic diagnostics.
6. Examination methods in the periodontology
7. Diagnosis and treatment of temporomandibular disorders
8. Evaluation of the edentulous patient. Fundamental principles of prosthetic therapy
9. Orthodontic diagnostics
10. Physiology and diagnostics of salivary glands. Diagnostic procedures of halitosis
11. Laboratory tests for the dental office (microbiological, haematological, clinical chemistry, immunological, histopathological, genetic)
12. Oral diagnostic evaluation of the elderly patient.
13. Pain assessment in the oral diagnostics
14. Influence of oral inflammatory diseases on the systemic conditions

Practices (2 hours per week)

15. Guiding of the patient, infection control
16. Communication with the patient
17. Position of patient and doctor, correct use of examination equipments, correct use of protective equipments
18. Patient examination and case description
19. Anamnesis, analysis of systemic diseases and medications influencing dental treatment
20. Periodontal Indices, Overview of Angle Classes
21. Fábíán-Fejérdy's classification
22. Recording the dental status
23. Additional tests: sensitivity tests, Diagnodent, Diagnocam
24. Additional examinations: ordering an X-ray, referring the patient to another department or place of care
25. Care for high-risk patients
26. Examination of the oral mucosa, primary and secondary lesions
27. Care of infectious patients
28. Focal infection examination

Notes:

Students must attend on the practices.

The signature will be refused, if the student was absent in more than 25% of the duration of the practices.
closing semi-final

Textbook:

1. Bricker, Langlais, Miller: Oral Diagnosis, Oral Medicine and Treatment Planning (second edition) 2 BC Decker Inc Hamilton London 2002.

Recommended books:

- 1 Bengel, Veltman, Loevy, Taschini: Differential Diagnosis of Diseases of the Oral Mucosa Quintessence Publishing Co. Inc. Chicago, Illinois 1989
- 2 Manfred Strassburg/Gerd Knolle : Diseases of the Oral Mucosa A Color Atlas (Second Edition) Quintessence Publishing Co. Inc. Carol Stream Illinois 1994 3 "hand-outs" will be prepared and presented for the students by the lecturers

ORAL MEDICINE I.

Department of Oral Diagnostics

Address: Bp. VIII., Szentkirályi u. 47. 1088

Phone: 459-1500/59161, 317-1044

Lecturer: **Prof. Dr. Csaba Dobó Nagy**

E-mail: oralis.diagnosztika@dent.semmelweis-univ.hu

Third year 2nd semester

Practices (1 hour per week)

1. Stomato-oncological screening
2. Developmental disorders
3. Physical, chemical and iatrogenic harms
4. Bacterial diseases
5. Viral diseases
6. Fungal pathogens
7. Diseases of the lips
8. Diseases of the tongue
9. Diseases of the immune system
10. Vesicobullosus and granulomatous oral diseases
11. Oral manifestations of diseases of organs and organ systems
12. Precancerous lesions and conditions
13. Benign tumors
14. Malignant tumors

Notes:

Students must attend on the practices.

The signature will be refused, if the student was absent in more than 25% of the duration of the practices.

During the practices, the students' performance is assessed on a five-point scale at each practice occasion. The arithmetic mean of the obtained grades determines the practical mark.

Textbook:

1. Bricker, Langlais, Miller: Oral Diagnosis, Oral Medicine and Treatment Planning (second edition), BC Decker Inc Hamilton London 2002.

Recommended books:

- 1 M. Glick, MS. Greenberg, PB. Lockhart, SJ Challacombe: Burket's Oral Medicine (thirteenth edition) Hoboken, NJ : Wiley-Blackwell 2021.

ORAL PATHOLOGY

Department of Pathology and Experimental Cancer Research

Course director and tutor: **Dr. Botond Timár**

Second Semester

Lectures

- Oral pathological sampling and processing.
- Orofacial malformations
- Pathology of the head and neck region. Esophageal diseases. Gingiva pathology
- Intraoral lesions, neoplasms, preneoplastic
- Conditions
- Orofacial inflammatory diseases.

- Pathology of the tongue
- Pathology of the nose, paranasal sinuses, larynx
- Manifestation of hematologic diseases in the head and neck and oral regions.
- Endocrine pathology
- Pathology of the salivary glands.
- Odontogenic tumors
- Pathology of the jaw
- Pathology of caries. Periodontal diseases.
- Orofacial manifestations of systemic diseases
- Differential diagnostics of the orofacial lesions

Note:

The maximum number of absences in a semester is 3. More than 3 absences invalidate the semester

PROSTHODONTICS I.

Second Semester

The theme of the seminars:

1. Introduction to the subject, introductory seminar
2. Online moodle learning module: Features of an elderly patient, gerostomatological considerations and the first visit. The importance of documentation.
3. Seminar material which requires personal attendance: Features of an elderly patient, gerostomatological considerations and the first visit. The importance of documentation.
4. Online moodle learning module: Clinical and laboratorial steps of the fabrication of complete dentures. How is a complete denture stabilized?
5. Seminar material which requires personal attendance: Clinical and laboratorial steps of the fabrication of complete dentures. How is a complete denture stabilized?.
6. Online moodle learning module: Impressions for complete dentures (anatomical landmarks, their features, advantages and disadvantages)
7. Seminar material which requires personal attendance: Impressions for complete dentures (anatomical landmarks, their features, advantages and disadvantages)

8. Online moodle learning module: Jaw relation recording in complete edentulousness, the properties of the trial dentures
9. Seminar material which requires personal attendance: Jaw relation recording in complete edentulousness, the properties of the trial dentures
10. Online moodle learning module: Processing of the final denture. Fitting and recalls.
11. Seminar material which requires personal attendance: Processing of the final denture. Fitting and recalls.
12. Online moodle learning module: Implant prosthodontics in the completely edentulous. Maxillofacial prosthodontics.
13. Seminar material which requires personal attendance: Implant prosthodontics in the completely edentulous. Maxillofacial prosthodontics.
14. Consultation

Note:

The maximum number of absences in a semester is 3. More than 3 absences invalidate the semester During the semester two midterm examinations should be passed
Practical course grade.

RADIATION PROTECTION

Department of Oral Diagnostics

Address: Bp. VIII., Szentkirályi u. 47. 1088

Phone: 459-1500/59161, 317-1044

Lecturer: Dr. Bence Tamás Szabó

E-mail: oralis.diagnosztika@dent.semmelweis-univ.hu

Third year second semester

Lectures (1,5 hours per week)

1. Atomic structure, radioactivity, ionizing radiations.
2. Interaction of ionizing radiations with materials, dosimetry, physical dose concepts
3. Principles of radiation protection, dose limits
4. Public exposure
5. Biological effects of the radiation
6. Radiation protection of the patients
7. Radiation protection in dentistry
8. X-ray equipments
9. Radiation protection regulation aspects
10. Radiation protection legalisation in Hungary
11. General rules of ionizing radiation applications
12. Nuclear and radiological accidents. Prevention, emergency plan
13. Medical exposure
14. Consultation, written pre-test

Practices (1 hour per week)

1. Possible tools and methods of basic nuclear measurements.
2. Measurement of X-ray radiation dose and dose performance on phantom.
3. Measurement X-rays absorption
4. Measurements of half-value layer
5. Describing the use of ionization chamber
6. Describing the use of G-M Tube
7. Describing the use of scintillation detector
8. Describing the use of thermoluminescent dosimeter
9. Personal dosimetry
10. Describing isotope diagnostics – contamination measurements
11. Record and physical protection of radiation sources. 190/2011 Governmental Decree and 11/2010. KHEM Decree. Defence-in-depth concept and its levels.
12. Technical parameters that affect the quality of x-rays
13. The application of X-ray films in dental radiology
14. Tools of reducing the patients' radiation exposure and their application

Notes:

Students must attend on the practices.

The signature will be refused, if the student was absent in more than 25% of the duration of the practices.
closing semi-final

RESTORATIVE DENTISTRY AND ENDODONTICS I.

Department of Restorative Dentistry and Endodontics

Head of Department: **Dr. János Vág DMD, PhD**

Second semester

The subject is taught with three practical hours per week, there is no lecture.

Objectives of the exercises: thorough patient examination, taking of medical and dental history, stomato-oncological screening, establishing the diagnosis, preparing a treatment plan, removing calculus, routine application of isolation procedures, preparation, and restoration of simple cavities. Caries lesion treated with fillings. Learning the basic skills for dental assisting.

Method of checking acquired knowledge during the study period:

Students must arrive prepared for the practice, which is regularly checked and evaluated orally and/or in writing by the supervisor. The work carried out on the practices will be monitored and assessed by the practice leaders at each stage. The results of the evaluations are included in the semester rating.

Requirements of an accepted semester (signature of the lecturer):

A minimum of 75% attendance is required at the practices, and absence may not exceed 25% of the practices regardless of the reason. The signature of the semester, a sufficient level of continuous and consistent theoretical preparation, and a sufficient level of practical performance are required. The average grade of the theoretical part and the average grade of the practical part must separately reach the 2.0-grade. By week 13, a photo-documented case report of the student's work must be submitted to the practice leader.

Type of the exam: Practice mark

List of textbooks, lecture notes and recommended textbooks:

Ritter AV, Boushell LW, Walter R: Sturdevant's Art and Science of Operative Dentistry. 7th ed. St. Louis, Mosby, 2018. 2. Torabinejad M, Walton RE, Fouad AF: Endodontics. Principles and Practice. 5th ed. St. Louis, Missouri, Saunders/Elsevier 2014 3. Hargreaves KM, Berman LH: Cohen's Pathways of the Pulp. 11th ed. St. Louis, Missouri, Mosby/Elsevier 2015

Lecturer: Péter Szluka - Central Library
Institute: Semmelweis University Central Library, 1088 Budapest
Duration: One semester, 30×45 minutes (10×3 lessons), Place of the course: distance learning (via Zoom)

SUGGESTED SEMESTER 5-10.

Type of assessment: Practical mark
Credit-value: 3 credit-points
Minimum/maximum group-size: 10/150
Registration: in Neptun system
Technical background: Zoom application, Internet (university IP address/VPN access for students)
The aim of the subject: Teaching students how to use/search in literature sources of medicine, analyse the result of their work supporting the proper competencies.
Assistant lecturer: Dr. Livia Vasas PhD, Anna Berhidi, Edit Csajbók
Student records officer: Tamásné Gere, Anna Berhidi
Application deadline: Third week of Fall/Spring Study Period
Precondition: Medical and Dental Physiology II.

Method of instruction:
digital e-learning - (guided) search exercises in databases, scientific, electronic, literature sources with VPN connection; scheduled consultation appointments during the course

Competencies acquired through the completion of course:
After completing the course, the students will be competent to search for literature sources and assess their reliability. They will learn the basic types of publications, the different indicators of journals and the basics of evidence-based medicine (EBM). They will learn the citation practices expected in autonomous scientific works, the applications that help to edit and organize references quickly and flexibly

Detailed course syllabus:

Module 1/3rd week: Introduction, Central Library's website, VPN, general introduction of databases

Introduction, requirements
VPN access, technical details, usage of mobile devices
Homepage: <https://lib.semmelweis.hu/> and its facilities
Structure, function and critical approach of databases
Criteria for a scientific journal; Types of publication, structure of scientific publication, content compliance, peer-review

Module 2/4th week: AI tools, Plagiarism, Copyright, Scientific publications

Using AI tools in scientific papers.
The concept of plagiarism, its different approaches
Using previously published content for copyright purposes
How to publish a paper, authors' instructions.
Characterization of journals

Module 3/5th week: Open Science, Open Access

The evolution of Open Access (OA) publishing
Different types of OA publishing and their descriptions
Introduction of DOAJ, Open Policy Finder databases
Risks associated with OA publishing, critical analysis of OA sources
OA publishing at Semmelweis University

Module 4/6th week: PubMed; Web of Science, Scopus

Basics of literature search
National Library Medicine, Entrez- databases, PubMed, PMC, MeSH, PubChem
Bibliographic item analysis
Multidisciplinary bibliographic databases: Web of Science platform, Scopus – general search

Module 5/7th week: Evidence Based Medicine

Introduction of EMBASE, Cochrane Library, UpToDate, TRIP databases

Module 6/8th week: Specific databases; prestige of journals

EBSCO: CINAHL with Full Text, PsycINFO; EBSCO Discovery Service
ProQuest Central
Dissertation databases
Quality/prestige of journals: Clarivate Analytics InCites JCR, SCImago (SJR), Scopus Sources (CiteScore)

Module 7/9th week: Reference managers I.

EndNote online, EndNote desktop

Module 8/10th week: Reference managers II.

Mendeley, Zotero
Practice of reference managers' word processor toolbar and Word, formatting

Module 9/11th week: Consultation on request

Module 10/12th week: Consultation, final test to improve the grade

Requirements for attendance: Participation in the program is not compulsory, but highly recommended in order to master the practice. The completion of post-module tests is recommended.

Assessment methods during semester: Post-module practical search exercises (in the form of 8 tests), at least 6 must be completed and will be graded from the total number of points at the end of the course.
There is a possibility to write the final test from the entire course material, where a minimum of 33 points is required in order to pass the course.

The scoring system indicates both the module tests and the final test:

0-32: fail (1),
33-45: pass (2),
46-57: fair (3),
58-64: good (4),
65-72: excellent (5)

The eight post-module tests (written exams) are based on the material of the given module on the day of the lecture.
The final written exam takes place on the same day as the 10th module. Topic: covers all the material studied in the entire course.

Number and type of individual assignments to be completed, submission deadlines: Completion of practical tests after each module, the deadline for submission is the 6th day after the lecture

Requirements for the successful completion of the course: Writing the post-module tests successfully (total score: min. 33 points) OR Successful completion of a test (min. 33 points) on all the material at the end of the course.

List of examination topics: The module topics correspond to the module tests and final test topics:

1. Website of Central Library, VPN
2. AI tools, Plagiarism, Copyright, Scientific publications
3. Open Science, Open Access
4. PubMed; WoS, Scopus
5. Evidence Based Medicine
6. Specific databases; Prestige of journals
7. Reference managers I.
8. Reference managers II.

Method and type of grading: After the completion of the eight post-module tests, the student receives a grade based on the total points of the post-module tests.

The scoring system indicates both the module tests and the final test:

- 0-32: fail (1),
- 33-45: pass (2),
- 46-57: fair (3),
- 58-64: good (4),
- 65-72: excellent (5)

Required literature:

The uploaded presentations and consultation materials for each module, which can be downloaded from the course interface in Moodle (<https://itc.semmelweis.hu/moodle/>).

SU Central Library's homepage: <https://lib.semmelweis.hu/>

PubMed: <https://pubmed.ncbi.nlm.nih.gov/>; <https://pubmed.ncbi.nlm.nih.gov/help/>

Web of Science and related products: <https://support.clarivate.com/ScientificandAcademicResearch>

Scopus: https://service.elsevier.com/app/answers/detail/a_id/14799/supporthub/scopus/

Scimago: <https://www.scimagojr.com/>

Cochrane: <https://www.cochranelibrary.com/>

OATD: <https://oatd.org/>

EndNote: <https://support.clarivate.com/Endnote>

Recommended materials:

Recordings of the lectures can be viewed on the Moodle interface of the course or on the Kaltura platform (<https://kaltura.semmelweis.hu/>) on the Central Library channel (SeKA login required).

Mendeley: <https://www.mendeley.com>

Zotero: <https://www.zotero.org/>

Carrot2: <https://search.carrot2.org/#/search/web>

UpToDate: <https://www.wolterskluwer.com/en/solutions/uptodate/resources>

Google: [https://support.google.com/websearch/?visit_](https://support.google.com/websearch/?visit_id=638508497838069298-282292072&hl=en-HU&rd=2#topic=3378866)

[id=638508497838069298-282292072&hl=en-](https://support.google.com/websearch/?visit_id=638508497838069298-282292072&hl=en-HU&rd=2#topic=3378866)

[HU&rd=2#topic=3378866](https://support.google.com/websearch/?visit_id=638508497838069298-282292072&hl=en-HU&rd=2#topic=3378866)

Google Scholar: <https://scholar.google.com/intl/en/scholar/help.html>

Dimensions: <https://www.dimensions.ai/why-dimensions/>

ELECTIVE SUBJECTS

Modern research methods in dentistry

Leader of the course: Prof. Gábor Varga

1st semester –2 credits

Wednesdays at 17.00-18.30 (2x45minutes)

Topics to be covered:

1. Stem cells and scaffolds
2. Gingival blood circulation and inflammation – Laser Doppler Flowmetry
3. Isolation, maintenance, differentiation and in vitro functional assays of oral stem cells and progenitors
4. CAD/CAM techniques and LASCA
5. Care for children having cleft lip and palate
6. Patch clamp electrophysiology technique
7. Investigation of epithelial transport
8. Investigation methods of implant stability
9. Psychosomatics - examination of saliva samples
10. Clinical periodontal research
11. Dental epidemiological studies, saliva as a diagnostic factor
12. Structural studies of non-decalcified hard tissues
13. Micro CT investigations
14. Real time 3D rendering of oral tissues

Requirements:

1. Participation in the course obligatory, absences do not exceed 25% of the total number of hours.
2. The tasks to be fulfilled during the semester:
3. create a professional interview (3-5 pages, word doc) with one of the lecturer on the course

Challenges in modern dental research

Leader of the course: Prof. Gábor Varga

2nd semester – 2 credits

Wednesdays at 17.00-18.30 (2x45 minutes)

Topics to be covered:

1. Artificial organs and tissues; artificial salivary glands - biological regeneration of the human glands
2. Anesthesia in dentistry
3. Saliva as diagnostic factor
4. Informatics – biology – dental research – practice dentistry
5. Gene therapy in dentistry
6. Laboratory animals for dental research - possible alternative methods; animal studies - pros and cons
7. Homeopathy in dentistry
8. Medical and dental use of stem cells; isolation and possible use of tooth-derived stem cells in craniofacial regeneration
9. Gene polymorphism – SNP – dental genomics – what is the use?
10. Bone loss – bone augmentation – craniofacial tissue regeneration – new directions
11. Smile design – aesthetics and dental/medical ethics
12. GERD and dental erosion
13. Implantology
14. Biodentin and alternatives in dentistry

Requirements:

1. Participation in the course obligatory, absences do not exceed 25% of the total number of hours.
2. PowerPoint presentation, lecture and leading related discussion
3. critical written review of one Researcher Student Conference presentation



Faculty of Medicine

7th–8th semester

FACULTY OF DENTISTRY

CLINICAL MODULE

7th Semester

	Subject	Subject code	CREDITS	Hours per semester	Lecture (hr/semester)	Seminar (hr/semester)	Practice (hr/semester)	Lecture (hr/week)α	Seminar (hr/week)α	Practice (hr/week)α	Prerequisite(s)	Evaluation
Obligatory elective	Dental Ethics	FOKVMAG259_1A	1	28	28	0	0	2	0	0	Pathology, Oral Pathology	Examination
Obligatory	Emergency Dentistry I.	FOKOFSI388_1A	0	35	3	11	21				Oral Pathology	Signature
Obligatory	General and Dental Radiology I.	FOKODT247_1A	3	42	14	0	28	1	0	2	Radiation protection	Term grade
Obligatory	Gnathology	FOKOFPK367_1A	3	42	0	14	28	0	1	2	Restorative Dentistry and Endodontics I., Prosthodontics I., Oral Diagnostics	Examination*
Obligatory	Internal Medicine I.	FOKOBOK300_1A	3	42	14	0	28	1	0	2	General and Oral Pathophysiology, Public Health, Pathology	Term grade
Obligatory	Medical Aspects of Disaster Preparedness and Response III.	FOKOHKT385_3A	0	2	2	0	0				The Medical Basis of Disaster Management II.	Signature
Obligatory elective	Neurorology	FOKVNEU079_1A	1	14	14	0	0	1	0	0	Macroscopic anatomy and embryology I.-II.	Examination
Obligatory	Oral and Maxillofacial Surgery II.	FOKOSZB353_2A	4	56	14	0	42	1	0	3	Oral and Maxillofacial Surgery I., Oral Pathology, Radiation protection	Examination
Obligatory	Periodontology I.	FOKOPDK387_1A	2	21	14	0	7	1	0	0.5	Oral Biology, Oral Pathology, Oral and Maxillofacial Surgery I.	Examination
Obligatory	Pharmacology I.	FOKOFPM254_1A	4	56	28	0	28	2	0	2	Pathology, Medical and Dental Physiology II., Dental Biochemistry II	Examination
Obligatory	Physical Education VII.	FOKOTSI380_7A	0	14	0	0	14	0	0	1		Signature
Obligatory	Prosthodontics II.	FOKOFPK366_2A	6	98	0	14	84	0	1	6	Prosthodontics I., Restorative Dentistry and Endodontics I., Radiation protection	Examination
Obligatory elective	Psychiatry	FOKVPSI078_1A	1	14	14	0	0	1	0	0	Oral Biology, Oral Medicine I.	Examination
Obligatory	Restorative Dentistry and Endodontics II.	FOKOKFK357_2A	3	42	0	0	42	0	0	3	Prosthodontics I., Restorative Dentistry and Endodontics I., Endodontics, Preclinical	Term grade
	Sum of credits in the semester:		31									

8th Semester

	Subject	Subject code	CREDITS	Hours per semester	Lecture (hr/semester)	Seminar (hr/semester)	Practice (hr/semester)	Lecture (hr/week)α	Seminar (hr/week)α	Practice (hr/week)α	Prerequisite(s)	Evaluation
Obligatory	Emergency Dentistry II.	FOKOFSI388_2A	0	14	0	0	14	0	0	1	General and Dental Radiology I., Emergency Dentistry I.	Signature
Obligatory	General and Dental Radiology II.	FOKOODT247_2A	1	14	0	0	14	0	0	1	General and Dental Radiology I.	Comprehensive examination #
Obligatory	General Dentistry practice	FOKOF0G408_1A	1	120							Prosthodontics III., Restorative Dentistry and Endodontics III., Periodontology II.	Term grade
Obligatory	Implantology I.	FOKOSZB311_1A	2	28	14	0	14	1	0	1	General and Dental Radiology I., Oral and Periodontology I., Maxillofacial Surgery II.	Examination
Obligatory	Internal Medicine II.	FOKOBHK389_2A	2	28	0	14	14	0	1	1	Internal Medicine I., Pharmacology I.	Comprehensive examination #
Obligatory	Medical Aspects of Disaster Preparedness and Response IV.	FOKOHKT385_4A	0	2	2	0	0				The Medical Basis of Disaster Management III.	Signature
Obligatory elective	Ophthalmology	FOKVSZE390_1A	1	21	0	17	4				Internal Medicine I., Pharmacology I.	Examination
Obligatory	Oral and Maxillofacial Surgery III.	FOKOSZB353_3A	4	56	14	0	42	1	0	3	General and Dental Radiology I., Oral and Periodontology I., Maxillofacial Surgery II.,	Term grade
Obligatory	Orthodontics Preclinical	FOKOGFK257_1A	1	14	0	0	14	0	0	1	General and Dental Radiology I.	Term grade
Obligatory elective	Otorhinolaryngology	FOKVFUL255_1A	1	21	14	0	7	1	0	0.5	Pathology, Oral Pathology	Examination*
Obligatory elective	Pediatrics	FOKVGY2369_1A	1	21	7	7	7	0.5	0.5	0.5	Pathology, Oral Pathology	Examination
Obligatory	Periodontology II.	FOKOPDK387_2A	4	56	14	14	28	1	1	2	General and Dental Radiology I., Oral and Periodontology I., Maxillofacial Surgery II.	Examination
Obligatory	Pharmacology II.	FOKOFRM254_2A	4	56	28	0	28	2	0	2	Pharmacology I., Internal Medicine I.	Comprehensive examination #
Obligatory	Physical Education VIII.	FOKOTSI380_8A	0	14	0	0	14	0	0	1		Signature
Obligatory	Prosthodontics III.	FOKOFPK366_3A	4	70	0	14	56	0	1	4	General and Dental Radiology I., Prosthodontics II., Restorative Dentistry and Endodontics II.,	Term grade
Obligatory	Restorative Dentistry and Endodontics III.	FOKOKFK357_3A	3	56	0	0	56	0	0	4	General and Dental Radiology I., Prosthodontics II., Restorative Dentistry and Endodontics II.	Term grade
Obligatory elective	Surgery	FOKVSB1370_1A	2	28	14	0	14	1	0	1	Macroscopic anatomy and embryology II., Pathology	Examination*
	Sum of credits in the semester:		31									

IMPORTANT NOTE: Signing up for Physical Education (PE) VI. in the 1st semester and for PE VIII. in the 2nd semester is obligatory.

LIST OF TEXTBOOKS (The list may change!)

- 1 Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0
- 2 Peter, E.S. Freund-Meredith B. McGuire.: Health, Illness and the Social Body. (A Critical Sociology.) Prentice Hall, Upper Saddle River, New Jersey.
- 3 Conrad Fischer-Caterina Oneto (2009): USMLE Medical Ethics: The 100 cases you are most likely to see on the exam (Second edition) New York: Kaplan Publishing ISBN: 9781419553141
- 4 Mumenthaler: Neurology. Georg Thieme Verlag 1990. ISBN 3 13 523 909 3
- 5 Kaplan & Sadock's Synopsis of Psychiatry. Tenth Edition. Eds: B.J. Sadock V.A. Sadock, Lippincott Williams, 2007
- 6 Fuller G.: Neurological Examination Made Easy. 3rd ed. Churchill Livingstone. 2004. ISBN 0 443 07420 8
- 7 Rajna Péter: Ideg- és elmegyógyászati szakkifejezések
- 8 Hoag, Pawlak: Essentials of Periodontics. Mosby. ISBN 80162228x.
- 9 Goaz, White: Oral Radiology. Mosby. ISBN 801618738.
- 10 T.G. Wilson-K.S. Kornman: Fundamentals of Periodontics Quintessence. 1996. ISBN 0-86715-303-2
- 11 The Washington Manual of Surgery. 3rd ed. 2002. Lippincott Williams & Wilkins. ISBN 0-7817-3389-8
- 12 Worthington-Lang-LaVelle: Osseointegration in Dentistry. An Introduction. Quintessence, Chicago, 1994.
- 13 Sethi, A.-Kaus, Th: Practical implant dentistry. Quintessence, London, 2013.
- 14 Bricker, S.L.-Langlais, R.P.-Miller, C: Oral Diagnosis, Oral Medicine and Treatment planning. 2nd ed. 2002. B.C. Decker Inc. Hamilton London
- 15 Essentials of Kumar and Clark's Clinical Medicine, Ed. Zammit, Sandilars. Elsevier, 7th ed., 2021. ISBN: 978070208280116
- 16 The New Public Health: An Introduction for the 21st Century. By: T. Tulchinsky, E.A. Varavikova. 2000. ISBN 0-12-703350-5
- 17 The New Public Health: An Introduction for the 21st Century. By: T. Tulchinsky, E.A. Varavikova. 2000. ISBN 0-12-703350-5
- 17 Gerry Humphris, Margaret S. Ling: Behavioural Sciences for Dentistry. Churchill Livingstone, London, 2005
- Handouts for the lectures in Dentsoc will be accessible on the homepage of the Institute of behavioural Sciences: www.magtud.sote.hu.
- 18 McCracken's Removable Partial Prosthodontics (10/e) Glen P. McGivney-Alan B. Carr. Hardback, Mosby, 1999. ISBN 0323006787
- 19 Schillingburg et al.: Fundamentals of Fixed Prosthodontics. Quintessence 4th ed. 2012. ISBN 93 13 86 500
- 20 R.M. Basker-J.C. Davenport: Prosthetic Treatment of the Edentulous Patient. 5th ed. McMillan Press Ltd. ISBN 978-1405192613
- 21 Mohl, Zarb, Carlsson, Rugh. A Textbook of Occlusion. Quintessence. Chicago, 1988.
- 22 McNeill: Science and Practice of Occlusion. Quintessence. Chicago, 1997.
- 23 Niklaus P. Lang, Jan Lindhe (ed.): Clinical Periodontology and Implant Dentistry (Wiley Blackwell, 2015)
- 24 Proffit WR, Fields Jr HW, Sarver DM: Contemporary Orthodontics 5th Edition, 2012; Elsevier Saunders, ISBN: 978032083171
- 25 Casamassimo PS, Fields HW, McTigue DJ, Nowak AJ: Pediatric Dentistry, Infancy through Adolescence 5th Edition, 2012, Elsevier Saunders, ISBN: 9780323085465.
- 26 Sethi A., Kaus Th. Practical Implant Dentistry: The Science and Art, Second Edition Quintessence, London 2013

Recommended textbooks:

- 1 Bengel, Veltman, Loevy, Taschini: Differential Diagnosis of Diseases of the Oral Mucosa. Quintessence Publishing Co. Inc. Chicago, Illinois 1989.
- 2 Manfred Strassburg/Gerdt Knolle: Diseases of the Oral Mucosa A Color Atlas 2nd ed. Quintessence Publ. Co. Inc. Carol Stream Illinois 1994.
- 3 Coleman, G.C.-Nelson, J.F.: Principles of Oral Diagnosis. Mosby-Year Book, Inc. St. Louis, Missouri, USA 1993. "hand-outs" will be prepared and presented for the students by the lecturers
- 4 Forrai J.-Ballér P.: Chrestomathy on the History of Medicine. Bp. SOTE. 1992.
- 5 Behavioral dentistry. Mostofsky DI, Forgione AG, Giddon DB (eds.), Blackwell Munksgaard, 2006.
- 6 Behavior & Medicine. 4th Edition, Danny Wedding, Hogrefe & Huber Publishers, Seattle, 2006.
- 7 Fadem B: Behavioral Science, Lippincott Williams & Wilkins, 5th ed., 2008.
- 8 Sarafino E.P.: Health Psychology. Biopsychosocial interactions. 6th ed., New York, Wiley, 2008.
- 9 Kopp M. - Skrabski Á.: Behavioral Sciences Applied in a Changing Society, Corvina, 1996.
- 10 Alan Stoudemire: Human Behaviour: An Introduction for Medical Students. Lippincott Company, 1994. ISBN 0-397-51337-2.
- 11 Gatchel R.J., Baum A., Krantz D.S.: An Introduction of Health Psychology. McGraw-Hill 1989. ISBN 0-07-100729-6
- 12 Principles of Oral Diagnosis. Ed.: Coleman, G.C.-Nelson, J.F. Mosby-Year Book, Inc. St. Louis, Missouri. 1993. ISBN 0-8016-1005-2
- 13 Rose, L.F.-Kaye, D.: Internal Medicine for Dentistry. 2nd ed. Mosby. 1990.
- 14 Surgery – Basic Science and Clinical Evidence. Ed. Norton, J.A. 1st ed. 2000. Springer. ISBN 0-387-9844-X
- 15 Baehr, M.M.D.-Frotscher, M.M.D.: Duus's Topical Diagnosis in Neurology: Anatomy, Physiology, Signs, Symptoms. Thieme. Medical Publ. 2005. ISBN 3136128044
- 16 Lindsay K.-Bone I.-Callender R.: Neurology and Neurosurgery. Illustrated. 4th ed. Churchill Livingstone, 2004. ISBN 0443070563
- 17 Szirmai I.-Kamondi A.-Arányi Zs.-Kovács T: Neurological examination. Bp. Semmelweis Publ. 2006. ISBN 963 9656062
- 18 J. Okeson: Management of Temporomandibular Disorders and Occlusion, 7th ed. 2012, Mosby
- 19 Neil-Walter: Partial Dentures. ISBN 06 32 08 025 8, 1984.
- 20 Neil-Nairne: Complete Denture Prosthetics. Wright. ISBN 72 36 20 636
- 21 Ward Booth, Hausamen, Schendel: Maxillofacial Surgery, C. Livingston Elsevier, 2007
- 22 DDS, MS, PhD Radi Masri, DMD Carl F. Driscoll (szerk.): Clinical Applications of Digital Dental Technology (2015 John Wiley & Sons Inc, Print ISBN: 9781118655795 | Online ISBN: 9781119045564)
23. Alessandro Agnini, Andrea Agnini, Christian Coachman (szerk.): Digital Dental Revolution – The Learning Curve (Quintessence Publishing, Italy, 2015, ISBN 978-88-7492-017-4)
24. Hermann Péter, Szentpétery András: Gnatológia (Semmelweis Kiadó, 2018)

First Semester

Bioethics

Course Syllabus.

Institute of Behavioral Sciences

Course Director: Prof. Dr. József Kovács

(28 hours)

Course objectives:

- a. To enable students to recognize ethical issues when encountered in everyday clinical practice and research
- b. To provide students with a conceptual-logical system, which helps them to address ethical questions and to resolve ethical dilemmas in an efficient way
- c. To introduce students to a body of knowledge, which helps them to understand, respect and protect the rights of patient research subjects and fellow health care professionals
- d. To help the would be health care professional to understand the responsibility of the individual, of the health care system and of the society as a whole in maintaining health

Lectures

1. week

Basic concepts of ethics.

Descriptive ethics, normative ethics, metaethics.
General ethics and applied ethics.
Bioethics, medical ethics, health care ethics. Similarities and differences.
The role of bioethics in a pluralistic society.
The relationship between law and ethics.
Reasoning in ethics. The most common mistakes.

2. week

Normative theories of ethics.

Deontological theories of ethics. (The Golden Rule, Kant and the categorical imperative, the principle of double effect, W.D. Ross and the prima facie duties.)
Teleological theories of ethics. (Act and rule utilitarianism.)
Theories of natural law.
Contractarian theories of ethics. (The theory of justice of John Rawls)

3. week

The basic principles of dental ethics.

The principle of respect for autonomy.
The principle of non-maleficence.
The principle of beneficence.
The principle of justice.
Arguments against „principalism”.

4. week

The concept of health and disease.

Naturalistic definitions of health.
The medical model of defining health.
Normativist definitions of health.
Some questions of psychiatric ethics.

5. week

Informed consent.

Simple consent and paternalism in medicine.
The emergence of the doctrine of informed consent.
Standards for information disclosure for patients.
When is informed consent not necessary?
Standards of competence and incompetence.
The right to refuse medical treatment.
Some psychological and communicational aspects of informed consent.

6. week

Information disclosure to terminally ill patients. Telling the truth to patients.

The history of information disclosure to terminally ill patients.
Pros and cons for lying to terminally ill patients.
The weaknesses of the arguments in favour of lying.
The dying process according to E. Kübler-Ross.
How to communicate the bad news to terminally ill patients.
The physician's relationship with the relatives of the deceased patient.

7. week

Justice in Health Care I. Ethical questions of macroallocation.

Higher and lower level macroallocational problems.
The role of personal responsibility in maintaining health.
The principles and practice of rationing in contemporary health care systems. (Soft and hard rationing.)
Medical ethics and medical economics. Ethical questions of cost-benefit and cost effectiveness analysis. The QALY.
The problem of right to health care. (The libertarian, the liberal and the socialist views about the right to health care.)
The role of the market and that of the state in the health care system.
Ethical problems of financing health care. (Fee-for-service, capitation, fixed salary, DRG-system, etc.)
Setting health care priorities in Oregon.
Attempts to define a just health care system.

8. week

Ethical questions of reproductive medicine.

Abortion.
Artificial insemination from donor.
In vitro fertilization, surrogate motherhood.
Ethical questions of genetic counseling.
Ethical questions of embryo experimentation.

9. week

Justice in Health Care II. Ethical questions of microallocation. Moral dilemmas in the allocation of scarce medical resources.

The concept of microallocation.
Ethical analysis of various selection criteria. (Medical benefit, psychological ability, supportive environment, social value criterion, resources required criterion, age, ability to pay, random selection, personal responsibility for the illness, etc.)

10. week

Ethical questions of animal experimentation.

History of the thinking about the moral status of animals.
The philosophical significance of the Darwinian conception of nature.
The views of Peter Singer: antispeciesism.
The views of Tom Regan: animal rights.
Ethical questions of experimentation on animals on the basis of a moderate animal protectionist's view.
Critical anthropomorphism.
Alternatives to animal experimentation.

11. week

Euthanasia and the withholding of life-sustaining treatment

Definitions.
The sanctity of life versus the quality of life doctrine.
Is there any difference between active and passive euthanasia?
The practice of active euthanasia in the Netherlands. The Remmelink Report.
Refusal of life sustaining treatment by competent and incompetent patients.
Possibilities to extend the autonomy of patients: living will, durable power of attorney, substituted judgement, etc.
The concept of medically futile treatment.
Ethical problems of the treatment of handicapped newborns. (The debate about the treatment of spina bifida babies, the Baby Doe case, the legal situation, etc.)

12. week

Ethical questions of human experimentation.

Possible forms of experimentation on humans.
Contradiction between the two roles of the physician. (Healer and scientist.)
The ethics of Randomized Controlled Clinical Trials. (RCT)
Randomization and prerandomization.

Course Faculty:

Prof. József Kovács, MD, PhD, (Head of the Department of Bioethics),
210-2930/56350;
e-mail: kovjozs@net.sote.hu
Ágnes Dósa, MD, JD, PhD e-mail: dosaagi@yahoo.com
Imre Szabik, MD, PhD e-mail: szabimre@net.sote.hu
Jeno Lorincz, MD, JD e-mail: lorjen@net.sote.hu

List of questions

1. Deontological theories of ethics.
2. Utilitarian theories of ethics.
3. The principles of dental ethics
4. Justice and dental ethics: the allocation of scarce medical resources.
5. Paternalism in dental practice
6. Informed consent
7. Information disclosure for terminally ill patients
8. Advance Directives
9. Experimentation on human subjects
10. Objection to Transplantation of Organs and Counterarguments
11. Ethical problems of live organ donation
12. Organ donation from brain-dead donors: the system of donor cards.
13. Organ donation from brain-dead donors: presumed consent
14. Active and Passive Euthanasia
15. Withdrawing and withholding life sustaining treatment.
16. Models of the dentist-patient relationship
17. Ethical issues related to treating patients with partially compromised capacity

13. week

Ethical questions of organ- and tissue transplantation.

Some problems of justice concerning kidney transplantation and chronic haemodialysis.
Ethical questions of transplantation from living kidney donors.
The concept of death.
Ethical questions of organ harvesting from the dead.
The debate about the market of organs.
Ethical questions of using embryo- or foetal tissue in human therapy.
Ethical problems of using anencephal newborns as organ donors.

14. week

The rights of patients.

The role of patient's rights in the transformation of the paternalistic physician-patient relationship.
Moral versus legal rights.
A list of basic rights of patients.
Mechanisms to ensure the realizations of patient's rights. (Patient's rights advocates, ombudsman, hospital ethics committees, institutional review boards, arbitration, etc.)

Department:

Institute of Behavioral Sciences

Department of Bioethics

NET Building, 19th, 20th floor
1089. Budapest, Nagyvárad tér 4.
Tel: 210-2953
Secretary: NET Building, 20th floor, Room-2005

18. Professional norms and bad outcomes
19. Ethical questions raised by HIV and AIDS in dental practice
20. Confidentiality issues in dental practice
21. Moral issues related to the HIV positive dentist
22. Possible criteria for distributing the society's resources
23. Social justice – the free market view of justice
24. Ethical issues in advertising dental services
25. Professional obligations in dentistry

Textbook:

Conrad Fischer—Caterina Oneto (2016): Medical Ethics for the Boards. (Third edition) New York: McGraw-Hill Education.
ISBN: 978-1-259-64121-3
MHID 1-25-964121-X

Important:

To participate on at least 75% of the total number of lessons is a prerequisite of getting the signature. Doctor's certificate is required to justify absence from the lessons and the exam.
Sign up for the exam: through the Neptun system.

EMERGENCY DENTISTRY I-II.

Department of Community Dentistry

Head of department and lecturer: Dr. Orsolya Németh

The purpose of this subject is for dental students to recognize and cope with possible daily emergency cases in a dental practice. In the 21st century dental emergency does not mean only extractions. It also includes Conservative Dentistry, Prosthetics, Pedodontics, Orthodontics, as well as Periodontal aspects. In the first three weeks of the semester, we define Emergency care in three lectures. At the seminars in smaller groups, the theoretical background of the practices is presented through case reports. The formation of the groups in the practices enables the "shadowing" system, where a maximum of two students work next to one supervisor. The curriculum of Emergency Dentistry is an integral part of the other subjects, but it is necessary to teach this special field of dentistry separately. The Department of Public Dental Health is responsible for all Budapest and Pest region dental care and, therefore, can provide a sufficient number of patients for practical education.

First Semester: Emergency Dentistry I.

Lecture: 1-3. weeks of the semester (1 lecture/week)

Seminar: 4-14. weeks of the semester (1 seminar/week)

Practice: 1,5 hours/week

Lecture topics:

1. Emergency dentistry at the Department of Public Dental Health
2. Economic background of Emergency dentistry and the CDO system
3. Legal background of Emergency dentistry

Seminars topics:

1. Topic - Treatment of odontogenic inflammations, traumas:
 - a. Pedodontic aspects of Emergency dentistry
 - b. Endodontic aspects of Emergency dentistry
 - c. Oral surgical aspects of Emergency dentistry
 - d. First aid and dental emergency care
2. Topic - Treatment of oral mucosal lesions and periodontal diseases:
 - a. Periodontal aspects of Emergency dentistry
 - b. Oral medicine in Emergency dentistry
 - c. Special needs patients in Emergency dentistry
3. Topic - Options for emergency care when wearing removable and fixed dentures and orthodontic appliances:
 - a. Orthodontic aspects of Emergency dentistry
 - b. Prosthodontic aspects of Emergency dentistry
 - c. Aesthetic aspects of Emergency dentistry

Second Semester: Emergency Dentistry II.

Practice: 1,5 hours/week (Only practice)

Lectures: -

Seminars: -

During the second semester, there are practices at the Emergency Department of the Department of Public Dental Health. Students will experience a wide range of dental emergencies, from dental inflammatory disorders to injured patients or paediatric acute dental conditions. The student will be able to diagnose emergency conditions and begin appropriate treatment.

GENERAL AND DENTAL RADIOLOGY I.

Department of Oral Diagnostics

Address: Bp. VIII., Szentkirályi u. 47. 1088

Phone: 459-1500/59161, 317-1044

Lecturer: Prof. Dr. Csaba Dobó Nagy

E-mail: oralis.diagnosztika@dent.semmelweis-univ.hu

First Semester

Lectures (1 hour per week)

1. Normal anatomy of the teeth
2. Normal anatomy of the jaws, development of the teeth
3. Interpretation of radiographs
4. Caries, pulp cavity; Extraction of the teeth
5. Periapical lesions; Root canal filling
6. Periodontal disease
7. Cysts of the jaws; Resorption of the teeth
8. Hypercementosis, tumors, anomalies
9. Extraoral techniques
10. Panoramic radiography
11. Cone-beam CT
12. Digital imaging systems
13. Imaging of the temporomandibular joint
14. Paranasal sinuses.

Practices (2 hour per week)

1. Tooth anatomy
2. Anatomical landmarks. Part one
3. Anatomical landmarks. Part two
4. Caries
5. Development of the teeth, extraction
6. Periapical lesions
7. Periodontal disease
8. Cysts
9. Hypercementosis, tumors, resection
10. Anomalies, Midterm
11. Complex practice, selected X-ray images
12. Practicing bisecting technique
13. Practicing parallel technique
14. Analyzing the intraoral X-ray images of the exam

Note:

Students must attend on the practices.

The signature will be refused, if the student was absent in more than 25% of the duration of the practices.

Successful completion of the midterm („satisfactory” mark at least) and attendance on the practices according to the Study and Examination Policy.

GENERAL AND DENTAL RADIOLOGY II.

Department of Oral Diagnostics

Address: Bp. VIII., Szentkirályi u. 47. 1088

Phone: 459-1500/59161, 317-1044

Lecturer: Prof. Dr. Csaba Dobó Nagy

E-mail: oralis.diagnosztika@dent.semmelweis-univ.hu

Second Semester

Practices (1 hour per week)

1. Panoramic anatomy of hard and soft tissues I.
2. Panoramic anatomy of hard and soft tissues II.
3. Interpretation of panoramic imaging, errors on panoramic radiographs.
4. Anomalies and developmental disorders
5. Periapical lesions and periodontal diseases 1. Midterm
6. Odontogenic and non-odontogenic cysts

7. Dysplasia, hypercementosis, regressive alterations of teeth 2. Midterm
8. Tumors
9. TMJ pathology
10. Pathologic disorders of paranasal sinuses
11. Fractures in the dentomaxillofacial region 3. Midterm
12. Radiologic signs of certain treatments
13. Incidental findings on panoramic X-ray images
14. Analyzing the X-ray images of the final exam

Note:

Students must attend on the practices.

The signature will be refused, if the student was absent in more than 25% of the duration of the practices.

Successful completion of the midterm („satisfactory” mark at least) and attendance on the practices according to the Study and Examination Policy.

Final exam

GNATHOLOGY

Department of Prosthodontics

Lecturer: Prof. Dr. Péter Hermann

First Semester

Lecture (1 hour/week)

Practice (2 hours/week)

The theme of the seminars:

1. Introduction to the subject, introductory seminar
2. Online moodle learning module: Introduction into the Anatomy and Physiology of the Stomatognathic System. Mandibular Positions: Rest Position, ICP, CR, CO
3. Seminar material which requires personal attendance: Introduction into the Anatomy and Physiology of the Stomatognathic System. Mandibular Positions: Rest Position, ICP, CR, CO
4. Online moodle learning module: Mandibular Movements: Rotation and Translation Opening and Closing, Protrusion-retrusion, Excentric Movements and Border Movements
5. Seminar material which requires personal attendance: Mandibular Movements: Rotation and Translation Opening and Closing, Protrusion-retrusion, Excentric Movements and Border Movements
6. Online moodle learning module: Simple Hinge, Average Value Articulators, Fully Adjustable Articulators Mounting with the Bonwill Triangle. Individual mounting, the Use of Face-bow.
7. Seminar material which requires personal attendance: Simple Hinge, Average Value Articulators, Fully Adjustable Articulators Mounting with the Bonwill Triangle. Individual mounting, the Use of Face-bow.
8. Online moodle learning module: Registration of Maxillomandibular relationships
9. Seminar material which requires personal attendance: Registration of Maxillomandibular relationships
10. Online moodle learning module: Adjustment of the Articulator
11. Seminar material which requires personal attendance: Adjustment of the Articulator
12. Online moodle learning module: Gnatological Aspects in the Manufacturing of Prosthetic Appliances. Axiography, Digital Analysis of Movements and the Arcus Digma System. Temporomandibular dysfunction, orofacial pain
13. Seminar material which requires personal attendance: Gnatological Aspects in the Manufacturing of Prosthetic Appliances. Axiography, Digital Analysis of Movements and the Arcus Digma System. Temporomandibular dysfunction, orofacial pain
14. Consultation

INTERNAL MEDICINE I.

Department of Internal Medicine and Oncology, 2/a Korányi S. u., Budapest, H-1083

Course director: prof. István Takács

Course coordinator: dr. Péter Studinger

Credits: 3

Lectures: 1 hour / week

Practices: 2 hours / week

Exam: No formal exam, signature and evaluation based on activity during practices: excellent (kiválóan megfelelt), pass (megfelelt) or fail (nem felelt meg).

Objective of the course: Primary objective of the course is to have the student to acquire the basic skills of obtaining a proper medical history, learn the bases of physical examination and other methods of patient evaluation, establishing diagnosis and treatment plan. Diseases of the endocrine, gastrointestinal and urogenital system will be reviewed, with special emphasis on their dental significance.

Lectures:

1. Medical patient interview, comprehensive health history, techniques of physical examination. Alterations of the skin.
2. Assessment of vital signs. Role of physical examination in emergency situations. Examination of a patient in shock, sudden dyspnea.
3. Examination of the chest, common abnormal findings.
4. Examination of the abdomen, common abnormal findings.
5. Diagnosis treatment of thyroid diseases and their relevance to dentistry.
6. Types, diagnosis and treatment of diabetes mellitus, relevance to dentistry.
7. Diseases of the calcium metabolism, diseases with altered bone composition.
8. Diseases of the upper gastrointestinal tract, malabsorption and their relevance to dentistry.
9. Diseases of the lower gastrointestinal tract, gastrointestinal neoplasms.
10. Diseases of the liver and biliary tract, their relation to dental diseases.
11. Acute diseases of the urogenital system, electrolyte disturbances.
12. Causes and management of chronic kidney disease.
13. Causes of hypertension, treatment options. Management of hypertensive emergency.
14. Diagnosis and management of the most common intoxications.

INTERNAL MEDICINE II.

1st Department of Internal Medicine

First Semester

Lectures (2 hours per week) **Practices** (1 hour per week)

1. Immunologic principles. Lymphocytic system.
2. Immunoglobulins. Types of immunologic reactions.
3. Polycythemia. Agranulocytosis. The leukemias.
4. Hodgkin's disease and non-Hodgkin's lymphoma.
5. Introduction to anemia and approach to patients with anemia. Iron deficiency anemia. Megaloblastic anemia. Aplastic anemia.
6. Hemolytic anemias.
7. Plasma cell disorders. Multiple myeloma.
8. Waldenström's macroglobulinemia.
9. Heavy-chain disease. Amyloidosis.
10. Hemostatic disorders. Thrombocytopenia.
11. Thrombocytosis. Vascular purpuras. Disorders of the coagulation mechanism.
12. Autoimmunity. Systemic lupus erythematosus.
13. Sjögren's syndrome.
14. Atopic diseases. Allergic rhinitis. Asthma of allergic etiology. Urticaria and angioedema. Serum sickness.
15. Drug allergy. Contact dermatitis.
16. Immunodeficiency diseases.
17. Rheumatoid arthritis. Juvenile rheumatoid arthritis.
18. Reiter's syndrome. Bechet's syndrome.
19. Systemic sclerosis. Polymyositis and dermatomyositis. Wegener's granulomatosis.
20. Hypothalamic and pituitary disorders. Hyperpituitary syndromes. Anterior pituitary insufficiency.
21. Diabetes insipidus. The adrenal cortex.
22. Cushing's syndrome. Addison's disease.
23. Diabetes mellitus. Diagnosis and classification of diabetes mellitus. Complication and treatment of diabetes mellitus. Gout.
24. Diabetes mellitus. Diagnosis and classification of diabetes mellitus. Complication and treatment of diabetes mellitus. Gout.
25. The thyroid gland. Hypothyroidism. Hyperthyroidism.
26. Thyroiditis. Hypoparathyroidism. Hyperparathyroidism.
27. Viral diseases. Herpes simplex. Varicella-zoster virus.
28. Cytomegalovirus. Epstein-Barr virus. Influenza. AIDS.
29. Bacterial disorders. Tuberculosis. Diseases caused by fungi. Salmonellosis. Shigellosis.

Note:

The maximum number of absences in a semester is 3
More than 3 absences invalidate the semester examination

The Medical Basis of Disaster Management III.-IV.

Semmelweis University, Faculty of Dentistry – single, long-cycle medical training programme

Name of the host institution (and any contributing institutions):
Department of Military-, Disaster- and Order Enforcement Medicine

Name of the subject: A katasztrófa-felszámolás egészségügyi alapjai

in English: The Medical Basis of Disaster Management

in German: Medizin Grundlagen der Beseitigung von Katastrophen

Credit value: 0 credit

Semester: VII. – VIII.

Total number of classes per week: lectures: 2×45'

practical lessons: –

seminars: –

Type of subject: obligatory / optional elective

Academic year: 2024/2025.

Language of instruction, for optional or elective subjects: english

Course code: FOKOHKTI60

Course coordinator: Dr. János Gál, university professor

Place of work, phone number: HKROT; +36 (20) 825 90 60

Position: department director

Date and number of habilitation: 2007.01.30. (1/2007/habil)

Objectives of the course and its place in the medical curriculum:

The primary aim of the subject is to provide basic level knowledge regarding civilian and disaster protection and resolution as they relate to medical students, healthcare, and citizens. Its objective is to empower students to creatively use their hereby gained knowledge and skills to recognize, and to participate in the resolution of emergency situations, disaster alerts and disaster resolving procedures in both their professional careers and their personal lives.

It also provides opportunities for various levels of specialization in the education and practice of potentially required medical duties in the prevention and resolution of disasters.

Place of instruction (address of lecture hall or seminar room etc.):

Nagyvárad téri Elméleti Tömb – Issekutz Béla or Selye János lecture hall Budapest, Nagyvárad tér 4, 1089

Competencies acquired through the completion of the course:

The student is able to determine the requirements of health care according to the operation and the health situation of the emergency normal system, to get to know the procedures, the health and safety administration in these situations and the tasks arising at the different levels of the care system.

Prerequisites for course registration and completion:

Completing modules 1 and 2 are necessary for module 3 application. Participating in module 4 requires the completion of modules 1, 2 and 3. Application for the course must be done in accordance to corresponding regulations. Due to consisting of two 45-minute sessions per module, in the case of absence the completion of the course can only be credited to the student following attendance of a posterior lecture, or with the specific permission of the dean to take a test and successfully pass the exercise. Without either of these options being met, the course will be considered failed and no signature will be given. **For transferred students however, the following may be applied: In the first uneven semester it is permitted to apply for the uneven modules (I and III), and in the first even semester it is permitted to apply for even modules (II, IV).**

Conditions for concurrent course registration and permission thereof in the case of a multi-semester subject: –

Student headcount conditions for starting the course (minimum, maximum) and method of student selection:

maximum 250 student/course

Detailed course description:

7th semester: 2 lectures: (3M) Subject and objectives of Disaster Medicine. Medical trade-offs: Possible solutions to the disproportionalities between the capacity of the providing service and patients requiring treatment.(Dr. László Liptay)

8th semester: 2 lectures: (4M) The importance of preventive medicine in disaster situations. Application of preventive medicine methods in disaster circumstances. Implementation of medical compromise principles during disasters. Surgical principals and their application during disaster situations. The principles of medical attendance during disasters.
(Dr. Levente Várhelyi Ph.D.)

Related subjects due to interdisciplinary fields (both obligatory and elective) and potential overlaps between subjects: -

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:

Accepted forms of certification: medical, formal – judicial, governmental, workplace, student governmental, etc.

Form of assessment in the study period: signature.

Number and type of assignments for individual work and the deadline for submission: none.

Requirements to obtain the teacher's signature:

Students are required to attend the seminars to gain complete the course and they must leave their own handwritten signature. Absence for acceptable reasons can be redeemed by participating on a posterior lecture or the successful completion of a test exercise following the permission of the dean. Only students who have initially applied for the course can participate on the posterior lecture. **Previously completed modules may be accepted in a separate procedure, subject to permission and approval.**

Type of assessment: (comprehensive examination, end-term examination, term-grade, term-grade on a three-grade rating scale, coursework project, no examination)

Examination requirements: none, only the participation requirement on the course is to be met.

Method and type of grading: signature

List of course books, textbooks, study aids and literature facilitating the acquisition of knowledge to complete the course and included in the assessment, precisely indicating which requirement each item is related to (e.g., topic by topic) as well as a list of important technical and other applicable study aids:

Dr. György Orgován Ph.D., Dr. László Liptay, Dr. László Major Ph.D.: *Medical aspects of disaster preparedness and response*
Signature of habilitated instructor (course coordinator) announcing the course:

Signature of the director of the host institution:

Date of submission:

ORAL AND MAXILLOFACIAL SURGERY II.

Department of Oro-Maxillofacial Surgery and Stomatology

Tutor: Dr. Kinga Körmöczy

First Semester

Lectures (1 hour per week)

- Odontogenic inflammation I. Pathology, pathophysiology, and microbiology of pyogenic inflammation. Work safety protection training.
- Odontogenic inflammation II. Clinical features, diagnosis, therapy. The question of dental foci.
- Odontogenic inflammation III. Maxillofacial inflammation.
- Odontogenic cysts I. Clinical classification of odontogenic cysts, the pathomechanism of their formation. Diagnosis, differential diagnosis.
- Odontogenic cysts II. The surgery of odontogenic cysts. Cystectomy, cystostomy, decompression methods.
- Non-odontogenic cysts. Developmental cysts. Pseudocysts. Soft tissue cysts.
- Endodontic surgery. Indications and operative technique of apicectomy. Retrograde root filling. The hemisection of teeth.
- Written midterm.
- The surgery of impacted teeth I. Disorders of the eruption of third molars. Clinical aspects of the prognosis of third molars. Diagnostics of mandibular third molars.

- The surgery of impacted teeth II. Surgical technique of the removal of mandibular third molars. Post-operative follow-up treatment of mandibular third molars, complications of their removal. Clinical features of maxillary third molars.
- The surgery of impacted teeth III. Disorders of the eruption of upper canines. Prognosis, diagnosis and surgical treatment. Clinical features of other impacted and supernumerary teeth.
- Special needs dentistry.
- Emergency medicine in dental surgery. Emergencies in the dental practice. Management of "high risk" patients.

Practices (3 hours per week) Practising minor oral surgery

Note:

The maximum number of absences in a semester is 3. More than 3 absences invalidate the semester. During the semester three midterm examinations should be passed.

Recommended literature:

1. Michael Miloro, G. E. Ghali, Peter E. Larsen, Peter Waite, Peterson's Principles of Oral and Maxillofacial Surgery, Springer, 2022
2. James R. Hupp, Myron R. Tucker, Ellis, Edward, III, DDS, MS, Contemporary Oral and Maxillofacial Surgery, Elsevier Books, 2018
3. Peter A. Brennan (Author), Henning Prof Dr Schliephake (Author), G.E. Dr. Ghali DDS MD FACS (Author), Maxillofacial Surgery, 3rd Edition, Churchill Livingstone 2017

ORAL AND MAXILLOFACIAL SURGERY III.

Department of Oro-Maxillofacial Surgery and Stomatology

Second Semester

Lectures (1 hour per week)

- Developmental anomalies I. Complex therapy of cleft lip and palate. Craniofacial malformations.
- Developmental anomalies II. Surgical management of dysgnathia.
- Preprosthetic surgery I. Basic principles.
- Preprosthetic surgery II. Edentulous jaws. Osteoplasty. Corrections of soft tissues.
- Salivary gland diseases. Diagnostics and therapy.
- Oral surgical aspects of maxillary sinus I. (pathology, diagnostics)
- Oral surgical aspects of maxillary sinus II. (sinus apertus)
- Dentoalveolar trauma. Injuries of neighbouring soft tissues, principles of management. Clinical aspects of tooth replantation: indication, technique, prognosis.
- Written midterm.
- Oral surgical aspects of antiresorptive therapy and irradiation.
- Diseases of the temporomandibular joint (diagnosis and management).

- Facial pain. The origin of different facial pain. Diagnosis and differential diagnosis of facial pain. Neuralgia.
- Laser surgery. Physical properties of laser. Laser devices. Possibilities of laser surgery.

Practices (3 hours per week)

Practising minor oral surgery

Note:

The maximum number of absences in a semester is 3. More than 3 absences invalidate the semester. During the semester three midterm examinations should be passed
Practical course grade

Recommended literature:

1. Michael Miloro, G. E. Ghali, Peter E. Larsen, Peter Waite, Peterson's Principles of Oral and Maxillofacial Surgery Springer, 2022
2. James R. Hupp, Myron R. Tucker, Ellis, Edward, III, DDS, MS, Contemporary Oral and Maxillofacial Surgery, Elsevier Books, 2018
3. Peter A. Brennan (Author), Henning Prof Dr Schliephake (Author), G.E. Dr. Ghali DDS MD FACS (Author), Maxillofacial Surgery, 3rd Edition, Churchill Livingstone 2017

PERIODONTOLOGY I-II.

Department of Periodontology

First Semester

Course Director: Prof. Dr. Péter Windisch

Lectures (1.5 hours per week)

Practices (0.5 hour per week)

Credit 2

Lectures:

- Introduction to Periodontology
- Etiology of periodontal disease
- Anatomy and morphogenesis of periodontal tissues
- Periodontal microbiology

Second Semester

Lectures (1 hour per week)

Practices (2 hours per week)

Seminars (1 hour per week)

Credit: 4

Lectures:

- Treatment of acute periodontal diseases
- The importance and steps of the periodontal cause related therapy
- Cause related therapy. Professional mechanical plaque control
- Elimination of plaque retentive factors
- Splinting techniques in periodontology
- Chemical plaque control and antibiotics
- General aspects of classifications. The new of classification of periodontal diseases

- Local factors, dental plaque, biofilm
- Periodontal epidemiology. Incides
- Pathomechanism of periodontal disease I. Immunological considerations
- Pathomechanism of periodontal disease II.
- Clinical and radiological diagnostics
- Individualised oral hygiene
- Local risk factors
- General risk factors
- Treatment phases of comprehensive periodontal treatment
- Written exam

Goal of practices: Students will practice on dental moulages the basic preiodontal diagnostical features as well the most common non-surgical periodontla therapies. The importnace of individual oral hygiene will be also highlighted.

- Classification of periodontal diseases I. Gingival diseases
- Classification of periodontal diseases II. Attachment apparatus
- Non-plaque related periodontal conditions. Gingival recession
- Differential diagnosis and therapy of endoperiodontal lesions
- Periodontal disease as a focal disease. Periodontal medicine + cardiovascular disease
- Reassessment of the initial phase. Periodontal maintenance

Goal of practices: Students will be able to diagnose the diseases of the gum and the attachment apparatus, diagnose the clinical manifestations of systemic diseases, provide oral prophylaxis, non surgical pocket therapy

Note:

The maximum number of absences in a semester is 3.

More than 3 absences invalidate the semester.

During the semester two midterm demonstrations should be passed.

PHARMACOLOGY I-II.

Department of Pharmacology and Pharmacotherapy

Obligatory

Credit: 4 (7th semester), 4 (8th semester)

Lecturer: Pál Riba, MD, PhD, Associate Professor

Pharmacology deals with the effects, mechanisms of actions, adverse effects, interactions and clinical administration of drugs used in the clinical practice as well as with their fate in the body. It also specifies the rules of prescription writing. It is based on and synthesizes the knowledge of basic, pre-clinical and clinical subjects such as physiology, biochemistry, oral pathology and internal medicine.

THEMATICS

First Semester

1st week

Lecture: Introduction to Pharmacology. (development, pharmacogenomics, basics of toxicology)
Practice: Pharmacodynamics I (drug receptors, receptor theories, drug-receptor **interactons**).

2nd week

Lecture: Basics of Pharmacokinetics (absorption, distribution, metabolism, excretion).
Practice: Pharmacodynamics II (quantal dose-response curves, therapeutic indices, tolerance, drug interactions).

3rd week

Lecture: Pharmacology of the cholinergic and adrenergic systems
Practice: Parasympathomimetics and parasympatholytics, centrally acting anticholinergic drugs

4th week

Lecture: Pharmacology of the skeletal muscles.
Practice: Sympathomimetics and sympatholytics

5th week

Lecture: Non-steroidal anti-inflammatory drugs (NSAIDs). Minor analgesics.
Practice: Drugs affecting uric acid metabolism. Drugs for headache syndromes. 1st midterm

6th week

Lecture: Drugs acting on opioid receptors
Practice: 1st midterm. The Summary of Product Characteristics

7th week

Lecture: Local anesthetics
Practice: Basic principles of prescription writing

8th week

Lecture: Antipsychotics
Practice: Sedative-hypnotics, anxiolytics

9th week

Lecture: Drugs acting on the extrapyramidal motoric system. Nootropic agents
Practice: Antidepressants, drugs against mania, mood stabilizers

10th week

Lecture: General anesthetics
Practice: Anticonvulsants (antiepileptics)

11th week

Lecture: Antiviral drugs
Practice: Cell wall synthesis inhibitor antibiotics. 2nd midterm

12th week

Lecture: Antifungal drugs. Antimycobacterial drugs.
Practice: Protein synthesis inhibitor antibiotics

13th week

Lecture: Anthelmintic and antiprotozoal agents. Antiparasitic drugs.
Practice: Inhibitors of nucleic acid synthesis and antibiotics with other mechanisms of action. Disinfectants, antiseptics.

14th week

Lecture: Biological Drugs. Orphan Drugs. Advanced Therapy Medicines
Practice: Nutrients, traditional plant medicines, vitamins, anorectic drugs.

2nd semester

1st week

Lecture: Anticoagulants, inhibitors of platelet aggregation
Practice: Fibrinolytics, drugs against bleeding, drugs acting on blood cell production.

2nd week

Lecture: **Drugs influencing cardiac electrophysiology**
Practice: Positive inotropic agents.

3rd week

Lecture: Diuretics, antidiuretics.
Practice: Drugs influencing blood pressure (sympatholytics, nitrates, Ca-channel blockers and other vasodilators. Pharmacology of RAAS.)

4th week

Lecture: Drugs acting on blood glucose control.
Practice: Drugs influencing the oxygen demand and oxygen supply of the heart. Drugs improving microcirculation.

5th week

Lecture: Drugs affecting lipid metabolism (1 study hour). Bronchodilators and drugs inhibiting the bronchial inflammatory processes (1 study hour).
Practice: Expectorants (secretomotorics, secretolytics, mucolytics), antitussive drugs. Histamine, antihistamines. Drugs acting on smooth muscles

6th week

Lecture: Corticosteroids and their antagonists. Drugs inhibiting steroid hormone synthesis
Practice: Pharmacology of pituitary hormones. Hypothalamic hormones, hormonanalogs and antagonists. Pharmacology of thyroid gland (thyroid hormones and antithyroid drugs). 3rd midterm

7th week

Lecture: Pharmacology of female sexual hormones. Contraceptive medications
Practice: Androgens, antiandrogens, anabolic steroids, drugs influencing sexual activity.

8th week

Lecture: Basics of toxicology
Practice: Drugs affecting bone mineral homeostasis.

9th week

Lecture: Drugs influencing gastric acid secretion, drugs protecting gastric mucosa
Practice: Appetizers, drugs promoting digestion, antiemetics, prokinetic agents. Laxatives, drugs against diarrhea. Pharmacology of liver and bile.

10th week

Lecture: Immunopharmacology (cytotoxic agents, inhibitors of intracellular signaling, cytokine and cytokine receptor inhibitors)
Practice: Cytotoxic anticancer drugs.

11th week

Lecture: Small molecule signal transmission inhibitor anticancer drugs. Anticancer drugs with hormonal mechanisms

Practice: Toxicology I. 4th midterm

12th week

Lecture: Anticancer antibodies. Immunostimulant anticancer agents.

Practice: Toxicology II.

13th week

Lecture: Pharmacodynamic and pharmacokinetic basics of drug interactions

Practice: Drugs and pregnancy Toxicology exam

14th week

Lecture: Pharmacogenomics, personalized medicine, drugs for orphan disease. Special aspects of pharmacology in children and elderly

Practice: Contrast agents. Consultation

Prescription writing continuously during the whole semester.

Maximum number of absences is 25 percent of the number of practices in the semester. In the case of absence, the student can attend another class the same week.

During the first semester, two obligatory midterm tests will be organized in weeks 6 and 11. These can be made up in weeks 7 and 12. Improvement attempt of the midterm tests (both) will be possible in week 13.

The course material for the first midterm test (study material from week 1 to 5): General Pharmacology. Pharmacology of cholinergic and adrenergic transmission. Skeletal muscle relaxants.

Second midterm test (study material from week 6 to 10): NSAIDs, Opioids, Neuropsychopharmacology

The midterm tests will count towards the semester semifinal exam results:

1. **5% of the students in the top 5% of the whole year will be awarded an excellent mark (5) and 5% of the students in the second top 5% will be awarded a good mark, provided that they achieve at least 2x75% in the midterm tests. If the number of these students is less than 10% of the whole year, only they will be offered a mark, if more than 10%, the top 10% will be offered a mark.**
2. **If the student scores better than 60% in both midterm tests, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded.**

If the student fails both midterm tests (even at the time of a retake), or fails to achieve 33% in either midterm test with a correction, the student will receive a grade penalty on the semifinal exam.

During the first semester, two obligatory midterm tests will be organized in weeks 6 and 11. These can be made up in weeks 7 and 12. Improvement attempt of the midterm tests (both) will be possible in week 13. The correction may only be a verbal demonstration. The first semester midterms cannot be improved in the second semester.

The course material for the first midterm test (study material from week 1 to 4): General Pharmacology (Pharmacodynamics, Pharmacokinetics). Pharmacology of cholinergic and adrenergic transmission. Skeletal muscle relaxants.

Second midterm test (study material from week 5 to 10): NSAIDs, Drugs affecting uric acid metabolism, Drugs affecting headaches, Local anaesthetics, Opioids, Neuropsychopharmacology (Prescribing and the Summary of Product Characteristics are not included in the midterm test.)

The midterm tests will count towards the semester semifinal exam results:

3. **10% of the students in the top of the whole year will be awarded an excellent mark (5) and further 10% of the students in the second top 10% will be awarded a good mark, provided that they achieve at least 2x75% in the midterm tests. If the number of these students is less than 20% of the whole year, only they will be offered a mark, if more than 20%, the top 10% will be offered a mark. Only the results of the first attempts count towards the offered semifinal mark, not the improved midterms.**
4. **If the student scores better than 60% in both midterm tests, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded. There is no exemption from the Core Concept topics.**
5. **If the student fails both midterm tests (even at the time of a retake), or fails to achieve 33% in either midterm test with a correction, the student will receive a grade penalty on the semifinal exam.**
6. **In the case of a repeated exam after a failure, the negative and, in the case of an improvement exam, both the positive and the negative modifications are cancelled.**

During the second semester, two obligatory midterm tests will be organized in weeks 6 and 11. These can be made up in weeks 7 and 12. Improvement attempt of the midterm tests (both) will be possible in week 13. The correction may only be a verbal demonstration. The first semester midterms cannot be improved in the second semester. The course material for the third midterm test (study material from week 1 to 4 and the half of the 5th week lecture): Pharmacology of the cardiovascular system. Drugs acting on lipid metabolism. Drug acting on blood glucose level.

Fourth midterm test (seminar topics of the 5th week, half of the 5th week lecture and study material from week 6 to 10): Endocrine pharmacology. Pharmacology of the respiratory system. Pharmacology of the gastrointestinal system. Histamine and antihistamines. Drugs acting on smooth muscles. Immunopharmacology.

The midterm tests will count towards the final exam results:

7. **If the student scores better than 60% in all four midterm tests during the whole year, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded. There is no exemption from the Core Concept topics.**
8. **If the student achieves at least 80% score of all four midterm tests one final exam topic will be waived as well as the drug recognition question. The waived topic will be chosen by the examiner.**
9. **At the competition at the end of the year, the student who has at least one midterm of 80% and none of his/her demonstrations is worse than 33%, depending on the result of the competition, will be rewarded: between scores 90-100% the students will choose one of the three topics, between 80-89% the students will choose which one he/she will drop, between 70-79% the examiner will choose one topic to be dropped. The drug recognition question will be waived.**
10. **If the student fails both midterm tests of the second semester (even at the time of a retake), or fails to achieve 33% in either midterm test with a correction, the student will receive a grade penalty on the final exam.**
11. **In the case of a repeated exam after a failure, the negative and, in the case of an improvement exam, both the positive and the negative modifications are cancelled. The first semester midterms, if their results were worse than 30%, will not be counted for the final exam.**

EXAM:

Examination (7th semester):

In the oral semifinal exam, at first 5 active substances selected from the obligatory list of active substances must be identified and their mechanism of action explained. If the student does not recognize at least 3 of the active substances, he/she will not be allowed to continue and will receive a fail mark. After successful completion of one core-concept question and two topics of two lists of topics (one from each), an acceptable level of knowledge of pharmacology must be demonstrated. If the student fails at any parts of the exam, the evaluation (grade) of the whole exam is "failed".

Final exam (8th semester): To apply for the oral examination, the student must pass the toxicology exam before the examination period starts. The grade in the toxicology exam counts towards the final grade. In the oral final exam, at first 5 active substances selected from the obligatory list of active substances must be identified and their mechanism of action explained. If the student does not recognize at least 3 of the active substances, he/she will not be allowed to continue and will receive a fail mark. After successful completion of one core-concept question and three topics of three lists of topics (one from each), an acceptable level of knowledge of pharmacology must be demonstrated.

If the student fails at any parts of the exam, the evaluation (grade) of the whole exam is "failed".

Registration:

In the NEPTUN system.

Modifying:

In the NEPTUN system, according to the Examination and Studies Regulations.

Certifying the absence from the exams:

According to the Examination and Studies Regulations.

Textbook:

Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0

Further study material:

Materials discussed during lectures and seminars: Moodle (<https://itc.semmelweis.hu>)

Physical Education VII-VIII.

Lessons (in hours): 14 lectures: 0 practicals: 14 seminars: 0

Lecturer of the course: Várszegi, Kornélia

Contact: Testnevelési és Sportközpont

Phone: +36-1/ 264-1408

Detailed course/lecture description*: (to facilitate credit recognition in other institutions)

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.
1107 Bp, Zágrábi utca 14.

1×60 min./week sessions:

Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, advanced Yoga, male football, salsa, step aerobics, badminton, beginner ultimate Frisbee, advanced ultimate Frisbee, Zumba

1×90 mins./week sessions:

women's football, ice hockey, beginner tennis, beginner tennis 2,

4×3 hrs. and 1×2 hrs. session packages:

Hiking 1, Hiking 2.

2×90 mins./week sport training (competitive sport, for qualified only):

cheerdance, cheerleader, men's football, handball, basketball, volleyball

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Important note: Document certifying the completion of the practice must be handed in at registration! Registration to the next year is not allowed without it!

* Detailed and numbered for each week of theoretical and practical lessons one by one, indicating the names of lecturers and instructors

Prosthodontics II.

First Semester

The theme of the seminars:

1. Introduction to the subject, introductory seminar
2. Online moodle learning module: General informations about making of fixed and removable dentures I: photodocumentation, tooth shade determination, magnification, isolation, smile design
3. Seminar material which requires personal attendance: General informations about making of fixed and removable dentures I: photodocumentation, tooth shade determination, magnification, isolation, smile design
4. Online moodle learning module: General informations about making of fixed and removable dentures II.: impression taking, luting
5. Seminar material which requires personal attendance: General informations about making of fixed and removable dentures II.: impression taking, luting
6. Online moodle learning module: Types of fixed dentures (veneers, post and cores, crowns, bridges, minimally invasive dentures) and tooth preparation
7. Seminar material which requires personal attendance: Types of fixed dentures (veneers, post and cores, crowns, bridges, minimally invasive dentures) and tooth preparation.
8. Online moodle learning module: Removeable partial dentures I.: definitions; parts, types and tasks of parts.
9. Seminar material which requires personal attendance: Removeable partial dentures I.: definitions; parts, types and tasks of parts
10. Online moodle learning module: Removeable partial dentures II.: support and retention
11. Seminar material which requires personal attendance: Removeable partial dentures II.: support and retention
12. Online moodle learning module: Clinical and laboratory steps of dental restorations; temporary dentures and repair of dentures
13. Seminar material which requires personal attendance: Clinical and laboratory steps of dental restorations; temporary dentures and repair of dentures
14. Consultation

Prosthodontics III.

Second Semester

The theme of the seminars:

1. Introduction to the subject, introductory seminar
2. Online moodle learning module: Treatment planning guidelines – Fábíán and Fejérdy classification (modifying factors of the treatment plan)
3. Seminar material which requires personal attendance: Treatment planning guidelines – Fábíán and Fejérdy classification (modifying factors of the treatment plan)
4. Online moodle learning module: Implant prosthetics I.: temporary dentures and fixed dentures
5. Seminar material which requires personal attendance: Implant prosthetics I.: temporary dentures and fixed dentures
6. Online moodle learning module: Implant prosthetics II.: hybrid prostheses and impression taking
7. Seminar material which requires personal attendance: Implant prosthetics II.: hybrid prostheses and impression taking
8. Online moodle learning module: Digital dentistry I.: impression taking
9. Seminar material which requires personal attendance: Digital dentistry I.: impression taking
10. Online moodle learning module: Digital dentistry II.: digital workflows
11. Seminar material which requires personal attendance: Digital dentistry II.: digital workflows
12. Online moodle learning module: Gnathological guidelines of the full mouth rehabilitation, rehabilitation of occlusal problems, bite elevation, splints
13. Seminar material which requires personal attendance: Gnathological guidelines of the full mouth rehabilitation, rehabilitation of occlusal problems, bite elevation, splints
14. Consultation

RESTORATIVE DENTISTRY AND ENDODONTICS II.

Department of Restorative Dentistry and Endodontics

Head of Department: János Vág DMD, PhD

First semester

Clinical practice (3 hours per week).

The subject is taught three practical hours per week, with no lectures. During the practices, clinical care is provided for patients requiring conservative dental care under the supervision of an instructor. The students work in pairs and take turns to assist each other.

The objective of the subject and its place in the medical curriculum:

More confident implementation of the following activities: Thorough patient examination, taking of medical and dental history, stomato-oncological screening, establishing the diagnosis, preparing of a treatment plan, removal of calculus, routine application of isolation procedures, preparation and restoration of simple and complex cavities, root canal treatment of single-rooted teeth and learning dental assistance.

Method of checking acquired knowledge during the study period:

Students must arrive prepared for the practice, which is regularly checked and evaluated orally and/or in writing by the supervisor. Students during the semester frequently write „small tests” to give proof of their theoretical knowledge. There is no possibility to retake the missed tests or to correct a test. The students will write midterm exam on restorative dentistry based on the knowledge gained from

lectures, practices, and textbooks in restorative dentistry. It is written at a particular time announced at the beginning of the year (preferable on week 10). If a student does not achieve a passing score on an exam the first time, the candidate can retake the exam in two weeks. A maximum of two additional attempts for the retake will be provided. It will be assessed in accordance with the procedure laid down in the Study and Examination Regulations of Semmelweis University. The work carried out on the practices will be monitored and assessed by the practice leaders at each stage. The results of the evaluations are included in the semester rating.

Requirements of an accepted semester (signature of the lecturer):

A minimum of 75% attendance is required at the practices, and absence may not exceed 25% of the practices regardless of the reason. The signature of the semester, a sufficient level of continuous and consistent theoretical preparation, the passed demonstration, and a sufficient level of practical performance are required. The average grade of the theoretical part and the average grade of the practical part must separately reach the 2.0-grade. By week 13, a photo-documented case report of the student's work must be submitted to the practice leader.

Type of the exam: Practice mark

List of textbooks, lecture notes and recommended textbooks:

1. Ritter AV, Boushell LW, Walter R: Sturdevant's Art and Science of Operative Dentistry. 7th ed. St. Louis, Mosby, 2018.
2. Torabinejad M, Walton RE, Fouad AF: Endodontics. Principles and Practice. 5th ed. St. Louis, Missouri, Saunders/Elsevier 2014
3. Hargreaves KM, Berman LH: Cohen's Pathways of the Pulp. 11th ed. St. Louis, Missouri, Mosby/Elsevier 2015

RESTORATIVE DENTISTRY AND ENDODONTICS III.

Department of Conservative Dentistry Restorative Dentistry and Endodontics

Head of Department: János Vág DMD, PhD

Second semester

Clinical practice (4 hours per week).

The subject is taught four practical hours per week, with no lectures. During the practices, clinical care is provided for patients requiring conservative dental care under the supervision of an instructor. The students work in pairs and take turns to assist each other.

The objective of the subject and its place in the medical curriculum:

Thorough patient examination, taking of medical and dental history, stomato-oncological screening, establishing the diagnosis, preparing a treatment plan, removing calculus, routine application of isolation procedures, preparation and restoration of simple and complex cavities, root canal treatment of single and multi-rooted teeth, and learning dental assistance.

Requirements of an accepted semester (signature of the lecturer):

A minimum of 75% attendance is required at the practices, and absence may not exceed 25% of the practices regardless of the reason. The signature of the semester, a sufficient level of continuous and consistent theoretical preparation, the passed demonstration, and a sufficient level of practical performance are required. The average grade of the theoretical part and the average grade of the practical part must separately reach the 2.0-grade. By week 13, a photo-documented case report of the student's work must be submitted to the practice leader.

Type of the exam: Practice mark

List of textbooks, lecture notes and recommended textbooks:

1. Ritter AV, Boushell LW, Walter R: Sturdevant's Art and Science of Operative Dentistry. 7th ed. St. Louis, Mosby, 2018.
2. Torabinejad M, Walton RE, Fouad AF: Endodontics. Principles and Practice. 5th ed. St. Louis, Missouri, Saunders/Elsevier 2014
3. Hargreaves KM, Berman LH: Cohen's Pathways of the Pulp. 11th ed. St. Louis, Missouri, Mosby/Elsevier 2015

GENERAL DENTISTRY PRACTICE

4-weeks (120 hours) at a Dental Office (Conservative Dentistry of Periodontology)

The student has to practice whole-scale comprehensive dental treatment including: Oral Prophylaxis, Restorations, Root Canal Therapy and Minor Prosthodontics as well as Er. Management.

Important note: Document certifying the completion of the practice must be handed in at registration! Registration to the next year is not allowed without it!

IMPLANTOLOGY I.

Department of Oro-Maxillofacial Surgery and Stomatology

Lecture: 1 hour/week

Course Syllabus:

- Introduction. History of oral implantology. The classification of oral implants, according to the anatomic site. Endosteal implants.
- The indications, contraindications of implant treatment.
- Diagnostics and treatment planning.
- General considerations of implant surgery.
- Special considerations of implant surgery. The time of implant placement.
- The fundamental biomechanics of oral implants.
- The role of surface chemistry and topography in the osseointegration
- The essential conditions of success of the implant therapy I. Biocompatibility. Osseointegration.
- The essential conditions of success of the implant therapy II. Gingival seal. Progressive osseointegration.
- The essential conditions of success of the implant therapy III. The factors influencing the masticatory load transmission through implants.
- The fundamentals of implant prosthodontics I. Implant abutments, impression techniques.
- The fundamentals of implant prosthodontics II. Prosthetic options on implants.
- Implant failures. Biological, mechanical complications and their management.

Practice: 1 hour/week

Practice of Implantology complements and deepens the knowledge obtained during the theoretical course

- Diagnostics – X-ray diagnostics, CBCT analysis, introduction of X-ray and surgical template
- Introduction of the implant surgery through the system of the Straumann – emphasize on the unique properties of the system (surface, comparison of 1-stage / 2-stage surgical method)
- Introduction of the implant prosthodontics through the SIC system – emphasize on the unique properties of the system, prosthodontics of the SIC system. Practicing the steps of the prosthetics on a model, cad-cam based prosthetic abutment, safe on four concepts, platform switching, Balance healing screws and and abutments
- Guided bone regeneration through the products of Geistlich company – introduction of the methods of bone augmentation techniques, sinus-liftig, lateral bone augmentation practicing on models
- Introduction of the guided implant surgery Nobel Biocare Guide System overview – emphasize on the unique properties of the system
- Introduction of the failures of implantology and their solutions through the Osstem system – emphasize on the unique properties of the system, practicing on models

OPHTHALMOLOGY

Dept. of Ophthalmology

Program director: Dr. Zsuzsa Récsán

Tutor: Dr. Zsófia Hargitai

First Semester

Lectures (1 hour/week)

Introduction. History of ophthalmology.
Conjunctivitis ("red eye").
Keratitis ("red eye").
Uveitis ("red eye"). Differential diagnostic approach of the "red eye".
Basics of optics.
Diseases of the crystalline lens. Cataract surgery. Diseases of the retina. Intraocular tumours.
Glaucoma (pathomechanismus).
Glaucoma (conservative and surgical treatment).
Diseases of the eyelids. Ocular injuries. Sudden visual loss. First aid in ophthalmology.

Practical guide (0,5 hour/week)

Anatomy of the eye. Patient's history.
Objective and subjective symptoms of eye-diseases.
Eyelids and lacrimal system.
Examination of the anterior segment of the eye (focal light, slit lamp).
Refractive errors. Checking of visual acuity.
Basics of orthoptics.
Examination of the refractive media and retina. (Ophthalmoscope)
Diagnosis of glaucoma (perimetry, checking of intraocular pressure, gonioscopy).
Treatment of glaucoma.
First aid in cases of ocular injuries.
First aid in sudden visual loss.
Differential diagnostic approach of the "red eye".
Differential diagnostic approach of the "painful" eye.
Consultation.

ORTHODONTICS PRE-CLINICAL

Department of Orthodontics and Pediatric Dentistry

Head of Department: Dr. Noémi Katinka Rózsa D.M.D., Ph.D.

tel: (1)-4591500/ 59268

E-mail: noemirozsa65@gmail.com

Tutor: Dr. László Miklós Kaán D.M.D., PhD.

Phone: (1)-4591500 / 59270

E-mail: kaanm@dent.semmelweis-univ.hu

First semester

The aim of training

Preparing the dental students for the practical education of orthodontic health care, focusing primarily on the development of the manual skills.

Training form and time frame

Practical education: 1 hour/week

Form of examination: practical mark based on the practical performance

Comment: The practical education takes place in 7x2 hours. Training starts in the spring semesters only.

The minimal conditions of participation

Successful final examination of oral biology subject

The used method

According to the detailed syllabus, presentation of the current appliance types on a sample, and/or with multimedia methods. The activation of the appliances, wire- and arch bending practiced individually. Individual practice of bracket bonding with the help of typodonts and phantoms. The students are working under the supervision and management of the instructor.

Detailed syllabus

1. The categorization of appliances, the basic principles of their functions, basics of the orthodontic biomechanics
2. The function of the discernible appliances, their activation, elements, wire bending practice
3. The characteristics of metallic alloys used in orthodontics, their usability, wire bending practice
4. The activation of the appliances, their elements, accessories, bracket bonding systems
5. The operation principle of the typodont, its application, the use of the ligatures
6. Arch bending on a model, using typodont
7. Friction-proof systems, loop bending methods

OTORHINOLARYNGOLOGY

Lecturer: Prof. Dr. László Tamás
Tutor: Dr. Beáta Bencsik

Second Semester

Obligatory elective
credit code: C1L1P0.5
credit: 1
lecture: 1
practice: 0.5
Prerequisite(s):

Pathology, Oral Pathology examination
Lectures (1 hour per week) Practices (0,5 hour week)

Thematic of lectures:

1. Examination in ORL. The role of otorhinolaryngology in dentistry and medicine.
2. Ear diseases. Acute and chronic otitis media. Diseases of the external ear. Etiology, diagnosis, complications and therapy.
3. Audiology, hearing aids, implanted devices. Fundamental audiological diagnostic methods. Surgical management of hearing losses. Otosclerosis and cochlear implant.
4. Headache, otoneurology, facial nerve. Diagnosis and treatment of dizziness and facial nerve palsy.
5. Rhinitis, nasal septum. Clinical anatomy and physiology of the nose and paranasal sinuses. Nasal obstruction. Epistaxis.
6. Sinusitis, FESS. Infections and tumors of the nose and paranasal sinuses. Therapeutic possibilities. Borderlines and related aspects between the oral surgery and ENT.

7. Benign cervical masses. Diseases of the neck. Diseases of the salivary glands
8. OSAS. Diagnosis and treatment of sleep apnoea.
9. Inflammation of the pharynx. Clinical aspects of diseases of the mouth and pharynx. Peritonsillar abscess. Diseases of the oral and laryngeal mucosa.
10. Swallowing and speech disorders. Anatomy and physiology of the larynx. Disorders of the voice.
11. Head and neck benign and malignant tumors, epidemiology, pathology and diagnosis.
12. Nonsurgical therapy of head and neck cancers.
13. Head and neck cancers, surgical therapy. Neck dissections.
14. Emergency in ORL. Emergency management of suffocation. Conicotomy and tracheotomy. Foreign bodies in the trachea and oesophagus.

Thematic of practices:

Routine clinical examinations in practice.

Ear diseases. Evaluation of different types of perforations of the tympanic membrane. Video demonstration. Routine audiology. Pure tone audiometry.

Pharynx infections. Peritonsillar abscess and therapy. Indications and dangers of the tonsillectomy. Adenotomy. Basis of conservative of the mouth and pharynx treatment of disease.

Anterior and posterior rhinoscopy, endoscopy. X-ray and CT of the paranasal sinuses. Clinical management of epistaxis.

Investigation of mesopharynx tumors. Direct and indirect laryngoscopy. Benign tumors of the mesopharynx and larynx.

Videostroboscopy and fiberoscopy. Malignancy in the mesopharynx. Malignancy in the larynx. Imaging. Video demonstration.

PEDIATRICS

Pediatric Center

Head of the Center: Prof. Dr. Attila Szabó

Tűzoltó Street Department

1094 Budapest, Tűzoltó. u. 7-9.

Phone: +361/215-1380 ext. 52800

Head of Department: Prof. Dr. Gábor Kovács

Tutor: Dr. Zsófia Gács (Dent.)

Second Semester

Lectures/Seminars (1 hour per week), **Practices** (0,5-hour week)

Lecture:

1. Introduction: somatomental development of a healthy child, care of a newborn
2. Cardiovascular diseases
3. Diseases of the respiratory tract (ENT incl.), infections,
4. Disorders of growth&development
5. Pediatric Surgery
6. Chronic Abdominal Pain,
7. Anaemia, bleeding disorders, haematological malignancies

Practice:

1. Physical Examination
2. Feeding of a baby&child; intolerances, allergies
3. Laboratory Findings (bloodcount + 'routine checkup' + urinalysis)
4. Acute care of life-threatening conditions
5. Fluid-electrolyte changes, dosage forms in pediatrics, antipyretics
6. Seizures
7. Signs of syndromes of infectious diseases

Seminars:

1. Vomiting, diarrhoea
2. Mononucleosis
3. Lymphnode enlargement
4. Anaemia
5. Child with a rash
6. Problems of weight gain
7. Diabetes mellitus

SURGERY

I. Department of Surgery Department Section of Surgery

Second Semester

Lectures (2 hours per week)	Practices (1 hour per week)
Surgery of the neck. Thyroid and parathyroid	Visiting patients' ward
Surgical treatment of the chest wall, breast, pleura,	Visiting operating theater lung and mediastinum
Oesophagal surgery (injuries, diverticula,	Visiting patients' ward malignant diseases)
Gastric and duodenal surgery (benign diseases)	Visiting patients' ward
Gastric and duodenal surgery (malignant diseases)	Visiting operating theater
Surgery of gall-bladder and extrahepatic	Visiting operating theater biliary system
Surgery of the small intestines and colorectum	Visiting patients'



Faculty of Medicine
9th–10th semester

FACULTY OF DENTISTRY

CLINICAL MODULE

9th Semester

	Subject	Subject code	CREDITS	Hours per semester	Lecture (hr/semester)	Seminar (hr/semester)	Practice (hr/semester)	Lecture (hr/week)α	Seminar (hr/week)α	Practice (hr/week)α	Prerequisite(s)	Evaluation
Compulsory	Clinical Dentistry I.	FOKOKFK313_1A	2	70	0	0	70	0	0	5	Prosthodontics III., Restorative Dentistry and Endodontics III.	Term grade
Obligatory elective	Forensic Dentistry	FOKVIGS088_1A	1	14	14	0	0	1	0	0	Internal Medicine II., Pharmacology II., Pathology	Examination
Compulsory	Implantology II.	FOKOSZB311_2A	1	14	14	0	0	1	0	0	Implantology I., Periodontology II., Oral and Maxillofacial Surgery III.	Comprehensive examination #
Compulsory	Oral and Maxillofacial Surgery IV.	FOKOSZB353_4A	5	84	14	0	70	1	0	5	Implantology I., Periodontology II., Oral and Maxillofacial Surgery III.	Term grade
Compulsory	Oral Medicine II.	FOKODT244_2A	1	14	14	0	0	1	0	0	Oral Medicine I., Oral Diagnostics, Oral and Maxillofacial Surgery III.	Comprehensive examination #
Compulsory	Orthodontics I.	FOKOGFK263_1A	5	70	14	0	56	1	0	4	Orthodontics Preclinical, Prosthodontics III., Restorative Dentistry and Endodontics III.,	Term grade
Compulsory	Pedodontics I.	FOKOGFK265_1A	5	70	14	0	56	1	0	4	Orthodontics Preclinical, Prosthodontics III., Restorative Dentistry and Endodontics III.,	Term grade
Compulsory	Periodontology III.	FOKOPDK387_3A	3	49	14	7	28	1	0.5	2	Implantology I., Periodontology II., Oral and Maxillofacial Surgery III.	Term grade
Compulsory	Physical Education IX.	FOKOTSI380_9A	0	14	0	0	14	0	0	1		Signature
Obligatory elective	Prehospital Emergency Medicine	FOKVOMS393_1A	1	14	0	3	11				First Aid, Internal Medicine II., Pharmacology II.,	Examination
Compulsory	Prosthodontics IV.	FOKOFPK366_4A	3	56	0	0	56	0	0	4	Prosthodontics III., Restorative Dentistry and Endodontics III.	Term grade
Compulsory	Restorative Dentistry and Endodontics IV.	FOKOKFK357_4A	3	56	0	0	56	0	0	4	Prosthodontics III., Restorative Dentistry and Endodontics III.	Term grade
Criterion requirement	Thesis preparation	FOKOSZD409_1A	0	3	0	3	0					Signature
	Sum of credits in the semester:		30									

Important note: Signing up for Physical Education (PE) IX. in the 1st semester and for PE X. in the 2nd semester is obligatory.

10th Semester

	Subject	Subject code	CREDITS	Hours per semester	Lecture (hr/semester)	Seminar (hr/semester)	Practice (hr/semester)	Lecture (hr/week)α	Seminar (hr/week)α	Practice (hr/week)α	Prerequisite(s)	Evaluation
Compulsory	Clinical Dentistry II.	FOKOFPK312_2A	2	60	0	0	60	0	0	5	Prosthodontics IV., Clinical Dentistry I., Restorative Dentistry and Endodontics IV.,	Term grade
Obligatory elective	Dermatology	FOKVBOR392_1A	1	18	6	0	12				Internal Medicine II., Pharmacology II.	Examination*
Compulsory	Gerostomatology	FOKOFSI394_1A	2	24	3	9	12				Prosthodontics IV., Gnathology, Oral Medicine II.	Examination*
Obligatory elective	Obstetrics and Family Planning	FOKVNO2092_1A	1	12	12	0	0	1	0	0	Internal Medicine II., Pharmacology II.	Examination
Compulsory	Oral and Maxillofacial Surgery V.	FOKOSZB353_5A	4	48	12	0	36	1	0	3	Implantology II., Periodontology III., Oral and Maxillofacial Surgery IV.	Comprehensive examination #
Compulsory	Orthodontics II.	FOKOGFK263_2A	5	72	12	0	60	1	0	5	Orthodontics I.	Comprehensive examination #
Compulsory	Pedodontics II.	FOKOGFK265_2A	5	72	12	0	60	1	0	5	Pedodontics I.	Comprehensive examination #
Compulsory	Periodontology IV.	FOKOPDK387_4A	3	42	18	0	24	1.5	0	2	Periodontology III.	Comprehensive examination #
Compulsory	Physical Education X.	FOKOTSI380_10A	0	12	0	0	12	0	0	1		Signature

LIST OF TEXTBOOKS (The list may change!)

- 1 Becker W.-Naumann H.- Pfaltz R.: Ear, Nose and Throat Diseases. Thieme. Stuttgart, 1994. ISBN 3-136712021.
- 2 Répássy,G.: Otolaryngology. Eger, Radó Ny. 2000.
- 3 Current Pediatric Diagnosis and Treatment. 13th ed. W.E.Hathaway, W.W.Hay. Appleton and Lange Medical Book. ISBN 0838514006, ISSN 0093-8556
- 4 Lecture Notes of Forensic Medicine (Bp.) 1994.
- 5 Gerhard K. Lang: Ophthalmology / a Pocket Textbook Atlas. Thieme / 2000. ISBN 3-13-126161-7 (GTV) ISBN 0-86577-936-8 (TNY) 1 2 3 4 5
- 6 Dénes J.-Gábris K.-Hidasi Gy.-Tarján I.: Pedodontics. Bp. SOTE 1995.
- 7 Andlaw, R.J.-Rock,W.P.: A Manual of Pediatric Dentistry. 1998. ISBN 0443053723
- 8 T.G.Wilson-K.S.Kornman: Fundamentals of Periodontics Quintessence. 1996. ISBN 0-86715-303-2
- 9 R.A.Cawson-E.W.Odell: Essentials of Oral Pathology and Oral Medicine. Churchill Livingstone, 1998. ISBN 0-443-06121-1
- 10 Szabó Gy.: Oral and Maxillofacial Surgery. Bp. Semmelweis Publ. 2001.
- 11 Bricker,S.L.-Langlais,R.P.-Miller,C: Oral Diagnosis, Oral Medicine and Treatment planning. 2nd ed. 2002. B.C.Decker Inc. Hamilton London 2002.
- 12 McCracken's Removable Partial Prosthodontics (10/e) Glen P. McGivney-Alan B. Carr. Hardback, Mosby, 1999. ISBN 0323006787
- 13 Schillinburg et al.: Fundamentals of Fixed Prosthodontics. Quintessence 4th ed. 2012. ISBN 93 13
- 14 R.M. Basker-J.C. Davenport: Prosthetic Treatment of the Edentulous Patient. 5th ed. McMillan Press Ltd. ISBN 978-1405192613, 2011.
- 15 C.M.Sturdevant: Operative Dentistry. Mosby. ISBN 0-80166366-0
- 16 Walton: Principles and Practice of Endodontics.
- 17 Niklaus P. Lang, Jan Lindhe (ed.): Clinical Periodontology and Implant Dentistry (Wiley Blackwell, 2015)
- 18 Proffit, WR, Fields, DW, Larson, B, Sarver, DM.: Contemporary Orthodontics 6 th ed., Mosby, 2018.
19. Mitchell, L.: An introduction to orthodontics, Oxford Publishing, 2011.

Recommended textbooks:

- 1 J Hunter, J Savin, M Dahl: Clinical Dermatology, 4th ed. Blackwell Publishing, 2007, Paperback, ISBN 9781405146630
- 2 J Bologna, J Jorizzo, R Rapini: Dermatology, 2nd ed. Elsevier, 2007. Hardback, ISBN 9781416029991
- 3 DJ Gawkrödger: Dermatology. An illustrated colour text, 4th ed. Churchill Livingstone Elsevier, 2007, Paperback, ISBN 9780443104213
- 4 JE Fitzpatrick et al: Dermatology Secrets in Color with Student Consult Access. 3rd ed. Hanley & Belfus, 2006. ISBN 1560536160
- 5 R. Graham-Brown, J Bourke: Mosby's Color Atlas and Text of Dermatology. 2nd ed. Elsevier Mosby, 2006. ISBN 072343364X
- 6 M Lebwohl et al: Treatment of Skin Disease, 2nd ed. Elsevier Mosby, 2005, ISBN 0-32-3036031
- 7 M Lebwohl, W Heymann, J Berth-Jones, I Coulson: Treatment of Skin Disease. Comprehensive Therapeutic Strategies, Expert Consult – Online and Print Hardbound, 2009, ISBN: 0702031216
- 8 Online: www.lib.sote.hu – Adatbázisok, adattárak – OVID – Books@OVID – Dermatology – Fitzpatrick's Dermatology in General Medicine
- 9 Burkit's Oral Medicine: Lynch,A.M.& Malcom,A. Lippincott. 1996. ISBN 0-397-51242-2
- 10 European federation of Preiodontology – efp.org
International Team for Implantology –iti.org
ITI Treatment Guide – iti.org/ITI-Treatment-Guide
- 11 McDonald, F.-Ireland, A.J.: Diagnosis of the Orthodontic Patient. Oxford Univ. Press. 1998. ISBN 0-19-262889-5
- 12 Graber,T.M.-Vanarsdall,R.L.: Orthodontics. Current Principles and Technics. Mosby Year Book, Inc. 1994. 2nd ed. ISBN 0-8016-6590-6
- 13 D.Hull-D.I.Johnston: Essential Paediatrics. 3rd ed. Churchill Livingstone. 1994. ISBN 0-443-04782-0.
- 14 Hollwich, F: Pocket Atlas of Ophthalmology. Thieme Verl. 2nd Rev. Ed. Stuttgart, 1986. ISBN 0-86577 244 4
- 15 Knight's Forensic Pathology. 3rd ed. 2004. Arnold.
- 16 Manual of Emergency Medicine. 5th ed. By Jon L.Jenkins, G.R.Braen. 2004 Lippincott Williams and Wilkins. Product nr. 479531-1019
- 17 Neil-Walter: Partial Dentures. ISBN 06 32 08 025 8, 1986.
- 18 Neil-Nairne: Complete Denture Prosthetics. Wright. ISBN 72 36 20 636
- 19 Nikiforuk: Understanding Dental Caries.(1-2) Karger.
- 20 Hermann Péter, Szentpétery András: Gnatológia (Semmelweis Kiadó, 2018)

CLINICAL DENTISTRY I.-II.

There is no lecture on the subject of Clinical Dentistry, at the beginning of the practices the previously acquired theoretical curriculum from conservative dentistry and prosthodontics will be repeated in the form of a mandatory consultation, in weekly shifts.

FORENSIC DENTISTRY

Department of Forensic Medicine

Tutor: Dr. Zoltán Szőlősi

First Semester

Lectures (1 hour/week)

- The discipline of forensic medicine, relation to law, the legal aspects of dentistry
- Injuries
- Asphyxia

- Identification
- Toxicology I.
- Toxicology II.
- Alcohol and narcotics
- The legal aspects of clinical medicine I.
- The legal aspects of clinical medicine II.
- Facial and cranial injuries
- Sudden death, SIDS
- Risk and malpractice in dentistry
- Forensic psychiatry
- Autopsy demonstration
- Autopsy demonstration

IMPLANTOLOGY II.

Department of Oro-Maxillofacial Surgery and Stomatology

Lecturer: **Dr. Árpád Joób-Fancsaly**

Lectures (1 hour/week)

Course Syllabus:

- Bone replacement I. Osteoconduction. Osteoinduction. Bone grafting materials. Guided Bone Regeneration (GBR). Bone grafting procedures in the outpatient surgery.
- Bone replacement II. The sinus-lift procedure. Indications, contraindications, surgical techniques.
- The possibility of PRF application in oral implantology.
- The periodontal aspects of implant therapy.
- Esthetic considerations in implant surgery. Surgical management of soft tissues.

- The possibility of periimplant soft tissue management.
- The influencing factors of periimplant tissue stability.
- Bone replacement III. Osteogenesis, bone transplantation. Distraction osteogenesis.
- Guided surgery in oral implantology.
- Immediate implantation and reconstruction of the buccal bone wall.
- Implant prosthodontics I. Crowns on implants.
- Implant prosthodontics II. Fixed dental prosthesis on implants.
- Implant prosthodontics III. Mesio-structures, combined (fixed-removable) prosthesis on implants

Practice: No practice only lecture according to the new curriculum

Final exam

ORAL AND MAXILLOFACIAL SURGERY IV.

Tutor: Dr. Kinga Körmöczi

First Semester

Lectures

- The evolution of modern oral surgery in Hungary
- Current issues of anticoagulation
- Precancerous lesions and conditions in the maxillofacial region. Screening and its importance.
- Benign tumors in the head and neck region.
- Malignant tumors in the head and neck region I. (Diagnosis, pathology)
- Malignant tumors in the head and neck region II. (complex treatment, surgical procedure)
- Reconstructive surgery in the maxillofacial region.
- Written midterm
- The modern diagnosis and therapy of maxillofacial traumatology
- Biological principles of bone healing and regeneration.
- Decision making in conservative and surgical orthognathia.
- The role of autologous blood products in regenerative surgery.
- General anesthesia in oral surgery and outpatient surgery.

Practices

A. Outpatient treatments:

Practicing simple and complex tooth extractions. Removal of teeth, roots and retained teeth. Practicing minor soft tissue surgeries. Assistance in various dentoalveolar surgical operations. Discussing the topics of the lecture. Regularly checking of the acquired theory.

B. Inpatient class practice:

1 week practice at in-patient ward. Getting insight in to the work of the Maxillofacial department. Surgical assistance in head and neck surgeries.

Note:

The maximum number of absences in a semester is 3.

More than 3 absences invalidate the semester.

During the semester three midterm examinations should be passed.

Practical course grade

ORAL AND MAXILLOFACIAL SURGERY V.

Second Semester

Lectures (1 hour / week) **Practices** (3 hours / week)

- Diseases of the temporomandibular joint Part I. (Pathology, diagnostics)
- Diseases of the temporomandibular joint Part II. (Therapy)
- Peripheral nerve disorders in the head and neck region. Rehabilitation after the paresis of the Facial nerve
- Antibiotic treatment in dental surgery
- Maxillofacial reconstructive surgery Part I. (Reconstruction of soft tissues and bone by local flaps)
- (Reconstruction by microvascular grafts)
- Modern diagnostic methods in oral and maxillofacial surgery
- Systematic diseases in the head and neck region
- The promotion of the osteogenesis by distraction methods
- Biomaterials in the maxillofacial surgery
- Guest speaker
- Consultation

Practice

1 week practice at in-patient ward.

Getting insight in to the work of the Maxillofacial department.

Surgical assistance in head and neck surgeries.

Note:

At least 75% participation on the practices is obligatory according to the Study and Examination Regulations.

During the semester 1 midterm examination should be passed.

ORAL MEDICINE II.

Department of Oral Diagnostics

Address: Bp. VIII., Szentkirályi u. 47. 1088

Phone: 459-1500/59161, 317-1044

Lecturer: **Prof. Dr. Csaba Dobó Nagy**

E-mail: oralis.diagnosztika@dent.semmelweis-univ.hu

First Semester

Lectures (1 hour per week)

1. Introduction. The aim and importance of Oral Medicine. Examination of the patient. Basic signs of the diseases on the oral mucosa.
2. Oral infections I.
3. Oral infections II.
4. Oral praecancerous lesions and conditions. Differential diagnostics of red and white oral lesions.
5. Dental aspects of systemic diseases and their treatments.
6. Diseases of the salivary glands. Diagnosis and treatment.
7. The aim of molecular oncology in the success of diagnosis and therapy of oral tumors.

8. Oral diseases affected by immune system I. (Vesiculo-bullous diseases, Oral lichen)
9. Oral diseases affected by immune system II. (Aphtae and other ulcers)
10. Differential diagnosis of the head and neck pain.
11. Risk patients in dental practice.
12. The aim of focal infections in dentistry.
13. Interactive differentialdiagnostics I.
14. Interactive differentialdiagnostics II.

Note: Final exam

Textbook:

1. Bricker, Langlais, Miller: Oral Diagnosis, Oral Medicine and Treatment Planning (second edition), BC Decker Inc Hamilton London 2002.

Recommended books:

- 1 M. Glick, MS. Greenberg, PB. Lockhart, SJ Challacombe: Burket's Oral Medicine (thirteenth edition) Hoboken, NJ : Wiley-Blackwell 2021.

ORTHODONTICS I.

Department of Orthodontics and Pediatric Dentistry

Head of Department: Dr. Noémi Katinka Rózsa D.M.D., Ph.D.

tel: (1)-4591500/ 59268

E-mail: noemirozsa65@gmail.com

Tutor: Dr. László Miklós Kaán D.M.D., PhD.

Phone: (1)-4591500 / 59270

E-mail: kaanm@dent.semmelweis-univ.hu

First Semester

Lectures (1 hour/week)

1. The subject, significance of orthodontics, its relation to caries and periodontal diseases
2. Historical survey of orthodontics. Classification and terminology of malocclusion
3. Diagnosis of malocclusions I.
4. Diagnosis of malocclusions II. X-ray diagnosis

5. Aetiology; hereditary and acquired anomalies. Functional anomalies.
6. The timing of the orthodontic treatment
7. Biomechanical principles of orthodontics. Possibilities of tooth movement.
8. Removable appliances I. Simple orthodontic appliances.
9. Removable appliances II. Functional appliances
10. Space gaining in orthodontics. Arch expansion and molar distalization
11. Elements of multiband/multibond appliances. Multibond technics I.
12. Multibond techniques II. Orthodontic wires and the phases of orthodontic treatment
13. Modern techniques in orthodontics: splint appliances I
14. Aesthetics in orthodontics

Practice (4 hours/week)

Treatment of patients.

Type of evaluation: Practical grade (1-5 grading system)

ORTHODONTICS II.

Second Semester

Week Lectures (1 hour/week)

1. Possibilities of orthodontic prevention. Early treatment in orthodontics.
2. Normocclusion. Local and general anomalies.
3. Treatment of distocclusion.
4. Treatment of mesiocclusion
5. Extraction in orthodontics.
6. Complex treatment of orthodontic anomalies combined with missing teeth
7. Surgical-orthodontic treatments
8. Complex therapy of cleft lip and palate
9. Retention and relapse.

10. Side effects and complications of orthodontic treatment.
11. Adult orthodontic treatment.
12. Interdisciplinary aspects of orthodontic treatment.
13. Digital techniques and workflow in orthodontics
14. Consultation

Practice (5 hours/week)

Treatment of patients.
Types of evaluation:
Practical grade (1-5 grading system)

Final examination. Evaluation of the whole subject matter (1-5 grading system).

PEDODONTICS I.

Department of Orthodontics and Pediatric Dentistry

Head of Department: Dr. Noémi Katinka Rózsa D.M.D., Ph.D.

Phone: (1)-4591500 / 59268

E-mail: noemirozsa65@gmail.com

Tutor: Dr. László Miklós Kaán D.M.D., PhD.

Phone: (1)-4591500 / 59270

E-mail: kaanm@dent.semmelweis-univ.hu

First Semester

Lectures (1 hour/week)

1. The subject, signification and interactions of paediatric dentistry
2. Tooth development, anatomy and dentition of primary teeth
3. Developmental disturbances of permanent and primary teeth
4. Caries of primary teeth. Treatment possibilities

5. Consecutive illnesses of caries in primary dentition
6. Mechanism of second dentition. Physiological and pathological significance
7. Caries and treatment of permanent teeth
8. Consecutive illnesses of caries in permanent dentition
9. Psychological aspects of dental treatment during childhood
10. Filling materials in Paediatric Dentistry
11. Dental radiology in Paediatric dentistry
12. Dental anomalies in syndromes
13. Root-canal treatment of immature teeth, apexogenesis, apexification
14. Special aspects of prevention in paediatric dentistry and orthodontics

Practice (4 hours/week)

Treatment of patients.
Type of evaluation: Practical grade (1-5 grading system)

PEDODONTICS II.

Second Semester

Week Lectures (1 hour/week)

1. Pain control and anaesthesia during childhood
2. Traumatic injuries of primary teeth
3. Traumatic injuries of permanent teeth, complex therapy solutions
4. Non- and minimally invasive dentistry
5. Prosthetics in Paediatric dentistry
6. Periodontology and oral diseases during childhood
7. Dental attendance of children suffering from general diseases
8. The management of children with special needs
9. Aetiology and treatment methods of hard tissue discoloration
10. Administration of medicine in pedodontics
11. Oral surgery during childhood

12. Non- and minimal invasive interventions in paediatric dentistry
13. Molar-Incisor-Hypomineralisation Syndrom (MIH)
14. Consultation Courses (obligatory and elective) which in part or entirely overlap

Practice (5 hours/week)

Treatment of patients.
Types of evaluation:
Practical grade (1-5 grading system)
Final examination. Evaluation of the whole subject matter. (1-5 grading system).

PERIODONTOLOGY III.

Department of Periodontology

Course Director: Prof. Dr. Péter Windisch

First Semester

Lectures (1 hour/week)

Practices (2 hours/week)

Seminars (0,5 hours/week)

1. Correlation between periodontology and orthodontics
2. Periodontal aspects of prosthetic rehabilitation
3. Morphology of periodontal defects. Indications of periodontal surgery
4. Periodontal surgery I. General introduction
5. Periodontal surgery II. Surgical correction of gingival enlargement
6. Periodontal surgery III. Periodontal resective/reparative surgery
7. Biology of periodontal tissue. Basics of regenerative techniques
8. Clinical application of periodontal regenerative techniques I.

9. Clinical application of periodontal regenerative techniques II.
 10. Treatments of furcation defects
 11. Biological mediators in periodontal surgery
 12. Mucogingival surgery I.
 13. Mucogingival surgery II. / Written exam
- Alveolar ridge preservation techniques

Goal of practices: Students will be able to diagnose the diseases of the gum and the attachment apparatus, diagnose the clinical manifestations of systemic diseases, provide oral prophylaxis, non surgical pocket therapy

Note:

The maximum number of absences in a semester is 3.

More than 3 absences invalidate the semester.

During the semester two midterm demonstrations should be passed.

Practical course grade

PERIODONTOLOGY IV.

Second Semester

Course Director: Prof. Dr. Péter Windisch

Lectures (1 hours / week)

Practices (2 hours/week)

Week Lectures (Part One)

1. Biology of periodontal and periimplant tissues
2. Periodontal aspects of implantology, augmentations I.
3. Periodontal aspects of implantology, augmentations II.
4. Is periodontitis a risk factor in implant dentistry?
5. Periimplantitis. Background and management
6. Comprehensive case presentations I. (perio-prot direct/indirect, surg)
7. Comprehensive case presentations II. (perio/plastic surg - impl)
8. Comprehensive case presentations III. (perio-non-surg/surg - impl)

9. Comprehensive case presentations IV. (perio- (reg)/ortho/prostho)
10. Supportive therapy in periodontology and implant dentistry
11. Periodontal diagnostic consultation
12. Written exam

Goal of practices: Students will spend the practices in blocks including three whole days in the Department when they will get a glimpse into ambulatory patient care, surgical assistance and differential diagnosis.

Note:

The maximum number of absences in a semester is 3.

More than 3 absences invalidate the semester.

During the semester two midterm demonstrations should be passed.

Practical course grade and **final** exam

PHYSICAL EDUCATION IX-X.

Lessons (in hours): 14 lectures: 0 practicals: 14 seminars: 0
Lecturer of the course: Várszegi, Kornélia
Contact: Testnevelési és Sportközpont
Phone: +36-1/ 264-1408

Detailed course/lecture description: *(to facilitate credit recognition in other institutions)*

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations. During the academic year, students can also choose the „Other” course category, where they record their weekly physical activity independently.

Students who cannot choose anything from the sports offer or who are forced to fulfill the conditions of participation on their own due to a lack of space can register for the “independent sports activity”

course as part of the Physical Education course in the Neptune system.

In cases, a questionnaire is sent to the students through the Neptune system:

- The questionnaire can be filled in from Monday to Sunday in a semester (no entries can be made in advance or afterwards).
- Students must assure themselves that they have completed the questionnaire truthfully.
- It is a minimum requirement for the signature that a training of 1×60 minutes per week is completed and this is recorded in the questionnaire.

Free of charge:

2×90 mins./week sport training (competitive sport, for qualified only): cheerleader, men's football, handball, basketball, volleyball

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptune system. The list of these locations may vary per school year.

PREHOSPITAL EMERGENCY MEDICINE (OXYOLOGY)

National Ambulance Service

Program Director: Dr. Gábor Göbl

Tutor: Dr. László Gorove

Type of the course: obligatory elective

Semester in which it is announced according to the curriculum: 9

The responsible educational and research organizational unit for teaching the subject: National Ambulance Service

Lecturer of the course: László Gorove MD gorove@gorove.hu

The goals and place of the course in regards to the education of dental students: To introduce the students into the philosophy and basic principles of emergency care; to teach them to evaluate the information gainable at the scene, how to check the patient at the scene, how to recognize and treat the most frequent emergency situations.

Competences acquired by completion of the course:

- overview of emergency care system
- recognizing an emergency situation. Call for help, general measures.
- evaluation of the scene and dangers. Patient survey using ABCDE scheme
- communication in emergency care (ISBAR)
- basic interventions (airway management, relief of bleeding, venous access, pain relief)
- recognizing and treating upper airway obstruction
- recognizing sudden circulatory arrest
- resuscitation: BLS – AED
- recognition and treatment of unconscious/mentally disturbed patients and stroke patients
- evaluation of chest pain. Treating ischemic chest pain
- treatment of fainting and shock. Recognition and care of anaphylactic reaction,
- treating acute hypertension
- recognition and treatment of acute dyspnea: left ventricular failure and bronchial asthma
- general principles of recognition and treatment of acute poisonings
- basics of care in severe injury
- general approach of multiple casualty incidents
- care of medical emergencies in dental praxis: equipment and organization
- basic skills in prehospital emergency care (CPR, airway management, relief of bleeding, venous access, pain management)

Pre-study requirements and prerequisites of course registration and completion: First Aid, Pharmacology II., Internal Medicine II.

Detailed course/lecture description: (to facilitate credit recognition in other institutions)

1. - 2. Seminar. Lecturer: Dr. László Gorove.

Overview of the content:

- characteristics of the emergency situation and the emergency care. Information gainable at the scene. Dangers and safety at the scene. How to get help. ABCDE survey. Communication in the emergency situation; ISBAR.
- characteristics of the emergency care system. Basic interven-

tions (airway management, relief of bleeding, venous access, pain relief). Circulatory arrest. Cardiopulmonary resuscitation: BLS – AED.

- unconsciousness and disturbed mental state Stroke.
- chest pain. Fainting and shock. Anaphylaxis. Hypertensive emergencies. Shortness of breath, dyspnea. Upper airway obstruction. Acute cardiac failure. Bronchial asthma.
- general principles of recognizing and treating acute poisonings. Common intoxications.
- ABC of injury care. Multiple injury management.
- acute events in the dental praxis. Emergency equipment.
- Handout of the themes will be available.

3. -13. Skill labor. Lecturer: Dr. László Gorove, and other colleagues.

Practical training (each occasion is the same, for maximum 10 students per instructor: airway management, relief of bleeding, venous access, pain relief, short repetition of BLS-AED.) A practical guide will be available electronically.

14. Seminar. Lecturer: Dr. László Gorove. Consultation. Wrap up.

Type of the exam: Oral

Theses:

- System of Emergency Care.
- Characteristics of emergency situations; the essence of emergency care
- Scene information and dangers
- Patient survey: ABCDE scheme
- Communication in emergency care: ISBAR
- Basic interventions: airway management, relief of bleeding, venous access, pain relief
- Upper airway obstruction
- Sudden circulatory arrest. Resuscitation: BLS – AED.
- The unconscious/mentally disturbed patient. Stroke.
- Chest pain
- Acute peripheral circulatory failure (fainting, shock)
- Anaphylactic reaction
- Acute hypertension
- Acute dyspnea: left ventricular failure, bronchial asthma.
- General principles of recognizing and treating acute poisonings
- Basics of severe injuries.
- Mass casualty incident.
- Theoretical (oral) exam (marks 1-5). No offered grade.

List of textbooks, lecture notes and recommended textbooks, online material:

1. Electronically accessible synopses of the lectures

Recommended:

2. Basic Guide to Medical Emergencies in the Dental Practice (Basic Guide Dentistry Series) 2nd Edition by Jevon, Philip (2014) Paperback
3. OMSZ Szabványos eljárásrendek – online access at OMSZ Oktatási portál (<https://oktatas.mentok.hu/course/view.php?id=103>)
4. Oxológia. Szerk: Göbl Gábor Medicina Budapest, 2001.

PROSTHODONTICS IV-V.

First Semester

Clinical practices, Integrated practices
Treatment of partial edentulousness, fixed and removable dentures.
No lectures.

Second Semester

Clinical practices integrated with the conservative dentistry. Complex treatment of different cases.
No lectures.

RESTORATIVE DENTISTRY AND ENDODONTICS IV.

Department of Restorative Dentistry and Endodontics

Head of Department: Dr. János Vág DMD, PhD

First semester

The subject is taught with four practical hours per week, there is no lecture.

During the exercises the students deal with root canal treatments and revisions within the framework of clinical care under the supervision of practice leader.

Attendance requirements and the possibility of making up for absences: Attendance at the practices is obligatory, and absences at any one practice may not exceed 25% of the total number of practices. Arriving late to the practices less than 15 minutes results in one absence after three times. Arriving late to the practices of more than 15 minutes counts as an absence. There is no possibility to make up a missed practice. No certificate is necessary in case of absence.

Signature requirements for the semester: A minimum of 75% attendance is required at the practices, and absence may not exceed 25% of the practices regardless of the reason. The signature of the semester, a sufficient level of continuous and consistent theoretical preparation, the passed demonstration, and a sufficient level of practical performance are required. The average grade of the theoretical part and the average grade of the practical part must separately reach the 2.0-grade. By week 13, a photo-documented report about an endodontic treatment made by the student must be submitted to the practice leader.

Type of the exam: Practice mark

RESTORATIVE DENTISTRY AND ENDODONTICS V.

Department of Restorative Dentistry and Endodontics

Head of Department: Dr. János Vág DMD, PhD

Second semester

Detailed course/lecture description:

Detailed weekly curriculum:

The subject is taught with three practical hours per week, there is no lecture.

During the exercises the students more independently and widely deal with the activities of the field of conservative dental care in the framework of clinical care under the supervision of the practice leader.

List of textbooks, lecture notes and recommended textbooks:

1. Ritter AV, Boushell LW, Walter R: Sturdevant's Art and Science of Operative Dentistry. 7th ed. St. Louis, Mosby, 2018.
2. Torabinejad M, Walton RE, Fouad AF: Endodontics. Principles and Practice. 5th ed. St. Louis, Missouri, Saunders/Elsevier 2014
3. Hargreaves KM, Berman LH: Cohen's Pathways of the Pulp. 11th ed. St. Louis, Missouri, Mosby/Elsevier 2015

Note: Attendance at the practices is obligatory, and absences at any one practice may not exceed 25% of the total number of practices (the maximum number of absences is 3). During the semester one documented clinical case must be presented to validate the semester by earning the signature.

Type of the exam: Final exam

Requirements of the exam : The final exam consists of three parts.
1. Students draw one from each of the three questions. Each question is evaluated by a mark (3 marks, 20-20-20% of the final mark).
2. Students presents three photo-documented clinical treatments of their own works, which they had carried out during the five semesters of Restorative Dentistry and Endodontics, or during the two semesters of clinical dentistry, or during the summer internship at the Department of Conservative Dentistry. Each case is evaluated by a mark (3 marks, 10-10-10 % of the final mark). The three treatments to be presented are: - Multi-surface composite filling - a CAD/ CAM inlay or crown - Completed root canal treatment of a single or multi-rooted tooth
3. The third component of the final exam is the analysis of an intraoral radiograph. The student must determine what teeth are visible, what diagnosis can be made and what treatment is required (1 mark, 10% of the final mark). If any part of the examination fails (does not reach 2.0), the final exam fails as well. Exam questions are available on the Moodle interface.

List of final exam items:

Questions A:

1. Concept, localization, and progression of caries on the anatomical crown
2. Histology of caries (enamel, dentin, and root caries)
3. Manual and mechanically powered preparation equipments and instruments (micromotor, turbine, burs)
4. Isolation of teeth, methods and tools
5. Classification of cavities by Black, the basis of classification. Cavity design methods, nomenclature
6. Rules and steps of cavity design for aesthetic direct restoration
7. Class I cavity preparation for a composite filling
8. Class II cavity preparation for a composite filling
9. Class III cavity preparation for a composite filling
10. Class IV cavity preparation for a composite filling. Treatment of crown fractures of anterior teeth.
11. Class V cavity preparation and cavities prepared for cervical lesions for filling
12. Purpose and type of the fillings. Requirements for filling materials. Classification of filling materials.
13. Application of liners, bases and temporary filling. Polishing, removal and toxicology of amalgam fillings
14. Glass-ionomer cement and other polymeric materials (composition, indication and application)
15. Composites - materials science (composition, classification, properties)

16. Theory and clinical application of the adhesive technique
17. Matrices and matrix systems
18. Clinical technique for the preparation of class III and IV composite direct restoration
19. Clinical technique for the preparation of class I and V composite direct restoration
20. Clinical technique for the preparation of class II composite direct restoration

Questions B

15. Classification (inlay/onlay/overlay/endocrown/veneer/tabletop) and materials for indirect restorations.
16. Cavity preparation for direct and indirect restorations. Similarities and differences.
17. Indications, contraindications, materials and clinical steps for preparing metal inlays
18. Indications, contraindications, materials and clinical steps for preparing aesthetic (composite, ceramic, hybrid) indirect restorations. Dome concept
19. Digital and analogue impression technique for indirect restorations. Indication and application of sulcus retraction.
20. Chairside CAD/CAM technology. Basics of design and milling
21. Cementation of aesthetic indirect restorations (material science of adhesive cement, surface treatments of the tooth and the restoration, clinical steps of cementation)
22. Patient admission and treatment plan (general rehabilitation and sequence of restorative and endodontic dental treatments)
23. Equipment in the dental surgery, ergonomics, four-handed treatment, infection control
24. Caries diagnostic tools
25. Indications, contraindications and methods of tooth whitening. Possible side effects and their prevention.
26. Endodontic treatment of accidentally damaged teeth
27. Restorative and endodontic treatment for patients requiring special care. Odontogenic focal infection.
28. Surgical interventions in restorative dentistry and endodontics (crown lengthening, drainage, resection, hemisection, bicuspidation, amputation).
29. Aesthetic and functional restoration of root canal treated teeth (post and core buildup, single crown, endocrown, indirect restorations)
30. Evaluation of endodontic outcome, revision of unsuccessfully treated teeth.
31. Orthograde retreatment of failed root canal treatments.

Questions C

32. History taking, patient examination and treatment plan in endodontics
33. Tools for diagnosis in endodontics
34. Anatomy and histology of the pulp. Description of the pulp chamber.
35. Anatomy of the root apex and the periapex.
36. Pulpal and periapical diseases: diagnostic terminology, pathogenesis and microbiology
37. Differential diagnosis of pulpal and periapical diseases
38. Pathology, symptoms, diagnosis and therapy of pulpal diseases
39. Pathology, symptoms, diagnosis and therapy of acute (symptomatic) and chronic (asymptomatic) apical periodontitis and condensing osteitis
40. Pathophysiology, symptoms, diagnosis and therapy of acute and chronic apical abscess.
41. Concept, purpose, indication, contraindication and limitation of root canal therapy.
42. Preventive endodontics: the importance of pulp protection. Vital pulp therapies.
43. Emergency procedures in endodontics
44. Manual and mechanical instruments used in root canal treatment
45. Microbiological aspects of endodontics. Antiseptic solutions, drugs and their use in root canal treatment.
46. Access openings (trepanation) and pulp extirpation
47. Importance and methods of working length determination
48. Endodontic hand instruments and their use. Orifice opening and shaping
49. Preparation of the root canal using the step-back technique. Apical stop/apical seal.
50. Purpose, protocol and technique of root canal irrigation and local medication in endodontic treatment
51. Other manual and mechanical root canal preparation techniques (beyond the step-back)
52. Procedural errors during root canal preparation
53. Root canal obturation techniques (cold and warm guttapercha techniques)
54. Lateral condensation/compaction.

DERMATOLOGY

Lecturer: Dr. Bernadett Hidvégi

Tutor: Dr. Bernadett Hidvégi

Department of Dermatology, Venerology and Dermatooncology

1085 Budapest, Mária u. 41.

Titkarság email: titkarsag.bor@semmelweis.hu

Oktatás email: oktatas.bor@semmelweis.hu

Second Semester

Credit value: 1

Lessons (in hours in the whole semester): 18 **from this,**

lectures: 6

practicals: 12

seminars: 0

Type of the course: obligatory elective

Lectures (0.5 hour per week)

Practices (1 hour week)

Detailed course/lecture description*: (to facilitate credit recognition in other institutions) every 2nd week 45'

1. Introduction to Dermatology. Diagnostic procedures, anatomy, functions of skin comparing to oral mucosa. Elementary lesions. Bacterial infections in Dermatology
2. Skin tumors. Malignant melanoma, basal cell carcinoma, squamous cell carcinoma. Benign tumors, paraneoplastic syndromes
3. Psoriasis, urticaria Cutaneous and oral manifestations of internal diseases
4. Atopic dermatitis, Seborrhoeic dermatitis, acne. Allergic skin diseases, drug allergy. Dermatitis, eczema, implication for dentist
5. Sexually transmitted diseases (syphilis, gonorrhoea, NGU). AIDS, HPV, herpes virus infections
6. Autoimmune bullous diseases Autoimmune diseases (LE, dermatomyositis, scleroderma) Dermatological treatment

Practises: every week 45', with patients of indoor and outdoor department

Participation in practices is mandatory. 25% missing is acceptable

Final examination

Oral exam, 2 theoretical and practical questions

* Detailed and numbered for each week of theoretical and practical lessons one by one, indicating the names of lecturers and instructors

GEROSTOMATOLOGY

Department of Community Dentistry

Head of department: Dr. Orsolya Németh

Lecturer: Dr. Péter Kivovics

Introduction of the concepts of Gerontology and Gerostomatology. Detailed description of dental and epidemiological characteristics of the elderly. Emphasis on psychological features. In developed countries, the number of older people is increasing year by year. This is largely due to disease control, adequate nutrition, widespread basic health care and relatively long periods without war. A considerable proportion of patients appearing in the dental office are considered elderly. Our course aims to provide an opportunity to gain a deeper understanding of the theoretical and practical knowledge of oral health care, treatment needs and specialities for elderly patients.

Lecture topics:

1. Introduction to Gerontology and Gerostomatology, dental epidemiology of the elderly
2. Social and psychological characteristics of the elderly
3. Special communication with the elderly during dental treatment

Seminars topics:

1. Topic
 - a. Oral symptoms caused by general diseases of the elderly.
 - b. Analysis of blood counts in elderly patients
 - c. Nutritional habits of the elderly
2. Topic
 - a. Characteristics of oral surgical treatment of the elderly
 - b. Characteristics of endodontic treatment of the elderly
 - c. Characteristics of restorative treatment of the elderly
3. Topic
 - a. Characteristics of oral mucosal lesions of the elderly and options for prevention
 - b. Characteristics of periodontal and dental hygiene treatment of the elderly and options for prevention
 - c. Dental treatment of bedridden and homebound patients

OBSTETRICS AND FAMILY PLANNING

Dept. of Obstetrics and Gynecology

Head of Department: **Prof. Dr. Nándor Ács**

Second Semester

Lectures (1 hour/week)

- Anatomy and physiology of the genital organs. The menstrual cycle.
- Conception.
- Prenatal care, diagnosis of pregnancy.
- Normal pregnancy and development of the fetus.
- Changes in maternal anatomy and physiology during pregnancy.
- Spontaneous abortion. Ectopic pregnancy.
- EPHgestosis. Hyperemesis.
- Medical complications during pregnancy. Gestational diabetes.
- Infections in obstetrics and gynecology.
- Normal labour and delivery.
- Abnormalities of labour and delivery.
- Normal and abnormal puerperium.
- Neonatology.
- Gyn. endocrinology. Family planning.
- Sterility, infertility.
- Genetic counseling, fetal anomalies.

Diploma work topics for students graduating in 2025-2026

Dr. Péter Barabás	The diagnostic challenges of salivary gland tumors
Dr. Sándor Bogdán	Miniplate osteosynthesis of mandibular fractures
Dr. Gergely Csókay	Prevalence, diagnosis and treatment of osteoradionecrosis in the maxillofacial region
Dr. Tamás Divinyi	Flapless oral implantology
Dr. Árpád Joób-Fancsaly	General conditions and diseases affecting oral surgery interventions
Dr. István Kaposvári	Occurrence and surgical treatment of supernumerary teeth
Dr. István Kaposvári	Indications and methods of vestibuloplasty
Dr. Dorottya Kiss	Antibiotic stewardship in oral surgery and dentistry
Dr. Dorottya Kiss	Antibiotic awareness of patients in Hungary
Dr. György Komlós	Dental management of patients with substance use disorder
Dr. György Komlós	The importance of peri-implant soft tissues
Dr. Ferenc Koppány – Dr. Krisztián Csomó	Bone integration of dental implants according to basic research
Dr. Kinga Körmöczi	New possibilities of bone regeneration with autogenous materials
Dr. Kinga Körmöczi	The importance of platform-switching in oral implantology
Dr. Péter Lillik	History of oral surgical oncology
Dr. Zsolt Németh	Possibilities of dental implantation in patients who have undergone radiotherapy and antiresorptive treatment
Dr. Zsolt Németh	Developmental soft tissue cysts in the maxillofacial region
Dr. György Szabó	Non-bacterial osteomyelitis of the jaw
Dr. György Szabó	Complications of the sinus lift surgery
Dr. Szófia Szentpéteri	Additional procedures to surgical therapy in the treatment of medication-related osteonecrosis of the jaw
Dr. Attila Szűcs	Biomechanical investigation of loading of dental implants. Direct mechanical testing and indirect simulations
Dr. Mihály Vaszkó	Ankylosis of the temporomandibular joint. Causes and treatment possibilities
Dr. Tamás Würsching	Treatment possibilities in syndromic and non-syndromic craniosynostosis
Dr. Tamás Würsching	The importance of the timing of surgery in patients with cleft lip and palate

ELECTIVE SUBJECTS FOR Dentistry 3rd, 4th and 5th year

PREVENTION AND CLINICAL SCREENING OF ORAL MALIGNANCIES

Department of Oral Diagnostics

(Orális Diagnosztikai Osztály, Bp. VIII., Szentkirályi u. 40. 1088

Phone: 317-6600; 317-0951; fax: 317-9199)

Tutor: Prof. Dr. Gábor Nagy D.M.D., Ph.D

I. Theoretical background

Incidence of intraoral tumours is very high, and Hungary has a leading position in Europe. Among men this is the third in ranking the causes of death, and regarding the whole population it has the seventh place.

The two main risk factors are smoking and alcohol consumption, the combination of these multiple the risk rate. Nowadays it is noteworthy that the frequency of oral cancers is increasing in younger age groups and among women lacking the before mentioned risk factors.

II. Methods of oral cancer screening

1. **Population based methods – large number of people invited to take part in a cancer screening, which could be combined with a general dental health assessment.**
2. *Opportunistic screening*

This means the comprehensive dental examination of a particular patient attending a dental service. This screening is not only concentrating on detection of oral premalignancies oral malignancies, but also other developmental and inflammatory lesions.

Basic investigative methods of head and neck region detailed case history (with special aspects on tumors, life style, persistent, non-healing lesions)

Precise extra- and intraoral physical examination

Novel visual examination procedures (e.g. Veloscope)

Conclusion

Screening for oral malignancies is a very important part of dental examination. Lesions, persisting two weeks after eliminating any irritating factor a special clinical examination including histology is needed. In this way the survival possibilities of oral cancer patients could be enhanced largely.

This shows the extreme importance of this subject in dental and medical education as well.

THEMATICS

Contemporary diagnostics of oral premalignancies and cancers

1. Importance of oral malignancies
Epidemiology, morbidities and mortality data
2. Etiological factor and pathomechanism of oral tumors
3. Rate and efficacy of different screening methods (screen or not to screen)
4. Basic clinical signs and symptoms of oral malignancies and premalignancies I.
5. Basic clinical signs and symptoms of oral malignancies and premalignancies II.
6. Consultation
7. Possibilities of early detection and prevention
8. Diagnostic process of oral malignancies I. Traditional physical examination
9. Diagnostic process of oral malignancies II. Traditional physical examination
10. Diagnostic process of oral malignancies novel Procedures (e.g. lightning devices)
11. Contemporary diagnostically possibilities and a multidisciplinary cooperation
12. Social and dental rehabilitation after the treatment of oral cancer
13. Consultation /Examination

PEDODONTIC AND ORTHODONTIC PREVENTION – for the 4th year, 7th semester

ORTHODONTIC DIAGNOSIS I-II. – both for the 4th year, 7th and 8th semester

Department of Pedodontics and Orthodontics

1 lecture / week

1 credit point

DIGITAL ORTHODONTICS – for the 5th year, 9th semester

Department of Pedodontics and Orthodontics

1 lecture / week

1 credit point

PEDODONTIC AND ORTHODONTIC PREVENTION

ORTHODONTIC DIAGNOSIS I-II. – both for the 5th year

Department of Pedodontics and Orthodontics

1 lecture / week

1 credit point

DIRECT AESTHETIC DENTISTRY 4th year

Department of Conservative Dentistry

Head of the Department: Dr. Zsuzsanna Tóth

Tutor: Dr. Kamil Al-Katib, Dr. Zsolt Döbrentey

Durations: 1 lecture and 3 practice

Every class: 3h (4x45 min)

Credit value: 1 credit point

Maximum group size: 50

Direct Aesthetic Dentistry I. (basic course) – 1st semester (autumn)

This elective course is for dental students having finished successfully Conservative Dentistry III.

1st week: theory

Advanced caries diagnostic and adequate treatment alternatives. The development of adhesive technology, and its potential in the light of direct restorations. Material science of composites. Stratification techniques, polymerization stress reduction. Minimally invasive and advanced preparation methods (tunnel-, sandwich- technique). Isolation techniques. Using photopolymerization devices. Practical possibilities in recontouring of tooth shapes. Theory and practice of anatomical layering technique Tooth anatomy and basic skills of Gnathology. Tooth color: hue, value, chroma, translucency, fluorescence, metamerism, opalescence, intensives. Dental photography.

2nd week: practice

Anterior wax-up. Proper design of cervico - oro – vestibular - incisal dimensions. Perikymata, grooves, character lines, and its effect on the visual dimension of the tooth.

3rd week: practice

Restorations in the front region. Preparation of a standardized full composite first incisor using the anatomical stratification technique.

4th week: practice

Medium size restoration in the molar region. Creation of appropriate cusps-fissure relation.

Direct Aesthetic Dentistry II. (advanced course) – 2nd semester (spring)

This elective course is for dental students having finished successfully Direct Aesthetic Dentistry I.

1st week: theory

Diagnostic criteria of aesthetic dentistry. The division between direct and indirect techniques. Color theory in the light of different composite materials. Physical, chemical properties and biocompatibility of materials used. Anatomical layering technique on complex and difficult cases: fluorotic spots, transparency, halo effect, discolored cracks, fissure staining. Advanced tooth anatomy: macro and micro-morphology. Smile design. Connection between aesthetics, function and durability. The adhesive technology frontier areas. Based on the use of composite Biomimetic principles. Special instruments. Documentation, dental photography and basics of presentation.

2nd time: practice

Direct veneer for randomized middle-aged „patients

3rd time: practice

Rebuilding the veneer for elderly patient.

4th time: practice

Large restoration in the molar region. Creation of appropriate cusp-fissure relation, using stain technique for making the restoration more life-like.

POSTGRADUATE COURSES

Head of Secretariat: Dr. János Gerle

Address: Budapest, district 8., Szentkirályi u. 47.
(7th floor., room no. 751.)

E-mail: szkepz@dent.semmelweis-univ.hu

E-mail: gerle.janos@dent.semmelweis-univ.hu

Phone: 266-7006

Fax: 266-4715

Administrators:

Ms. Erika Sviderszky Blahó

Office hours: Monday, Tuesday 13.30-15.30, Wednesday, Thursday 9.00-12.00

Phone: 266-7006, **fax:** 266-4715,

e-mail: szkepz@dent.semmelweis-univ.hu

Ms. Veronika Gecse

Office hours: Monday, Tuesday 13.30-15.30, Wednesday, Thursday 9.00-12.00

Phone: 266-7006, fax: 266-4715,

e-mail: szkepz@dent.semmelweis-univ.hu

Postgraduate courses are available at the Faculty of Dentistry at Semmelweis University, ending with a specialty exam in the following fields:

1. Pedodontics
2. Orthodontics
3. Periodontology
4. Dentoalveolar Surgery
5. Prosthetic Dentistry
6. Endodontics

The language of the postgraduate courses and the specialty exams is Hungarian. The courses convey theoretical knowledge and practical skills.

If you wish to take a specialty exam you must meet the following requirements:

you can take a specialty exam after 36 months of professional practice fulfilled as an employee, according to Hungarian law. To complete this practice, therefore, you must obtain a work permission.

professional practice includes theory and treating patients. You will need a good command of the Hungarian language to understand theory, and be able to communicate with patients

Non-European citizens must have their degree nostrified



Pharmaceutical Sciences

1st year

FACULTY OF PHARMACEUTICAL SCIENCES

1st–2nd semester

Curriculum of the credit-based training for second year students in the 2025/2026 academic year

1st Semester

Subject	Lecture (hour/week)	Practice (hour/week)	Credit	Prerequisites	Exam type
General and Inorganic Chemistry I. GYKASK266E1A	3	4	7		semi-final
Informatics GYKDEI107G1A	–	2	2		practical mark
Physical basics of Biophysics GYKFIZ267E1A	1	–	1		semi-final
Biophysics I. GYKFIZ268E1A	1.5	2,5	4		examination
Biology GYKGEN269E1A	2	2	4		semi-final
First Aid	0,3	0,7	1		practical mark
The Latin basics of pharmaceutical terminology GYKNYE111G1A	–	2	2		practical mark
Mathematics for Pharmacists (practice) GYKEGY112G1A	–	2	2		practical mark
Mathematics for Pharmacists GYKGYH271G1A	2	–2	4		practical mark
Introduction to Pharmaceutical Studies (methodology, law) GYKEGY113E1A	1	–	1		semi-final
History of Pharmaceutics and Propedeutics GYKFMG153E1A	2	–	2		semi-final
Principles of Professional Ethics I. GYKGTO071E1A	–	–	–		signature
Physical Education I. GYKTSI116G1A	–	1	–		signature
Hungarian Pharmaceutical Terminology I. GYKNYE306G1A	–	2	0		signature
Elective or obligatory elective subjects	–	–	–		examination or practical mark
Total:	11.5	18.5	27		

General Chemistry

Full name of the subject: Általános kémia
Program: Undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Ált. kém.
English name of the subject: General Chemistry
German name of the subject: Allgemeine Chemie

Neptun-Code: GYKGYK329E1A
Type of registration: obligatory

Responsible Department: Department of Pharmaceutical Chemistry

Responsible tutor/lecturer: Dr. György Tibor Balogh full professor, PhD, DSc, dr. habil
E-Mail: balogh.gyorgy.tibor@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. István Szalai full professor, DSc
Dr. Arash Mirzahosseini associate professor, PhD
Dr. Norbert Szoboszlai associate professor, PhD
Dr. Tamás Pál assistant professor, PhD
Dr. Krisztina Kovács assistant professor, PhD
Dr. Ádám Golcs assistant professor, PhD
Dr. Gitta Schlosser assistant professor, PhD
Dr. Edina Kiss assistant professor
Dr. István Molnár assistant lecturer
Zsombor Mohácsi PhD student

Classes per week: 2 hours lecture, 4 hours practice
Credit points: 6

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Understanding the fundamental concepts of chemistry and acquiring basic laboratory skills.

Short description of the subject:

Fundamentals of atomic structure. Elementary particles. The Bohr model of the atom. Dual nature of electron. Heisenberg uncertainty principle. Schrödinger's equation and quantum numbers. Pauli's exclusion principle and Hund's rule. Energy levels of orbitals and order of filling orbitals. The structure and properties of the Periodic Table of Elements. Periodic properties. Ionic bond. Covalent bond. Depicting covalent bonds with Lewis structures. Octet rule. Valence shell electron pair repulsion (VSEPR) theory. Geometry of molecules based on VSEPR theory. Creation of molecular orbitals. Polarity of bonds and molecules. Magnetic properties. Electronegativity and its determination. Metallic bond. Weak bonds. Types of chemical reactions. Stoichiometry. Phases of matter. Phase diagram and the phase law. Mixtures, solutions. Laws of dilute solutions. Acid-base theories. Electrode processes. Galvanic cells. Direction of redox reactions, redox potential. Chemical equilibria. Law of mass action. pH and its calculation. Salt hydrolysis. Buffer systems. Complexation equilibria. The Pearson concept of Lewis acid-base theory.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
1 st semester	28	56	–	–	84	Autumn semester	–

Semester program

Lecture topics/week:

- States of matter, phase changes and the most common purification methods. Purification of water.
- Atomic structure: electron, proton, neutron. Determination of the charge of an electron. The Bohr model and its limitations. The dual behavior of the electron. The Heisenberg uncertainty principle. The Schrödinger equation and the quantum numbers. The Pauli exclusion principle and the Hund's rule. The order of electron filling in an atom.
- The basic properties of the Periodic Table. Periodic properties: atomic radius ionic radius, ionization energy and electron affinity. Ionic bonding and the types of ions. The electronegativity and the ionic character of the covalent bonds. Bonding energy. Metallic bonding.
- The covalent bonds and its representation in Lewis structures. Limitations of the Lewis structure and exceptions to the octet rule. Geometry of the molecules based on the VSEPR theory.
- The valence-bond theory and the hybridization. The formation of molecular orbitals. Single and multiple covalent bonds, the bond polarity. Weak bondings.
- Ideal and real gases. Introduction to redox reactions.
- Redox reactions. Spontaneous redox processes. Redox reactions in practice.
- Galvanic cell and electrolysis Faraday's laws.
- Chemical equilibria and the factors affecting the chemical equilibrium. Law of mass action
- Acid base theories, acid-base equilibria and the pH

- pH calculations, strong and weak acids. The hydrolysis and the buffer systems. Colligative properties
- Thermal decomposition of inorganic compounds. Complex formation I.
- Complex formation II. Characterization of complexes.
- Heterogeneous equilibria, solubility product, solubility, factors affecting the solubility.

Practice topics/week:

- Grading requirements. General instructions, safety in laboratory. Opening inventory. Nomenclature of inorganic compounds. Observation of osmosis.
- Problem solving: concentrations, mixing and diluting of solutions. Recrystallization of alum. Sublimation of iodine.
- Problem solving: basics of stoichiometry, acid-base reactions. Purification of hydrochloric acid by distillation. Preparation of copper(II) sulfate.
- Problem solving: stoichiometry, gas laws. Preparation for the 1st Midterm. Water purification using ion-exchange resins.
- Hydrolysis. Oxidation state of the elements. Observation of hydrolysis of some salts.
- Balancing redox equations, standard potential. Experimental observation of redox reactions, direction of spontaneous change. Observation of some oxidation-reduction reactions.
- Redox reactions II. Determination of mass of a magnesium sample.
- Preparation for the 2nd Midterm. Demonstration: 'Chemical volcano': thermal decomposition of ammonium dichromate
- Problem solving: pH calculations, Part I. Preparation of copper(II)

oxide (p. 128). Demonstration: Preparation of metallic substances: manganese.

10. Problem solving: pH calculations, Part II. Preparation of metallic substances: copper. Preparation of precipitated sulfur.
11. Thermal decomposition, Problem solving: pH calculations, Part III. Buffer solutions and buffer action. Observation of thermal decomposition of inorganic substances.
12. Preparation for the 3rd Midterm. Preparation of a coordination compound, [tetraammine copper(II)] sulfate.
13. Solubility of precipitates. Solubility product. Compensatory lessons for Midterm writing
14. Compensatory lessons for Midterm writing

Schedule of consultations: upon request

COURSE REQUIREMENTS

Prerequisites: –

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Students must be present at minimum of 75% of the total number of laboratory practices scheduled during the semester (i.e. a maximum of 3 absences is allowed). Timeliness is mandatory. Arriving more than 15 minutes late will be considered equivalent to absence from the laboratory practice. Arriving up to 15 minutes late to a practice will be considered “late” and 3 late practices amount to an absence. All exercises and measurements listed in the schedule must be completed before the end of semester. A make up (“supplementary lab”) to complete the measurements labs missed will be provided during the semester; and at the end of the semester for justified cases.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results

In order to assess the mastery of the theoretical curriculum 3 major test-papers will be written during lecture hours on separate occasions which will be agreed upon mutually with the students (see list of lectures). All written tests and oral answers will be evaluated according to a five-scale grading system. Minimum of 50% of the total score is required for earning a passing mark (satisfactory, 2) on the tests. 2 opportunities to correct/make-up the marks of each major test (retake) will be provided during the semester.

The mean of the 3 test results (or the retake result thereof) will account for 50% of the semi-final mark (see **Examination requirements**).

Requirements of the signature at the end of the semester:

Acquiring the semester-end signature has theory and practice requirements as well.

Theory requirement:

At least satisfactory (2) mark achieved on all the major midterm tests (or retake test thereof).

Practice requirement:

The student must accomplish all goals defined for the laboratory practices as in the topic list and the number of absences does not exceed the allowed limit.

A student is allowed to take the semester-end examination if they have acquired the signature for the semester.

Type of the semester-end examination: semi-final

Examination requirements:

The semester-end mark consists of 2 parts:

- The mean of the 3 test results (or the retake result thereof) (50%);
- The mark achieved on the semi-final oral exam (50%).

The topic list for the semi-final oral exam will be published on the MOODLE website of the department til the beginning of the semester. For a successful semester-end examination both the above parts must be achieved with at least a satisfactory (2) mark.

Form of the semester-end examination: oral

Scientific, course related researches, publications, assays:

Materials of the lectures and practices and additional notes can be downloaded from Moodle E-learning interface.

Recommended literature: -

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: -

The course description was prepared by:

Dr. Tamás Pál

Informatics (practice)

Complete name of the course: Informatika (gyakorlat)**Program:** Undivided program (pharmaceutical)**Schedule:** full-time**Short name of the subject:** Informatics (practice)**English name of the subject:** Informatics (practice)**German name of the subject:** Informatik (Praktikum)**Neptun-Code:** GYKDEI107G1A**Type of registration:** obligatory**Responsible Department:** Institute of Digital Health Sciences of the Faculty of Health and Public Services of Semmelweis University**Responsible tutor/lecturer:** Dr. Szócska Miklós PhD, PhD, professor**E-Mail:** titkarsag.dei@semmelweis.hu**Further tutors:**

Sándor Zoltán PhD, associate professor

Tamus Ádám PhD, PhD, senior lecturer

Tóth Tamás associate professor PhD

Class /week: 2**Credit points:** 2**Professional content, intent of acquirement and it's function in order to implement the goals of the program:**

The goal of the course is to introduce the students to the applications of health information technology, especially the sources, organization, analysis and presentation of health information and knowledge. To improve the basic computer skills of students, including the use of office software tools, digital data storage and analysis methods. Acquisition and practical application of IT tools and methods required for later studies (e.g. preparation of a dissertation)

Short description of the subject:

Knowledge of basic MS Office tools

Sources of health information and knowledge, online scientific databases and the basics of evidence-based medicine

Course data							
Recommended semester of completing the course	Lecture (contact hrs/ week)	Practice (contact hrs/ week)	Seminar (contact hrs/ week)	Individual lecture	Total number of contact hours/ semester	Semester	Consultation
1	–	2	–	–	28	autumn	–

Semester program**Practice topics/week:**

1. MS Excel – basics of data storage
2. MS Excel – processing of data 1
3. MS Excel – processing of data 2
4. MS Excel – data representation, diagrams
5. MS Excel – advanced level exercises
6. Practice, preparation for the test
7. 1. test (Excel exercises, computer test)
8. Theoretical basics of databases
9. Creation of a simple database with Ms Access
10. Data extraction from databases, performing queries
11. Online health information sources
12. Presentation tools
13. Visualisation of medical data: Infographics, word clouds
14. 2. test (Access exercises and information searching, computer-based test)

Order of consultations: by agreement**Prerequisites:** –**Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:**

Attendance of at least 75% of the practices, at least 50% result of both tests

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results

Mid-term test on week 7 (topic: Excel)

Mid-term test on week 14 (topics: Access, online information sources)

Replacement test: 2 times in the first week of the exam period

Requirements of the signature at the end of the semester:

Attendance of at least 75% of the practices, at least 50% result of both tests

Type of the semester-end examination: practical grade**Examination requirements:** as published by the education-research department on the MOODLE interface by the start of the academic term.**Form of the semester-end examination:** written**Scientific, course related researches, publications, essays:****Recommended literature:**

Meskó Bertalan: The Guide to the Future of Medicine, Webicina 2014 ISBN 9789631200072

Microsoft Office Help and Training Center: <https://support.office.com/>

The educational materials are available in the Moodle system.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no**The course description was prepared by:**

Dr. Tóth Tamás

Physics for pharmacists

Neptun code: GYKGYI330E1A

Type of registration: obligatory

Institute: Department of Pharmaceutics, Institute of Biophysics and Radiation Biology

Name of the tutor/lecturer: Dr. István Antal professor PhD,
Phone: +36 1 4591-500/53066
E-Mail: antal.istvan@semmelweis.hu
Dr. Ádám Orosz assistant professor, PhD
Phone: +36 1 4591-500/60209
E-Mail: orosz.adam@semmelweis.hu

Further tutors:

Dr. Bálint Budavári PhD student
Dr. Gergely Agócs senior lecturer, PhD
Dr. Tamás Bozó senior lecturer, PhD
Dr. Rita Galántai teacher, PhD
Dr. Nikoletta Kósa teacher, PhD
Dr. Gusztáv Schay senior lecturer, PhD
Dr. Ádám Zolcsák PhD student

Number of classes /week: 1.5 hours theory, 2 hours practice

Credit points: 4

Aims of the subject

Our teaching program is evolving continuously. Focused on the general objective of meeting the requirements of the medical curriculum, the courses are also intended to provide specific medical physics and statistics training.

Today's students will be the physicians of the oncoming decades. In selecting and highlighting topics of study, the first viewpoint is scientific foresight: the knowledge should be conveyed which must be pertinent to ensure first-class professional competence while keeping abreast of the most recent development in the field of study. Our aim is not only the teaching of a specific body of knowledge but also the development of the exact scientific method and concrete problem-solving abilities.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2 nd semester	21	28	–	–	49	Fall semester	–

Program of semester

Topics of theoretical classes (pro week):

1. week: Introduction
2. week: The world that surrounds us, the nature of matter. Changes in physical states, physical quantities and their units.
3. week: Mechanics - dynamics, statics, work, energy
4. week: Fluids and gases, hydro-aerodynamics.
5. week: Basics of thermodynamics. Boltzmann distribution and its applications
6. week: Atomic and nuclear physics, nuclear radiation, radioactive isotopes
7. week: Electricity, magnetism
8. week: Oscillations, waves. Basics of geometrical optics
9. week: Optics, lenses, lens systems; magnifying glass, microscope
10. week: Wave optics
11. week: Radiation, electromagnetic radiation, photons.
12. week: Light emission, thermal radiation, luminescence
13. week: Light scattering, light absorption, lasers.
14. week: Bioelectronics - basic circuits, amplifier, signal conversion, signal selection

Topics of practical classes (pro week):

1. week: **Introduction. Data analysis**
2. week: Light emission
3. week: Amplifier
4. week: Problem solving
5. week: Refractometry
6. week: Light absorption
7. week: Resonance
8. week: Microscopy
9. week: Problem solving
10. week: Polarimetry
11. week: Optics of the eye
12. week: Dosimetry
13. week: Nuclear medicine
14. week: Summary, repetition

Scientific, course related researches, publications, essays:

Damjanovich–Fidy–Szöllősi (eds): Medical Biophysics (2009)
Medical Biophysics Practices (Semmelweis Publisher, 2015)

Biology I.

Full (Hungarian) name of the course: **Biológia I.**

Name of the Programme: **Pharmacy Basic Education**
Abbreviated name of the subject: **Biol I.**
English name of the subject: **Biology I.**
German name of the subject: **Biologie I**

Neptun-Code: GYKGEN269E1A
Institute: Department of Genetics, Cell- and Immunobiology Semmelweis University, Faculty of Medicine

Name of the tutor/lecturer: Prof. Dr. Edit Buzás DSc
coordinator: Dr. Orsolya Láng PhD
Phone: 2102940/56251
E-Mail: lang.orsolya@semmelweis.hu

Further tutors:
Dr. András Kristóf Fülöp Associate Professor, CSc
Dr. Hargita Hegyesi Associate Professor, PhD
Dr. László Kőhidai Associate Professor, CSc
Dr. Eszter Lajkó Research Fellow, PhD
Dr. Marianna Csilla Holub Associate Professor, PhD
Dr. Zoltán Wiener Associate Professor, PhD

Dr. Tamás Visnovitz Assistant Professor, PhD
Dr. Pálma Porrogi Assistant Professor, PhD
András Försönits Research Assistant

Class per week: Lecture 2hrs Practice 2hrs
Credit points: 4

Professional content, intent of acquirement and it's function in order to implement the goals of the program:
The basics of classical and molecular cell biology and techniques applied in the field of modern cell biology are discussed. The subject provides the theoretical background for Biochemistry, Physiology, and Anatomy.

Short description of the subject:
The subject Biology I. discusses the close relation of the function and structure of the eukaryotic cells. It discusses the most significant phenomena of cell compartmentalization, function, aging and cell death. In practices the following topics are studied: light- and electronmicroscopy and histotechniques, relevant techniques of cell biology applied to detect basic cell physiological activities.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lecture	Total number of contact hours/ semester	Semester	Consultation
1 semester	28	28	–	–	56	Autumn semester	6 (exam period)

Program of semester

Topics of theoretical classes (pro week):

- 1. week: The cell membrane: structure and function
 - 2. week: Structure and function of nucleus I.
 - 3. week: Structure and function of nucleus II.
 - 4. week: Endoplasmic reticulum and the ribosome
 - 5. week: Golgi complex, secretion and protein transport
 - 6. week: Lysosomes, endocytosis, vesicular transport
 - 7. week: Structure and function of mitochondria and peroxisomes
 - 8. week: The cytoskeleton and cellular movement
 - 9. week: Cell adhesion, cell junction
 - 10. week: Extracellular regulation of the cells, signal transduction I.
 - 11. week: Extracellular regulation of the cells, signal transduction II.
 - 12. week: Cell cycle and its regulation I.
 - 13. week: Cellular aging and programmed cell death
 - 14. week: Stem Cells and differentiation
- (The order of lectures may vary.)

Topics of practical classes (pro week):

- 1. week: The light microscope in use
 - 2. week: General view of the cell; Light microscopic microtechnique
 - 3. week: Plasma membrane; Electronmicroscopic microtechnique
 - 4. week: Cell nucleus; Cyto(histo)chemistry
 - 5. week: Endoplasmic reticulum
 - 6. week: Midterm I.
 - 7. week: Immunohistochemistry and super-resolution microscopy
 - 8. week: Secretion
 - 9. week: Endocytosis; Cellular digestion;
 - 10. week: Cell and tissue culture
 - 11. week: Store and supply of energy; Mitochondria; Peroxisome
 - 12. week: Cell surface differentiation, ultrastructure of cellular junctions. Enzyme-histochemistry.
 - 13. week: Cellular aging and programmed cell death
 - 14. week: Stem Cells and differentiation
- (The order of lectures may vary.)

COURSE REQUIREMENTS

Prerequisites: -

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:
Student must visit 75% of the practice classes. More than three absences from the practice invalidate the semester, no signature is given. There are no extra practices.

Number, topics, and dates of tests during the semester, opportunities of makeup and improvement of results:
The ability to set a light microscope for sample examination is controlled by the practice teacher.
Students will write two Midterm tests (Moodle tests) during the semester. Writing the tests is not obligatory. Students who achieve 75% of the total score, in case of a successful examination (obtain more than 50% of the total score in the exam), will get one better mark. This option is only available until the end of the regular examination period, and cannot be transferred to the extended exam period, CV, and FM courses.

Requirements of the signature at the end of the semester: Less than three absences from the practice class.

Number and type of projects students have to perform independently during the semester and their deadlines: -

Type of the semester-end examination: semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.
Written test in MOODLE

Form of the semester-end examination: written

The possibility and conditions for offering grades: -

Scientific, course-related researches, publications, assays:
The Institute of Genetics, Cell- and Immunobiology (DGCI) activity includes teaching, research, and diagnostics. Our scientific work focuses on a broad scale in the fields of immunology, cell biology and genomics. The main research groups of the Department: National Heart Program, Extracellular Vesicle; Medical Genomics; Chemotaxis; Experimental Translational Immunology and Molecular Cancer Biology. The applied methodologies include cell- and molecular biological, immunological, genomic, and bioinformatic techniques and procedures.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on and individual assesment basis

First Aid (practice)

Full name of the subject:: Elsősegélynyújtás
Program: Undivided program (pharmaceutical)
Schedule: full-time

Name of the Programme: Pharmacy Basic Education
Short name of the subject: First Aid
English name of the course: First Aid
German name of the subject: Erste Hilfe

Neptun-Code: GYKXI270G1A
Type of registration: obligatory
Institute: Department of Oxiology and Emergency Care

Name of the tutor/lecturer: Dr. Hornyák István senior lecturer
Phone: 486 5840
E-Mail: hornyaki@se-etk.hu

Name of the persons responsible for the teaching of the subject:
Dr. Hornyák István PhD

Number of classes /week: 0,3 theory 0,7 practical

Credit points: 1

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The students are acquainted with the international Guidelines of First Aid. They learn the assessment of an emergency case. In the analysis of the victim the use of ABCDE approach. Introduce into the serious emergency situation, airway management, unconsciousness, BLS for adult or baby, bleeding control.

Short description of the subject:

Assessment on the scene. The ABCDE approach in the first aid practice. Identification of the dangers. Airway management for non-injured and injured unconscious victim. Basic Life Support. The use of AED with CPR. CPR for Baby. Types of injuries. Bleeding control. Wound care, bandages. Chest pain, myocardial infarction, Stroke. Anaphylaxis. Environmental emergencies.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
1. semester	4,2	9,8	–	14	-	Autumn	–

Topics of theoretical classes (pro week):

1.-2. Lessons: the importance of the first aid. The current international Guideline of first aid. The content of the ABCDE approach. The importance of the scene in the emergency cases. Conscious – unconsciousness. Airway management. The care of the airway obstruction in adult and baby. The signs of stroke and the care. Sudden cardiac arrest, Basic Life Support. Chest pain, signs of myocardial infarction.

3.-4. Lessons: The art of injuries. The type of wounds. Burned wound. Bleeding control, without tools, with tourniquet. Wound care and bandages. Anaphylaxis. Immersion. Heatstroke, hyperthermia. Hypothermia.

Topics of practical classes (pro week):

1-5. Lessons: Assessment in different situation, with the ABCDE method. Recovery position. HAINES position. Adult BLS, Baby BLS.

6.-10. Lessons: Bleeding control with more solution. Wound care. Bandages: press-, hard-, neck-, joint-, handbandage. Repeat of the BLS

Schedule of consultations: -

COURSE REQUIREMENTS

Prerequisites: -

Conditions of attending the classes, amount of acceptable absences, way of presentation of leave, opportunity for makeup:-

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:-

Requirements of signature:

The student has to take part of practice lessons.
25% of absence confirmed with official document
25%-50% absence has to retake in other time over 50% no signature

Number and type of projects students have to perform independently during the semester and their deadlines:-

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Mathematics for Pharmacists

Complete name of the course: Matematika gyógyszerészeknek
Program: Undivided program (pharmaceutical)
Schedule: full-time
English name of the subject: Mathematics for Pharmacists
German name of the subject: Mathematik für Pharmazeuten
Short name of the subject: Math

Neptun-Code: GYKGYH271G1A
Type of registration: obligatory
Institute: Semmelweis University, Department of Pharmacology

Name of the tutor/lecturer:
 László Tóthfalusi professor, D.Sc.
Phone: (+36-1) 476-3600
E-Mail: totlasz@net.sote.hu

Number of classes /week: Lectures: 2 hours Seminars: 2 hours

Credit points: 4

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

Acquisition of basic pharmacological numeracy skills, review of mathematical apparatus used in other subjects, introduction of computer bases of modeling techniques useful in scientific research

Short description of the subject:

The course aims to provide a comprehensive overview of the mathematical tools used in the pharmaceutical sciences. From a mathematical point of view, it covers the following subjects: Elementary and linear algebra, mathematical analysis and numerical methods. During the exercises, the goal is to develop the numerical skills used in basic pharmacy practice, and to get to know the computer options used for mathematical calculations.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
1 semester	2	–	–	–	28	Autumn	–

Semester program

Topics of theoretical classes (pro week):

Week 1: Pharmacy calculations
 Week 2: Sets, relations
 Week 3: Functions I
 Week 4: Functions II
 Week 5: Linear algebra I
 Week 6: Linear Algebra II
 Week 7: Sequences, Limits
 Week 8: Differentiation
 Week 9: Applications of differentiation
 Week 10: Integration
 Week 11: Differential equations
 Week 12: Two-variable functions, concept of partial derivative
 Week 13: System of differential equations
 Week 14: Computer applications

Topics of practical classes (pro week):

Week 1: Pharmacological calculations I. Algebraic problems
 Week 2: Use of the R programming environment to solve mathematical problems I.
 Week 3: Representation and transformation of functions
 Week 4: The R programming environment to solve mathematical problems II.
 Week 5: Solving linear equations
 Week 6: Linear regression
 Week 7: Application of series and sequences
 Week 8: Midterm 1
 Week 9: Calculation of limit values. Differential calculus
 Week 10: Application of differential calculus
 Week 11: Applications of integral calculus
 Week 12: Solving differential equations
 Week 13: Midterm 2
 Week 14: Retake midterm

COURSE REQUIREMENTS

Schedule of consultations: Consultation is possible during the seminars

Prerequisites: –

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Granting credit might be refused if more than 3 seminars are missed. Absences can be made up in the class of another group.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

There will be two midterms in the 8th and 13th weeks and also a short quiz at each seminar. Results of the latter is aggregated at the end of the semester.

The grade is calculated based on the average of the three percentile results as follows:

< 50% – failed
 50-70% – 2
 71-80% – 3
 81-90% – 4
 >90% – 5

In the 14th week, there will be a retake opportunity for those students whose average result below 60%.

Requirements of signature:

Participation in at least 75% of the practice sessions is mandatory. The retake quiz on the last week of the semester is needed if the average score is below 60%.

Number and type of projects students have to perform independently during the semester and their deadlines: -

Type of the semester-end examination: none

Examination requirements: not applicable

The possibility and conditions for offering grades: not applicable

Individual activity of the student during the semester (protocol, etc.): Solving practice exercises

Performance control in the examination period (final, examination): Examination

Performance control in the examination period (written, oral, written and oral): Written

Prescribed external practice: None

Recommended textbook: Joel Kilty, Alex McAllister. Mathematical Modeling and Applied Calculus, Oxford University Press, 2018

Pharmaceutical Propaedeutics

Program:: undivided program (pharmaceutical)

Schedule: full-time

Schedule: full-time: Pharmaceutical Propaedeutics

English name of the subject: Pharmaceutical Propaedeutics

German name of the subject: Pharmazeutische Propedeutik

Type of registration: obligatory

Neptun code of the subject: GYKEGY332E1A

Institute: University Pharmacy, Department of Pharmacy Administration

Name of the tutor/lecturer: Dr. Romána Zelkó professor, PhD, DSc

Phone: +361-36 1 459 1500

E-Mail: zelko.romana@semmelweis.hu

Number of classes /week: 1,5

Credit points: 0,5

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

To familiarise students with the purpose, content, structure and requirements of pharmacy education, which will guide them towards

further university studies. It provides an insight into the profession of pharmacist. It introduces the health service and pharmaceutical fields that can be covered by a pharmacy qualification. It introduces the concept of medicine and highlights its differences from other products that can be sold in pharmacies.

Short description of the subject:

The focus of the course is to provide information for students on the content and structure of the university training program, starting from the knowledge of the expected training outcomes of pharmacist training, based on the relevant Hungarian EU-compliant regulations. The course then introduces the organisational structure and training structure of Semmelweis University and the Faculty of Pharmacy. The course also aims to provide first-year students with general pharmacy knowledge at the beginning of their studies, so that they can acquire the basic subjects with an appropriate pharmacy perspective. In addition to providing an overview of the different areas of pharmacy through lectures, the course aims to provide future pharmacists with interactive, team building, and awareness-raising exercises. The primary aim of teaching the subject is to confirm that students have chosen a valuable and exciting career.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
1st semester	21	7	–	–	28	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week):

1. The aim and characteristics of pharmacist training, disciplines, structure of pharmacist training; EU-compliant degree in pharmacy
2. Unified Higher Education Study System (Neptun) and its management, exam application process, viewing of results, messaging. Study administration
3. E-learning - Moodle-Zoom
4. Use of library services and databases
5. Being a Student at Semmelweis. Student organizations (IPSF, HUPSA); Student mobility (Erasmus).
6. Training places, structure of Semmelweis University and Faculty of Pharmacy: its organizational units.
7. Writing student applications, professional CV.
8. Pharmaceutical Propaedeutics; The profession and duties of the pharmacist; a profession with lifelong learning
9. The types of medicines according to different aspects (drugs of different origin, controlled drugs, counterfeit medicines), drug-forms. Basic concepts of terminology (dose, prescription ...)
10. Research and drug development
11. Quality assurance in the world of Pharmacy, therapy safety

Topics of practical classes (pro week):

- Visit to the EGIS - Visitor Center
- Visit to the Hospital Pharmacy of Semmelweis University and Unit dose dispensing in Practice
- Visit to the teaching Pharmacy of the Faculty - in a pharmacy laboratory

COURSE REQUIREMENTS

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Based on the current Study and Exam requirements

Requirements of the signature: completing the exam

Type of the semester-end examination: semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

The possibility and conditions for offering grades: -

Scientific, course related research, publications, essays: -

Hand-outs of lectures

History of Pharmacy and Semmelweis University

Program: undivided program (pharmaceutical)

Schedule: full-time

Schedule: full-time: History of Pharmacy and Semmelweis University

English name of the course: History of Pharmacy and Semmelweis University

German name of the subject: Geschichte der Pharmazie und Semmelweis Universität

Type of registration: obligatory

Institute: University Pharmacy, Department of Pharmacy Administration

Name of the tutor/lecturer:

Dr. Romána Zelkó professor, PhD, DSc

Phone: +361-2170-927

E-Mail: zelko.romana@semmelweis.hu

Number of classes/week: 2

Credit points: 2

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The course aims to provide a comprehensive overview of the history of pharmacy, tracing its evolution from prehistory to the present. This historical context will help students understand contemporary achievements in pharmacy. It serves as an introductory exploration of pharmaceutical sciences and the pharmacy profession, detailing the progression of pharmacy practices and the education of pharmacists. Additionally, the course includes a focused study on the history of Semmelweis University and its Faculty of Pharmacy.

Short description of the subject:

The history of medicine and pharmacy is an important part of general history, and is crucial for pharmacists' understanding of medical evolution. This course is designed to familiarise students with the development of pharmacy from ancient times to the modern era, highlighting key milestones, instruments, literature, and pharmacist/practitioners involved in historical healing practices. Additionally, it aims to explore both the national and international narratives of pharmacy education, with a particular focus on the history of Semmelweis University and its Faculty of Pharmacy.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Semester	Consultation
1st semester	28	–	–	–	28	Autumn semester	–

Program of semester

Topics of theoretical classes (every second week):

- History of the Semmelweis University, Ignac Semmelweis
- Medicine and Pharmacy in Egypt/Rome/Greece
- Medieval times and cure in the monastery
- Paracelsus, iatrochemistry; chemical, biological and medical discoveries
- History and development of International Health and Pharmaceutical Organisation
- Famous Pharmacists in the world
- Change of Pharmacist role throughout the centuries

Topics of practical classes (pro every second week):

- History of the Hungarian Pharmaceutical Industry: Richter Gedeon
- History of the international pharmaceutical Industry
- Pharmacopoeias
- Development of the community pharmacy
- Websites related to health and pharmacy, pharmaceutical literature
- History of the Pharmacopoeias
- Visit to the Pharmacy Museum

COURSE REQUIREMENTS

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Based on the current Study and Exam requirements

Requirements of the signature: –

Type of the semester-end examination: semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

The possibility and conditions for offering grades: –

Scientific, course related research, publications, essays: –

Hand-outs of lectures

David L. Cowen, William H. Helfand: Pharmacy, an illustrated history. Harry N. Abrams., Publishers, New York. (1998)
List of course materials: Lecture hall projection
Scientific, course related researches, publications/essays: –

Principles of Professional Ethics I.

Complete name of the course: Hivatásetikai alapok I.

Name of the Programme: Pharmacy Basic Education

Abbreviated name of the course: Principles of Prof. Ethics

English name of the course: Principles of Professional Ethics I.

Neptun-Code: GYKGT0071E1A

Type of registration: obligatory

Number of classes /week: –

Credit points: –

Newly enrolled students have to take an oath at the Opening Ceremony.

Physical Education I.

Full (Hungarian) name of the subject: Testnevelés I.
Program: Undivided program (pharmaceutical)
Schedule: Full-time
Short name of the subject: P.E.
English name of the subject: Physical Education I.
German name of the subject: Sport I.

Neptun Code: GYKTSI3351A
Type of registration: obligatory
Institute: Semmelweis University's Physical Education and Sportcenter

Name of the tutor/lecturer: Várszegi, Kornélia director P.E. teacher
Phone: +36-20/825-0611
E-Mail: varszegi.kornelia@semmelweis.hu;
titkarsag.tsk@semmelweis.hu

Further tutors:
Doharné Buczkó, Anikó P.E. teacher
Kalmus, Dániel P.E. teacher
Lehel, Zsolt P.E. teacher
Sótonyiné Hrehuss, Nóra P.E. teacher

Várszegi, Kornélia P.E. teacher
Weisz, Miklós P.E. teacher
Dominika Farkas P.E. teacher

Number of classes /week: 1 hour practise
Credit points: 0 credit

Course principles:
The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice – so that they can represent those in their later practice, through their own health-promoting behavior.

Brief course summary:
One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
1st semester	–	14	–	–	14	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week): -

Topics of practical classes (pro week):

1st Week: General information
Health and Safety, Fire and Environmental protection. The mid-year adoption requirements, the construction of the classes and the presentation of the university recreational and sports opportunities for extra-curricular activities. Heart rate measurements, Ruffier test and evaluation of the results.

2nd Week: Athletic
Exercises to improve stamina. Preferably outdoors, on grass ground running, with the aim of developing good running and breathing techniques.

3rd Week: Flying disc
Introduction the basic of frisbee rules and practicing the basic technical elements in pairs and game situation.

4th Week: Tennis
Introducing the basis technical elements of tennis (forehand and backhand shot), improving hand–eye coordination.

5th Week: Agility ladder
Introducing different running, skipping techniques using agility ladder.

6th Week: Football
Introducing the basic technical elements of football. Single exercises and exercises in pairs to improve the ball skill development.

7th Week: Badminton
Introducing the basic technical and tactical elements of badminton. Introducing the basic rules and game.

8th Week: Circuit training
Bodyweight exercises and exercises with basic equipment to learn the correct functional movement pattern.

9th Week: Ruffier test and ball skill developing exercises
Compare the results with the previous test to bring the importance of the health of the cardiovascular system to the attention.

10th Week: Meta
Introducing the game and the basic rules. Aim to improve the ball skill development, improve reaction time, speed and explosiveness.

11th Week: Obstacle course
To complete a built up obstacle course using differend creeping-climbing, hovering, pulling, skipping, throwing techniques for general skill development.

12th Week: Core traning
Postural correction exercises using the own bodyweight especially to strengthen the core muscles to prevent the health of the vertebrae.

13th Week: Skipping rope
Endurance and coordination developing exercises at different levels using skipping rope.

14th Week: Dumbbell exercises
Strengthening exercises with dumbbells.

COURSE REQUIREMENTS

Order of consultations: –

Prerequisites: –

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:
The number of active participations for physical education classes is 10, regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Requirements of the signature at the end of the semester:
Active participation in practice classes 10 times (once a week) under the conditions described above.

Type of the semester-end examination: signature

The possibility and conditions for offering grades:
Active participation in practice classes 10 times under the conditions described above.
May be exempted from attending classes the student who

- whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate**

or

- does sports regularly and submits a certificate of association and federation in the neptun system during the exemption period at the beginning of the semester.**

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes
If you have not completed the course you may be readmitted in the 1. semester of the following academic year.

The course description was prepared by: Kornélia Várszegi

Hungarian Pharmaceutical Terminology I.

Full name of the subject: Magyar gyógyszerészeti szaknyelv I.
Name of the Programme: Undivided program (pharmaceutical)
Schedule: full-time
Abbreviated name of the course: Hungarian Pharmaceutical Terminology I.
German name of the subject: Ungarische pharmazeutische Terminologie (Praktikum) I
English name of the course: Hungarian Pharmaceutical Terminology (practice) I.

Neptun-Code: GYKNYE306G1A
Type of registration: obligatory
Institute: Institute of Languages for Specific Purposes

Name of the tutor/lecturer: Katalin Fogarasi PhD, habil.

Further tutors:
 Borda Szandra language teacher
 Nagyné Górász Judit language teacher
 Tick Vera language teacher

Zsófia Egedi language teacher
 Lili Szöllősi language teacher

Number of lectures /week: 2
Credit points: 0

Course principles:
 The role of this subject is to help students acquire the basic vocabulary, grammar and language skills they need for the effective communication in the language they use during their field practice both in their everyday life /'survival language/' and in their academic studies.

Brief course summary:
 The first semester is dedicated to learning basic general vocabulary and grammar. Students acquire basic structures and the vocabulary for everyday topics / e.g. shopping, food, housing etc./. The course places special emphasis on phrases essential for everyday communication, e.g. introductions, greetings, getting/giving information etc. and on phrases needed in basic communication at a pharmacy.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
1	–	2	–	–	28	autumn	–

Program of semester

I. Lecture topics/week: –

II. Practice topics/week:

Week 1 The Hungarian alphabet
 Week 2 Greetings
 Week 3 Basic pharmacy vocabulary
 Week 4 Numbers
 Week 5 Descriptions (nouns and adjectives)
 Week 6 Ordering foods and drinks (accusative case)
 Week 7 Asking for medications (accusative case)
 Week 8 Test (oral)
 Week 8-9 Locatives
 Week 10-11 Activities – verbs
 Week 12 Explaining what can be found in a pharmacy
 Week 13 Final test (oral)
 Week 14 Oral interview

COURSE REQUIREMENTS

Order of consultations: Individual consultations by email or in person on meeting formerly agreed upon with the teacher via email.

Prerequisites: – There is no prerequisite for the first semester.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

A maximum of 3 absences is allowed (3x90 minutes); if the number of absences exceeds this, the student may make up missed classes in another group (maximum two times) in agreement with the instructor.

A student who misses more than 25% of the practical classes will not be allowed to get a signature (Study and Examination Regulations §29). For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required. According to the Study and Examination Regulations (§ 28), three tardies count as one absence. Arriving 15 minutes later than the start of the lesson is considered tardiness.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Hungarian Pharmaceutical Terminology I (signature)
 an oral interview, week 14

Topic: the material covered
 Make-up and upgrade opportunities: to be arranged outside of class with the instructor, at the latest by the end of the first week of the examination period.

Semester acceptance conditions:
 An attendance of 75% is required to get the signature.

Knowledge testing during the semester:
 The instructors may evaluate the students' performance with the help of short tests.

Requirements of the signature at the end of the semester:
 An attendance of 75% minimum and taking the two oral tests.

Examination requirements:
 As published by the education-research department on the MOODLE interface by the start of the academic term.
 Signature

Performance control in the examination period (final, semi-final):

–

Performance control in the examination period (written, oral, written and oral): –

List of teaching materials: Teaching materials and audio recordings containing authentic texts compiled by the instructors of the Institute.

Prescribed external practice: –

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on an individual assesment basis

List of course materials: –
 Scientific, course related research material, publications/essays: –

The Latin Basics of Pharmaceutical Terminology

Responsible Department: Department of Languages for Specific Purposes

Responsible tutor: Katalin Fogarasi PhD habil., director, associate professor

Contact information:

phone: +3612159338

email: fogarasi.katalin@semmelweis-univ.hu

Class per week: 2

Credit point(s): 2

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The course is to prepare students for understanding Latin and Greek medical and pharmaceutical terminology, including the language of anatomy, diagnostics, pathophysiology, and prescriptions.

Short description of the subject:

Students get familiarised with the basics of Latin grammar, such as forming plural forms of Latin nouns, adjective agreement, the use of numbers, and prepositional phrases (accusative and ablative cases). Furthermore, they develop an extensive Latin and Greek vocabulary that enables them to understand and formulate medical terms in the fields of medicine and pharmaceuticals.

Topics of practical classes (per week):

Week 1	Latin herb names in pharmaceuticals
Week 2	Parts of herbs as used in pharmaceuticals
Week 3	Parts of herbs with adjectives
Week 4	Types of crude drug names
Week 5	Revision of herb names
Week 6	Test 1
Week 7	Pharmaceutical preparations with adjectives
Week 8	Pharmaceutical preparations with possessives
Week 9	Prescriptions – the basics
Week 10	Prescriptions – common phrases
Week 11	Prescriptions and excipients
Week 12	Prescriptions – revision 1
Week 13	Prescriptions – revision 2
Week 14	Test 2

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: An attendance of 75% minimum is required to get the signature. Classes can be made up in a different group of the subject with the written consent of the instructors.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results*:**

Test 1 is scheduled for week 6 and covers the topics of weeks 1-5. Test 2 is scheduled for week 14 and covers the material of weeks 7-13. The final grade is calculated based on the two tests.

2. SEMESTER

Subject	Lecture (hour/ week)	Practice (hour/ week)	Credit	Prerequisites	Exam type
General and Inorganic Chemistry II. GYKASK266E2A	3	–	3	Gen. and Inorg. Chemistry I.	semi-final
Analytical Chemistry I. GYKASK273G1A	2	4	6	Gen. and Inorg. Chemistry I., Introd. to Pharm. Studies, Mathematics for Pharm.	practical mark
Anatomy GYKANT272E1A	–	2	–	Biology I., Pharm. Terminology,	semi-final
Pharmaceutical biophysics GYKFIZ338E1A	1.5	2.5	2	Physics for pharmacists	examination
Biology II. GYKGEN109G2A	–	2	2	Biology I.	practical mark
Biology (theory) II. GYKGEN269E2A	2	2	4	Biology I.	final*
Pharmaceutical and medical terminology GYKNYE119G1A	–	2	1	The Latin basics of pharmaceutical terminology	practical mark
Communication and Information Networks GYKMAG120G1A	1	1	2	Introd. to Pharm. Studies	practical mark
Basics of Economics (theory) GYKEGY247E1A	1	–	1	Mathematics for Pharm., Introd. to Pharm. Studies	semi-final
Physical Chemistry for Pharmacists GYKGYI122G1A	2	2	4	Gen. and Inorg. Chemistry I., Mathematics for Pharm.	practical mark
Organic Chemistry I. (theory + practice) GYKSZK337E1A	4	4,5	8	Gen. and Inorg. Chemistry I.	semi-final examination
Hungarian Pharmaceutical Terminology II. GYKNYE306G2A	–	2	0	Hungarian Pharmaceutical Terminology I.	signature
Physical Education II. GYKTSII16G2A	–	1	–		signature
Elective or obligatory elective subjects	–	–	–		examination or practical mark
Total:	14.5	16.5	26		

Inorganic Chemistry

Full name of the subject: Szervetlen kémia

Program: Undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject:

English name of the subject: Inorganic Chemistry

German name of the subject: Anorganische Chemie

Neptun-Code: GYKGYK336E1A

Type of registration: obligatory

Responsible Department: Department of Pharmaceutical Chemistry

Responsible tutor/lecturer: Dr. György Tibor Balogh, PhD, professor

E-Mail: balogh.gyorgy.tibor@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. István Szalai full professor, DSc

Dr. Arash Mirzahosseini associate professor, PhD

Dr. Norbert Szoboszlai associate professor, PhD

Dr. Tamás Pál assistant professor, PhD

Dr. Krisztina Kovács assistant professor, PhD

Dr. Ádám Golcs assistant professor, PhD

Dr. Gitta Schlosser assistant professor, PhD

Dr. Edina Kiss assistant professor

Dr. István Molnár assistant lecturer

Zsombor Mohácsi PhD student

Classes per week: 2 hours lecture, 2 hours practice

Credit points: 3

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The acquisition of fundamental knowledge in inorganic, bioinorganic, and environmental chemistry, as well as gaining an understanding of the physicochemical properties of inorganic compounds used in pharmaceuticals, the pharmaceutical industry, and medicine. Additionally, the course aims to introduce the theoretical aspects and practical applications of qualitative analytical chemistry methods, fostering an analytical mindset in determining the composition of substances.

Short description of the subject:

The method of characterizing elements and compounds in inorganic chemistry using the principles learned in general chemistry. The course focuses on understanding the most important properties of elements and inorganic compounds, with particular attention to their physiological effects and potential medicinal applications. It includes the theoretical presentation of qualitative analysis in chemistry and its practical application in determining laboratory samples. The characterization and classification of qualitative analytical chemical reactions are also covered. The course primarily builds on the principles taught in general chemistry.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lecture	Total number of contact hours/ semester	Semester	Consultation
2nd	28	28	–	–	56	Spring semester	–

Semester program

Lecture topics/week:

1. Introduction, presentation of requirements. Qualitative Analysis I.
2. Qualitative Analysis II.
3. Qualitative Analysis III.
4. Qualitative Analysis IV.
5. Qualitative Analysis V.
6. Introduction to Descriptive Inorganic Chemistry. General description of nonmetals. Occurrence, properties and binary compounds of hydrogen (covalent, ionic, metallic and complex hydrides). Production of hydrogen, hydrogen in industry.
7. Noble gases and their compounds. General description of halogens, occurrence of the elements, chemical properties and preparation. Important compounds (halides, oxo acids, interhalogens). Pharmaceutical importance of halogen compounds.
8. General description of the oxygen group. Occurrence of the elements, chemical properties and preparation. Oxides, peroxides and superoxides. Chemical and pharmaceutical importance of sulfur, selenium, and their inorganic compounds.
9. General description of the nitrogen group. Occurrence of the elements, chemical properties and preparation. Important compounds and their pharmaceutical relevance. The role of inorganic phosphate in biology.
10. General description of the carbon group. Occurrence of the elements, chemical properties and preparation. Important compounds and their pharmaceutical relevance. Silicates, carbon and silicon compounds in comparison. Inorganic chemistry of boron.
11. General description of metals, preparation (metallurgy), alloys. Toxicity of metals. Description of alkali metals, important compounds and their biological activity/pharmaceutical importance.

Occurrence, chemical properties and important compounds of alkaline earth metals. Characterisation of the compounds of aluminum, boron

12. General description of transition metals (physical and chemical properties, common oxidation states) and important compounds in chemistry and pharmacy. The elements and compounds of zinc group.
13. Midterm
14. Structure of complex compounds, types of ligands, chelate complexes. Types of complex isomers. Magnetic and optical properties of complexes. Biomedical applications of complexes, description of host-guest complexes.

Practice topics/week:

Practices on every second week:

1-2. week	Occupational safety training; General rules of work in the laboratory, Group I of cations 1.
3-4. week	Group I of cations 2., Reactions of arsenic (III), Individual simple unknown (cations of Groups I-II)
5-6. week	Reactions of Group III of cations; Practice with complex unknown (ions of Groups I-III); Individual simple unknown (cations of Groups I-III)
7-8. week	Reactions of Group IV-V of cations; Individual complex unknown (ions of Groups I-V)
9-10. week	Reactions of Group I-II of anions; Individual simple unknown (anions of Groups I-II)
11-12. week	Reactions of Group III-IV of anions; Individual simple unknown (anions of Groups I-IV)
13-14. week	Individual complex unknown in powder/solution form.

Schedule of consultations: upon request

Prerequisites: General Chemistry

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Students must be present at minimum 75% of the total number of laboratory practices scheduled during the semester (i.e. a maximum of 2 absences is allowed). Timeliness is mandatory. Arriving more than 15 minutes late will be considered equivalent to absence from the laboratory practice. Arriving up to 15 minutes late to a practice will be considered "late" and 2 late practices amount to an absence.

A make up ("supplementary lab") to complete the measurements labs missed will be provided during the semester; and at the end of the semester for justified cases.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results

To assess theoretical knowledge, a total of five short quizzes will be administered at the beginning of the lab sessions, along with one comprehensive mid-term exam during the lecture period. These will be scheduled in advance with the students. A total of 150 points can be earned. To assess practical skills, students will identify unknowns containing inorganic ions at the end of the lab sessions.

Requirements of the signature at the end of the semester:

During the theoretical assessments mentioned above, students must earn at least 60 out of the 150 available points to obtain a course signature.

In the practical work, at least 50% of the assigned unknowns must be correctly identified to receive the signature.

Type of the semester-end examination: semi-final

Examination requirements:

The semester ends with a semi-final examination, which consists of two topics drawn from two different topic list (qualitative analysis and descriptive inorganic chemistry) and a calculation problem.

- The topic list for the oral exam will be published by the education-research organizational unit on the MOODLE interface until the beginning of the due diligence period.

In order to pass the exam, a sufficient level must be achieved in each part.

The student can be exempted from the topic containing the calculation problem and the qualitative analysis if he performs adequately during the theoretical assessments during the semester.

Form of the semester-end examination: oral

Scientific, course related researches, publications, essays:

Materials of the lectures and practices and additional notes can be downloaded from Moodle E-learning interface.

Recommended literature: -

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: -

The course description was prepared by:

Dr. Tamás Pál

Anatomy

Full Hungarian name of the subject: Anatómia
Program: Undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Anatomy
English name of the course: Anatomy
German name of the subject: Grundlagen der Anatomie

Neptun-Code: GYKANT272E1A
Type of registration: obligatory
Institute: Department of Anatomy, Histology and Embryology

Name of the tutor/lecturer: Dr. Csáki Ágnes associated professor, Ph.D.
Phone: 215 6920 / 53652 ext
E-Mail: csaki.agnes@semmelweis.hu

Further tutors:
 Dr. Herberth-Minkó Krisztina assistant professor, Ph.D.
 Szász Dr. Kocsis Katalin assistant professor, Ph.D.
 Dr. Puskár Zita senior research fellow, Ph.D.

Number of classes /week: 2 lecture(s) 2 practice(s)
Credit points: 2

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

Course principles:

Principles:

- to teach the terminology of the human anatomy to the future pharmacists
- to discuss those special anatomical and physiological conditions, which may influence the therapeutical considerations;
- to discuss those anatomical conditions, which are necessary for the understanding of the further medical subjects of the pharmacists' studies;
- to teach the terminology (Latin and English) of human body parts (at a gross and microscopical anatomical level) necessary for the understanding of the medical language during the communication between the pharmacists and the doctors.

Special attention is required concerning the anatomy of the central nervous system and the digestive tract, the absorption of medicines and their mechanism of action.

Short description of the subject:

The lectures include all topics of anatomy, histology and embryology. Locomotor system, internal organs, nervous system, general and detailed histology, general embryology and development of organs are the topics of the lectures.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2nd semester	28	28	–	–	56	Spring semester	–

Program of semester

Topics of theoretical classes (pro week):

1. week: 1. Introduction, Locomotor System
2. week: 2. Skull, vertebral column, head, neck muscles
3. week: 3. Basic tissues I
4. week: 4. Basic tissues II, Skin
5. week: 5. The Immune System, the Lymphoid Organs
6. week: 6. Blood, hematopoiesis
7. week: 7. Heart, the Vascular System
8. week: 8. The Respiratory System, the Mechanics of Breathing
9. week: 9. The Digestive System I, abdominal cavity
10. week: 10. The Digestive System II
11. week: 11. The Liver, the Pancreas
12. week: 12. Peritoneum, abdominal cavity
13. week: 13. The Female Reproductive Organs, cycle The Kidneys and the Urinary tract I.
14. week: 14. The Kidneys and the Urinary tract II.
15. week: 15. The Female Reproductive Organs, cycle
16. week: 16. The Male Reproductive Organs, Pelvis
17. week: 17. Nervous System introduction (synapses, neurotransmitters) Spinal cord, spinal nerves
18. week: 18. Central Nervous System, meninges, blood supply, CSF, Encephalon, Spinal cord, Spinal nerves
19. week: 19. Motor system, Sensory system, Limbic system
20. week: 20. Cranial nerves, The Autonomic Nervous System
21. week: 21. The Eyeball and Visual system
22. week: 22. The Organ of Hearing and Equilibrium.
23. week: 23. Hypothalamus, the Endocrine Organs I
24. week: 24. The Endocrine Organs II
25. week: 25. Germ cells, Fertilization, Development of the fetus, Placenta,
26. week: 26. Teratology
27. week: 27. Development of the Digestive System and Reproductive organs
28. week: 28. Malformations

Topics of practical classes (pro week):

1. week: Introduction, upper and lower limbs
2. week: basic tissues, skin
3. week: skull, vertebral column, head, neck muscles
4. week: histology of the blood, vessels and the lymphoid organs
5. week: respiratory tract, thoracic cavity, heart, large vessels
6. week: respiratory tract histology, gastrointestinal tract histology
7. week: gastrointestinal tract, abdominal cavity
8. week: kidney and urinary tract histology genital organs histology
9. week: abdominal cavity urogenital system, pelvis
10. week: 1st Midterm - locomotor system, internal organs (not obligatory); nervous system histology
11. week: pelvis sensory organs histology
12. week: nervous system: brain, spinal cord, cranial nerves, spinal nerves, main vessels and nerves on limbs, sensory organs
13. week: endocrine organs, placenta
14. week: 2nd Midterm - nervous system, endocrine organs, general embryology (not obligatory), revision

COURSE REQUIREMENTS

Schedule of consultations: –

Prerequisites: Biology I. (GYKGEN109E1A), Pharmaceutical Terminology, First Aid (GYKNEY111G1A)

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Attendance of a minimum of 75% of practices is necessary for the end-term signatures. There is no makeup opportunity.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Midterms: 10th week and 14th week Midterms are “non-obligatory assessment”, from the topics “locomotor system, internal organs” and “nervous system, sensory organs, endocrine organs, general embryology”, respectively. Its form is identical with the one of the semifinal exam (electronic, Moodle test). Successful (at least 50%) midterm provides the student with the exemption of the corresponding part of the examination, and if accepted, it is counted into the result of the semifinal exam.

The Midterms are not obligatory, there is no make-up possibility.

Exam: In the end of the semester written semi-final exam defines the exam grade. The exam is electronic, via the Moodle system, including multiple choice question types, and “drag and drop” question types (requiring identification). In the case of the written (electronic Moodle) test, 50% of the maximum score available must be achieved for a successful (at least satisfactory grade) test result. The written test consists of two main parts: 75% of the questions are from topics belonging to “locomotor system, internal organs”, 25% of the questions are from the topics of “nervous system, sensory organs, endocrine organs, general embryology”.

Requirements of the signature: Attendance of a minimum of 75% lectures and a minimum of 75% of the practices is necessary for the end-term signature. There is no make-up possibility.

Type of the semester-end examination: semifinal exam

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

The possibility and conditions for offering grades:

Midterms: 10th week and 14th week Midterms are “non-obligatory assessment”, from the topics “locomotor system, internal organs” and “nervous system, sensory organs, endocrine organs, general embryology”, respectively. Its form is identical with the one of the semifinal exam (electronic, Moodle test). Successful (at least 50%) midterm provides the student with the exemption of the corresponding part of the examination, and if accepted, it is counted into the result of the semifinal exam.

Scientific, course related researches, publications, essays:

List of teaching materials: (List of textbooks, hand-outs, scripts, etc.): Faller, A, Schuenke, M.: The Human Body: An Introduction to Structure and Function (Flexibook) 2004., Thieme, Stuttgart

Pharmaceutical biophysics

Neptun code: GYKFIZ338E1A

Type of registration: obligatory

Institute: Department of Biophysics and Radiation Biology

Name of the tutor/lecturer: Dr. Ádám Orosz assistant professor, PhD

Phone: +36 1 4591-500/60209

E-Mail: orosz.adam@semmelweis.hu

Further tutors:

Dr. Bálint Budavári PhD student

Dr. Gergely Agócs senior lecturer, PhD

Dr. Tamás Bozó senior lecturer, PhD

Dr. Rita Galántai teacher, PhD

Dr. Nikolett Kósa teacher, PhD

Dr. Gusztáv Schay senior lecturer, PhD

Dr. Ádám Zolcsák PhD student

Number of classes /week: 1.5 hours theory, 2.5 hours practice

Credit points: 4

Aims of the subject

Our teaching program is evolving continuously. Focused on the general objective of meeting the requirements of the medical curriculum, the courses are also intended to provide specific medical physics and statistics training. Today's students will be the physicians of the oncoming decades. In selecting and highlighting topics of study, the first viewpoint is scientific foresight: the knowledge should be conveyed which must be pertinent to ensure first-class professional competence while keeping abreast of the most recent development in the field of study. Our aim is not only the teaching of a specific body of knowledge but also the development of the exact scientific method and concrete problem-solving abilities.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2nd semester	21	35	–	–	56	Spring semester	–

Program of semester

Topics of theoretical classes (pro week):

1. week: Basic electronic units and circuits
2. week: Signal processing, Detectors, Displays
3. week: Sound
4. week: Ultrasound.
5. week: Transport phenomena, flow of fluids and gases
6. week: Diffusion, osmosis
7. week: Thermodynamic aspects of transport processes
8. week: Change of entropy, Thermodynamic potential functions
9. week: Membrane potential, Action potential
10. week: Sensory phenomena, Laws of sensation
11. week: Optical spectroscopic techniques
12. week: Sedimentation and electrophoretic methods
13. week: Radio spectroscopy methods: (NMR, ESR, MRI)
14. week: Microscope techniques, Other physical methods

Topics of practical classes (pro week):

1. week: Skin impedance
2. week: Coulter counter
3. week: Ultrasound
4. week: X-ray
5. week: Gamma absorption
6. week: ECG
7. week: Pulse generators
8. week: Audiometry
9. week: Isotope diagnostics
10. week: Diffusion
11. week: Sensor
12. week: Fluid flow
13. week: CAT-scan
14. week: Summary, repetition

Scientific, course related researches, publications, essays:

Damjanovich–Fidy–Szöllősi (eds): Medical Biophysics (2009)
Medical Biophysics Practices (Semmelweis Publisher, 2015)

Genetics

Full (Hungarian) name of the subject: Genetics
Program: Undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Genetics
English name of the subject: Genetics
German name of the subject: Genetik

Type of registration: obligatory

Neptun-Code: GYKGEN269E2A

Institute: Institute of Genetics, Cell- and Immunobiology Semmelweis University, Faculty of Medicine

Name of the tutor/lecturer: Prof. Dr. Edit Buzás DSc

Course coordinator: Dr. Hegyesi Hargita PhD.

E-Mail: Hegyesi.hargita@semmelweis.hu

Further tutors:

Dr. András Kristóf Fülöp Associate Professor

Dr. Hargita Hegyesi Associate Professor

Dr. László Köhidai Associate Professor
 Dr. Eszter Lajkó Research Fellow
 Dr. Marianna Csilla Holub Associate Professor
 Dr. Zoltán Wiener Associate Professor
 Dr. Tamás Visnovitz Assistant professor
 András Försönits Research Assistant

Number of lectures /week: Lecture :2 hrs Practice: 2 hrs

Credit points: 4

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

Besides the basics of Mendelian genetics and cytogenetics, pharmacogenetics and genomics are discussed as well as the main molecular genetic techniques are presented. The subject provides the theoretical background for Microbiology and Immunology.

Description of the subject:

The subject Biology II. discusses Mendelian genetics, molecular genetics and genomics. The most significant characteristic of inheritance in human and the techniques applied in medical field are studied.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2nd semester	28	28	–	–	56	Spring semester	6 times in exam period

Program of semester

Topics of theoretical classes (pro week):

1. week Transmission of the genetic information. Meiosis
2. week Introduction to human genetics. The human genome.
3. week Cytogenetics
4. week Genetic variation I.
5. week Genetic variation II.
6. week Epigenetics
7. week Autosomal inheritance I.
8. week Autosomal inheritance II.
9. week Role of sex in inheritance; Genetics of sex
10. week Introduction to genomics; Methods in genomics
11. week Genetics and genomics of complex trait and disorder
12. week Pharmacogenetics and nutrigenomics
13. week Genetics of biological processes (tumor biology)
14. week Gene and genome manipulation

(The order of lectures may vary.)

Topics of practical classes (pro week):

1. week Mitosis
2. week Meiosis and gametogenesis
3. week Cytogenetics I.
4. week Cytogenetics II.
5. week Midterm I. Mutagenic tests
6. week Study of monogenic inheritance; Pedigree analysis
7. week Molecular genetics I.
8. week Molecular genetics II.
9. week Molecular genetics III.
10. week Monodgenic inheritance I. (Autosomal Dominant)
11. week Monodgenic inheritance II (Autosomal recessive)
12. week Monodgenic inheritance III. (Sex linked)
13. week Midterm II. Prenatal genetic testing
14. week Complex inheritance

(The order of lectures may vary.)

COURSE REQUIREMENTS

Schedule of consultations: weekly in the exam period

Prerequisites: Cell Biology

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Student must visit 75% of the lessons. More than three absences from the practice or more than four absences from the lecture invalidate the semester, no signature is given. There are no extra practices.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Students will write two Midterm tests (Moodle tests) during the semester. Writing the tests is not obligatory. Students who achieve 75% of the total score, in case of a successful examination (obtain more than 50% of the total score in the exam), will get one better mark. This option is only available until the end of the regular examination period, and cannot be transferred to the extended exam period, CV, and FM courses

Requirements of the signature at the end of the semester:

Practice class attendance should be over 75%.

Type of the semester-end examination: semifinal written test on Moodle

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades: no

Scientifiy, yourse related researches, publivations, assays:

The activity of the Institute of Genetics, Cell- and Immunobiology (DGCI) includes teaching, research and diagnostics. Our scientific work focuses on a broad scale in the fields of immunology, cell biology and genomics. The main research groups of the Department: National Heart Program, Extracellular Vesicle; Medical Genomics; Chemotaxis; Experimental Translational Immunomics and Molecular Cancer Biology. The applied methodologies include: cell- and molecular biological, immunological, genomic and bioinformatic techniques and procedures.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on and individual assesment basis

Communication and Information Networks

Institute: Institute of Behavioural Sciences of Semmelweis University

Name of the tutor/lecturer:

Dr. Pilling János PhD, Associate professor
Phone: +36 (1) 2102930/56457
E-Mail: pilling.janos@semmelweis.hu
Dr. Hankó Balázs

Further tutors:

Kinga Babonits-Farkas Psychologist, assigned lecturer
Zsuzsanna Papp Psychologist, assigned lecturer
Karolina Szabó Psychologist, assigned lecturer

Number of classes /week: 1 lecture(s), 1 seminar(s)

Credit points: 2

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

Proper communication has an essential role in pharmaceutical practice. The main objectives of the course are the following:

- to teach basic skills to improve pharmacists' communicational techniques of information gathering, active listening and patient education
- introduction of pharmaceutical communication with the useage of digital and social media

Short description of the subject:

The education will be interactive and practical. In the first part of the semester (week 1-7), students will get familiar with the basic concepts of communication, online information sources and the pharmaceutical usage of modern information communication networks and social media. On the practices (week 7-14) basic communication skills will be improved with a special focus on information delivery, patient education, healthy literacy, active listening, empathy and assertive communication.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2nd semester	14	14	–	–	28	Spring semester	–

Program of semester

Topics of theoretical classes (1.-7. week):

1. week: Role of communication and empathy in pharmaceutical practice.
2. week: Internet use, excessive internet use, telemedicine
3. week: Information gathering and patient information. Online information seeking. Basics of presenting.
4. week: Modern information networks in the pharmaceutical practice. Social media as the new pathway to infocommunication I.
5. week: Modern information networks in the pharmaceutical practice. Social media as the new pathway to infocommunication II.
6. week: New ways of improving health literacy
7. week: Conflict management and the role of assertive communication.

Topics of practical classes (8.-14. week):

8. week: Role of communication in the pharmaceutical practice.
9. week: Verbal and non-verbal communication. Information delivery.
10. week: Verbal and non-verbal techniques of empathy.
11. week: Patient information, information gathering, funnel method and persuasive communication.
12. week: Online human behaviour, mindful social networking. Communication in line with patient's health literacy.
13. week: Conflict management. Assertive communication.
14. week: Summary and written exam.

Schedule of consultations:

Seminars will ensure the possibility of ongoing consultation with the seminar leader.

COURSE REQUIREMENTS

Prerequisites: Introduction to Pharmaceutical Studies GYKEGY113E1A

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:
The participation at a minimum of 75% of the practices is the prerequisite of the signature. Makeup is possible in other seminar group at the same week.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:
Written examination at the end of the semester, on the last practice.

Requirements of the signature:
The participation at a minimum of 75% of the practices is the prerequisite of the signature.

Number and type of projects students have to perform independently during the semester and their deadlines:---

Type of the semester-end examination: semi-final
Form of the semester-end examination:
Written examination.

- Below 50%: 1
- 50%-65%: 2
- 66%-75%: 3
- 76%-85%: 4
- 85%-100%: 5

The possibility and conditions for offering grades: –

List of teaching materials: (List of textbooks, hand-outs, scripts, etc.)
Pilling János: Medical Communication in practice. Medicina, Budapest, 2020.
Beardsley, RS. – Skrabal, MZ. – Kimberlin, CL: Communication Skills in Pharmacy Practice. Wolters Kluwer. Seventh edition. 2020.

The course description was prepared by: Dr. Mónika Ditta Tóth, Kinga Babonits-Farkas, Dr. Orsolya Szépe

Basics of Economics (theory)

Full (Hun) name of the subject: Közgazdaságtani alapismeretek
Program: Undivided program (pharmaceutical)
Short name of the subject: Közg. Alapism.
English name of the course: Basics of Economics
German name of the subject: Grundkenntnisse der Wirtschaftswissenschaften

Neptun-Code: GYKEGY247E1A

Type of registration: obligatory

Institute: Health Services Management Training Centre of Semmelweis University

Responsible tutor Vilmos Ivády master instructor

Phone: +36204808366

Email: ivady.vilmos@emk.semmelweis.hu

Class per week: 1

Credit points: 1

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The goal of the subject is to help the attending students understand the basic terminology and principles of economics both in general and within the healthcare settings. By the end of the semester the students will comprehend the core economic question of how to utilize the limited resources available in order to maximize health outcomes at a population level. Beyond the theoretical background, the students will be also able to perform basic economic calculations by their own.

Short description of the course:

During the subject the students will hear about the various definitions and interpretations of economics and the reasons why health economics needs to be considered as a different discipline. The lectures will primarily focus on the theoretical nature of economics in general and within the healthcare settings; however, during the discussion of case studies and economic calculations the students will also have the opportunity to utilize the theoretical knowledge in practice.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2nd semester	14	–	–	–	14	Spring semester	–

Program of semester

Topics of theoretical classes (pro week):

- Week 1: Principles of Economics - Part 1 - What economics is all about?
- Week 2: Principles of Economics - Part 1 - About the role of economists
- Week 3: Principles of Economics - Part 1 - Scarcity: the basic economic problem
- Week 4: Principles of Economics - Part 2 - Economics in healthcare
- Week 5: Principles of Economics - Part 2 - Health and the economy
- Week 6: Principles of Economics - Part 2 - Evaluation of decision
- Week 7: Understanding Basic Economic Terms - Problems of an economic organization
- Week 8: Understanding Basic Economic Terms - Scarcity and the alternatives to output of a society
- Week 9: Understanding Basic Economic Terms - Understanding utility in health care
- Week 10: Understanding Basic Economic Terms - Understanding all concepts for efficiency
- Week 11: Understanding Basic Economic Terms - Understanding equity
- Week 12: Economic Principles at Organizational Level - Financial statements used to evaluate business
- Week 13: Economic Principles at Organizational Level - Cost-revenue analysis
- Week 14: Semi-final exam

Topics of practical classes (pro week): Not applicable

Schedule of consultations: The lecturer is available for consultations on predetermined dates agreed on by the student and the lecturer.

COURSE REQUIREMENTS

Prerequisites: None

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

There are no conditions of attending the class. A student needs to attend at least 80% of the lectures. Those students who are absent more often will have the opportunity to work on a case study as a homework assignment.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

There is a semi-final test at the end of the semester, which consists all the topics learned during the subject.

Requirements of the signature: Attending lectures

Number and type of projects students have to perform independently during the semester and their deadlines:

There are no projects that the students need to perform outside the lectures.

Type of the semester-end examination: semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

The possibility and conditions for offering grades:

The grades are given based on the results of the written exam.

Scientific, your related researches, publications, essays:

Vilmos Ivády: Introduction - Whose debt is it anyway? [Beköszöntő - Mégis, kinek az adóssága?]. IME, 18(9):1, 2019. [in Hungarian]

Vilmos Ivády: On the methodological issues of evaluating hospital debt. [A kórházi adósság értékelésének módszertani kérdéseiről]. IME, 16(8):8-12, 2017. [in Hungarian]

Viktor Dombrádi, Klára Bíró, Jonitz Günther, Muir Gray, Anant Jani: Broadening the concept of patient safety culture through value-based healthcare. Journal of Health Organization and Management, 35(5):541-549, 2021.

Viktor Dombrádi, Erica Pitini, Carla G. van El, Anant Jani, Martina Cornel, Paolo Villari, Muir Gray, Klára Bíró: Value-based genomic screening: exploring genomic screening for chronic diseases using triple value principles. BMC Health Services Research, 19(1):823, 2019.

Physical Chemistry for Pharmacists (theory+practice)

For details on this subject please contact the department or visit their website.

Organic Chemistry I. (theory + practice)

Full name of the subject: Szerves kémia I.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Org Chem
English name of the subject: Organic Chemistry I.
German name of the subject: Organische Chemie I

Neptun code of the subject: GYKSZK337E1A
Type of registration: obligatory
Responsible Department: Semmelweis University, Institute of Organic Chemistry

Responsible tutor: Dr. Petra Dunkel assistant professor, PhD
Phone: +36-1-476-3600/53006
E-mail: dunkel.petra@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Balázs Balogh assistant professor, PhD
Dr. Dóra Bogdán assistant lecturer, PhD
Dr. Andrea Czompa assistant professor, PhD
Dr. Ruth Deme assistant lecturer, PhD
Dr. Petra Dunkel assistant professor, PhD
Dr. Zoltán Kaleta assistant professor, PhD
Dr. Róbert Ludmerczki assistant lecturer, PhD
Dr. Krisztina Süttőné Kaczeus research associate
Bence Kontra PhD student
Dr. László Piros PhD student
Patrik Pollák PhD student

Dániel Remecz PhD student
Gergő Riszter PhD student

Classes per week: 4 lectures, 4 practices
Credit point(s): 8

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The course discusses the state-of the art knowledge of synthetic and structural organic chemistry subjects to develop problem-solving skills for organic chemistry and biomolecular sciences. Students will acquire the basics of organic chemistry, develop an organic chemistry perspective and acquire the theoretical, practical and material knowledge base for their future studies.

Short description of the subject:

The course in Organic Chemistry at the Faculty of Pharmaceutical Sciences has two main objectives:

- to provide a modern organic chemistry curriculum and to develop an organic chemistry approach, by presenting typical synthesis methods for the preparation of the different types of compounds and, with particular emphasis, by illustrating and interpreting their chemical reactivity. Introduction to and practical application of the main methods and tools of preparative organic chemistry.
- to provide a solid molecular, organic chemistry base for subsequent subjects in the curriculum of students at the Faculty of Pharmaceutical Sciences and to strengthen the molecular approach necessary for biomedical disciplines.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2nd semester	4	6 (biweekly)	3 (biweekly)	–	56+36+20	Spring semester	upon demand

Program of semester

Topics of theoretical classes (pro week):

1. week: Introduction to Organic Chemistry. MO theory 1. Atomic orbitals, LCAO-MO method, σ and π orbitals, molecular orbitals, delocalisation. MO theory 2. Hybridisation, Lewis-Langmuir theory of bonds, valence bond method, resonance. Conjugation: allyl system, pentadienyl system, electron system of butadiene and hexatriene. Classification of organic compounds. Isomers: constitutional and conformational isomers, stereoisomers. Enantiomers and diastereomers.
2. week: Chirality, absolute configuration according to Cahn-Ingold-Prelog. Stereochemistry of organic compounds containing more than one center of chirality. Axial chirality, determination of absolute configuration. Tautomerism. Newman and Fischer-projection. Energy profile of reactions. Reaction mechanisms. Factors affecting reactivity. Electronegativity, reactivity of reagents: inductive, mesomeric and steric effects.
3. week: Classification of reactions. Kinetic and thermodynamic control. Nomenclature of organic compounds I.

4. week: Alkanes and cycloalkanes: physical and chemical properties, preparations, reactions. Mono- and disubstituted cyclohexanes. Alkenes: preparations, physical, chemical and biological properties. Cis-trans isomerization. Addition reactions. Markovnikov and anti-Markovnikov addition. Radical reactions and their mechanism. Addition vs substitution.
5. week: Polymerisation. Dioléfins. Diels-Alder reaction. Pericyclic reactions. Woodward-Hoffmann rules. Alkynes: preparations, physical, chemical and biological properties. Nucleophilic addition reactions.
6. week: Benzene and aromaticity. Extension of the aromatic system. Antiaromatic and non-aromatic structures. SEAr reactions of aromatic compounds. Activating and deactivating groups, direction rules. SNAr reactions of aromatic compounds. Linear free energy relationships. Structure of halogenated hydrocarbons, physical, biological properties, preparations.
7. week: Nucleophilic substitution reactions: SN1, SN2, SNi, elimination reactions: E1, E2, E1cB - factors influencing ratio of SN vs. E reactions: substrate, solvent, temperature effects, role of the base, of the leaving group, stereochemical consequences. Alcohols, phenols, ethers: preparations, physical

cal, chemical and biological properties. Protecting groups. Acid-base theories. Acidity and basicity of organic compounds. Acid-base reactions.

8. week: Organic sulfur compounds: structure, classification, reactivity, chirality, sulfonic acids, sulfonamides.
9. week: Amines: preparations, physical, chemical and biological properties. Aromatic diazonium and nitro compounds, organophosphorus compounds: preparations, physical, chemical and biological properties.
10. week: Nomenclature of organic compounds II. Oxo compounds: aldehydes and ketones - preparations, physical, chemical and biological properties. Addition to the carbonyl group. (Enolate chemistry I.)
11. week: Carboxylic acids and their derivatives: preparation, reactivity, nucleophilic reactions at the acyl carbon atom, physical, chemical and biological properties. (Enolate chemistry II.)
12. week: Substituted carboxylic acids, dicarboxylic acids and their derivatives. Synthetic applications of ethyl acetoacetate and diethyl malonate.
13. week: Carbonic acid derivatives: classification, nomenclature, synthetic applications. Carbamates, polymers, protecting groups, transformations.
14. week: Summary of organic chemical reactions, reaction mechanisms, synthesis planning.

Topics of practical classes (pro week):

1. week: –
2. week: Mesomeric structures, hybridisation states. Type of π -electron systems. Classification of reagents: electrophilic, nucleophilic, radical. Reaction types: S_N1 and S_N2 mechanisms.
3. week: Recrystallization of 4-bromoacetanilide, thin-layer chromatography.
4. week: Identification of cis-trans stereoisomers, E/Z notation. Recognition of chirality (stereogenic) centres in molecules.

COURSE REQUIREMENTS

Prerequisites: GYKASK266E1A General and inorganic chemistry I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

If necessary, students may make up for a limited number of missed or failed preparative experiments after preliminary agreement with the leading instructor at the end of the semester. Without permission, the repetition of unsuccessful experiments is not allowed. Course material for the seminars (problem sets) are provided in advance to the students via Moodle. Students are expected to consult these materials before the respective seminars. These problem sets will form the basis of the discussion. Attendance is mandatory at the seminars. No more than one seminar absence per semester will be accepted without special consequences. A student who misses more seminar classes in their group may attend a seminar of another group (in the same week) if possible (only a limited number of students may be allowed to do so), always by notifying the seminar leaders in advance. If this is not possible, the student (who has more than 2 absences) will be briefly debriefed by the seminar leader on the relevant topics by the end of the semester (however, regular absences are not permitted). The Study and Examination Regulations also require attendance at 75% of the practical sessions and attendance at the seminars (which count as practical sessions) according to the above criteria in order to be signed off at the end of the semester.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Theory: At the mid-term tests (one/semester) students have to answer in a written form questions on the subject-matter of the main lectures, the practicals and the seminars, the dates of which are fixed at the beginning of the semesters. The value of the midterm test can be either ranging 2-5 or failed. If the test is failed or the student did not attend it, the student must attend the following makeup test. If the makeup test is failed, a second makeup test should be written. If any of the makeup tests reach the passmark, then the midterm test is accepted. If also the second makeup test is failed, the student does not get signature for the semester, they are not allowed to sit in the semi-final examination. Grades for the main and makeup mid-term tests of the same topic are not averaged. Students who have a result of at least 90% in the mid-term test (excluding the retake tests) during the semester will have a 5-point advantage in the written exam.

Identify and draw the enantiomers. Identify the configuration of chirality centres (R/S notation). Identify the stereochemical relationship between two compounds. Recognition of diastereomeric and meso compounds. Determining configuration from Fischer projection, drawing Fischer projection. Conformation analysis using Newman projection. Cyclohexane conformers.

5. week: Preparation of acetanilide and acetylsalicylic acid.
6. week: Aromatic, antiaromatic and non-aromatic systems. Synthesis of aromatic hydrocarbons, reactions of aromatic compounds.
7. week: Preparation of 4-bromoacetanilide, column chromatography.
8. week: Stereochemistry of S_N2 and S_E2 reactions and interpretation of the transition state. Aliphatic and aromatic hydroxy- and halogen compounds: basic properties of substitution and elimination reactions and their mechanism. Kinetic and thermodynamic control
9. week: Preparation of 4-bromo-2-nitroacetanilide and β -naphthol-orange.
10. week: Preparations, applications, and reactions of quinones and ethers. Organic sulfur compounds, preparations of sulfonamides, reactions. Chemical properties of amines, basicity, preparations, reactions, diazotation.
11. week: Purification of ethyl acetate with extraction and distillation.
12. week: Aldehydes and ketones: nucleophilic addition reactions. Reactions of α -hydrogen of aldehydes and ketones.
13. week: Introduction into cheminformatics.
14. week: Supplement. Inventory. Reactivity of carboxylic acids and their derivatives (acylation), reactions involving α -hydrogen. Carbonic acid derivatives.

Schedule of consultations: consultation upon request, at least 1 week before the date of consultation

Practice: at the beginning of each laboratory practical, students must write a short test on the theoretical and practical subject-matter of the experiment. These tests are immediately corrected by the leading instructor, and the practical work can be started only if the short test is accepted. If the test is failed, the experiment in question can be performed only at the end of the semester.

Completing successfully the non-preparative practicals during the two semesters is also a condition of the signature and 75% of the maximum number of laboratory notebooks that can be submitted must be also approved.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

mid-term test, obtaining a signature, attending practicals and seminars as specified above

Number and type of projects students have to perform independently during the semester and their deadlines:

completion of the mid-term assessment, completion of practical work, attendance of a sufficient number of seminars (final deadline: last day of the semester)

Type of the semester-end examination: semi-final

Examination requirements: as published by the institute on the MOODLE course site by the start of the academic term

Form of the semester-end examination written

Scientific, course related research, publications, essays:

Materials of the lectures and practices can be downloaded from Moodle

P.C. Vollhardt; N.E. Schore: Organic Chemistry: Structure and Function, 8th Edition (W. H. Freeman)

D.R. Klein: Organic Chemistry, 3rd Edition (Wiley)

K.L. Williamson, K.M. Masters: Techniques Labs for Macroscale and Microscale Organic Experiments, 7th Edition (Cengage Learning)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assesment basis

The course description was prepared by:

Dr. Petra Dunkel (assistant professor, PhD)

Hungarian Pharmaceutical Terminology (practice) II.

Complete name of the course: Magyar gyógyszerészeti szaknyelv II.

Program: Pharmacy education, undivided program

Schedule: full-time

Abbreviated name of the course: Hungarian Pharmaceutical Terminology II.

English name of the course: Hungarian Pharmaceutical Terminology (practice) II.

German name of the subject: Ungarische pharmazeutische Terminologie (Praktikum) II

Neptun-Code: GYKNYE306G2A

Type of registration: obligatory

Institute: Institute of Languages for Specific Purposes

Name of the tutor/lecturer: Katalin Fogarasi PhD, habil. PhD, habil.

Further tutors:

Borda Szandra language teacher

Nagyné Górász Judit language teacher

Zsófia Egedi language teacher

Lili Szöllősi language teacher

Number of classes /week: 2

Credit points: 0

Course principles:

The role of this subject is to help students acquire the basic vocabulary, grammar and language skills they need for the effective communication in the language they use during their field practice both in their everyday life /'survival language/ and in their academic studies.

Brief course summary:

The second semester is dedicated to learning basic general vocabulary and grammar. Students acquire basic structures and the vocabulary for everyday topics / e.g. shopping, food, housing etc./. The course places special emphasis on phrases essential for everyday communication, e.g. introductions, greetings, getting/giving information etc. and on phrases needed in basic communication at a pharmacy.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2nd semester	0	0	2	0	28	Spring semester	0

Program of semester

I. Lecture topics / week:---

Practice topics/week:

Week 1	Giving directions
Week 2	Locatives
Week 3	Asking about time
Week 4	When to take the medicine
Week 5	Body parts
Week 6	Basic verbs – talking about diseases
Week 7	Basic verbs – asking about symptoms
Week 8-9	How to take the medicine
Week 10	Warning about side effects
Week 11	Plural forms of nouns
Week 12-13	Serving clients at the pharmacy
Week 14	Oral interview

COURSE REQUIREMENTS

Order of consultations: Individual consultations by email or in person on meeting formerly agreed upon with the teacher via email.

Prerequisites: Hungarian Pharmaceutical Terminology I. GYKNYE306G1A

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

A maximum of 3 absences is allowed (3x90 minutes); if the number of absences exceeds this, the student may make up missed classes in another group (maximum two times) in agreement with the instructor. A student who misses more than 25% of the practical classes will not be allowed to get a signature (Study and Examination Regulations §29). For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required. According to the Study and Examination Regulations (§ 28), three tardies count as one absence. Arriving 15 minutes later than the start of the lesson is considered tardiness.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results***:

Hungarian Pharmaceutical Terminology II (signature) an oral interview, week 14

Topic: the material covered

Make-up and upgrade opportunities: to be arranged outside of class with the instructor, at the latest by the end of the first week of the examination period.

Semester acceptance conditions:

An attendance of 75% is required to get the signature.

Knowledge testing during the semester:

The instructors may evaluate the students' performance with the help of short tests.

Requirements of the signature at the end of the semester: An attendance of 75% is required to get the signature.

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.: Signature

The possibility and conditions for offering grades: ----

Individual activity of the student during the semester: Homework in the forms of language practice tasks.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on an individual assesment basis

List of teaching materials: (List of textbooks, hand-outs, scripts, etc.)

Teaching materials and audio recordings containing authentic texts compiled by the instructors of the Institute.

Pharmaceutical and Medical Terminology

Responsible Department: Department of Languages for Specific Purposes

Responsible tutor: Katalin Fogarasi PhD habil., director, associate professor

Contact information:

phone: +3612159338

email: fogarasi.katalin@semmelweis-univ.hu

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The course is to prepare students for understanding Latin and Greek medical and pharmaceutical terminology, including the language of anatomy, diagnostics, pathophysiology, and prescriptions.

Short description of the subject:

Students get familiarised with the basics of Latin grammar, such as forming plural forms of Latin nouns, adjective agreement, the use of numbers, and prepositional phrases (accusative and ablative cases). Furthermore, they develop an extensive Latin and Greek vocabulary that enables them to understand and formulate medical terms in the fields of medicine and pharmaceuticals.

Topics of practical classes (per week):

Week1	Basics of Anatomical Terminology
Week 2	Musculoskeletal Terminology
Week 3	Musculoskeletal Disorders
Week 4	Drug Names
Week 5	Revision for Test 1
Week 6	Test 1
Week 7	Cardiovascular system and disorders, drugs
Week 8	Respiratory system and disorders, drugs
Week 9	Gastrointestinal system and disorders, drugs
Week 10	Urinary system and disorders, drugs
Week 11	Reproductive system and disorders, drugs
Week 12	Nervous system and disorders, drugs
Week 13	Revision for Test 2
Week 14	Test 2

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: An attendance of 75% minimum is required to get the signature. Classes can be made up in a different group of the subject with the written consent of the instructors.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results*:**

Test 1 is scheduled for week 6 and covers the topics of weeks 1-5. Test 2 is scheduled for week 14 and covers the material of weeks 7-13. The final grade is calculated based on the two tests.

Hungarian Pharmaceutical Terminology (practice) III.

Physical Education II.

Complete name of the course: Testnevelés II.

Program: Undivided program (pharmaceutical)

Short name of the subject: P. E. II.

English name of the course: Physical Education II.

German name of the subject: Sport II.

Neptun-Code: GYKTSI3352A

Type of registration: obligatory

Institute: Semmelweis University's Physical Education and Sportcenter

Name of the tutor/lecturer: Várszegi, Kornélia director P.E. teacher

Phone: +36-20/825-0611

E-Mail: varszegi.kornelia@semmelweis.hu;

titkarsag.tsk@semmelweis.hu

Further tutors:

Doharné Buczkó, Anikó P.E. teacher

Dominika Farkas P.E. teacher

Dániel Kalmus P.E. teacher

Zsolt Lehel P.E. teacher

Sótonyiné Hrehuss Nóra P.E. teacher

Kornélia Várszegi P.E. teacher

Miklós Weisz P.E. teacher

Number of classes /week: 1 hour practise

Credit points: 1 credit

Course principles:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice – so that they can represent those in their later practice, through their own health-promoting behavior.

Brief course summary:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
2nd semester	–	14	–	–	14	Spring semester	–

Program of semester

Topics of theoretical classes (pro week): -

Topics of practical classes (pro week):

- 1st week: General information: Accident, fire and environmental knowledge. Requirement for acceptance of the semester system, the structure of the classes and the presentation of the university recreational sports opportunities for extra-curricular activities.
- 2nd week: Basketball: Dribbling, passing and shooting drills in order to improve fine motor skills.
- 3rd week: Bench exercises: Using the dimensions of the sport bench by running, skipping, jumping, lifting etc. exercises.
- 4th week: Rubber band exercises: Strength and coordination training by taking advantage of the elastic features of the object.
- 5th week: Football: Introducing the sport to the Students by exposing the major rules, proper technique of stick handling. Passing and shooting drills.
- 6th week: "Double-trouble": Strength and stretch training in pairs by applying different starting positions. Functional movements executed in pairs.
- 7th week: Volleyball: Introducing the fundamental elements of the game (serves, hits, digs etc.) Exposing the major rules and techniques.
- 8th week: Frisbee: Taking the next step into the game by applying tactical elements in match situations. Passing and catching drills in different moving forms.
- 9th week: Ruffier test and ball skill developing exercises. Compare the results with the previous test to bring the importance of the health of the cardiovascular system to the attention. Sport games on the side (Dodge-ball, King of the court etc.)
- 10th week: Circuit training: General strengthening drills at each stations. Applying different intensity level, regarding the various conditions of the Students.

- 11th week: Tennis: Involving the new strokes into the learning process: form of serves, the volleys, the smash etc.
- 12th week: Badminton: Introducing the new technical and tactical elements of the game (drop shots, lobs, smash etc.) Exposing the rules of doubles.
- 13th week: Core exercises: Relative (own body) weight exercises applying different equipment (hand weights, rubber band etc.) with the aim of postural correction, by strengthening the core muscles in order to avoid spinal deformations.
- 14th week: Box exercises: Applying the sport box by jumping, lifting, slaloming, carrying (etc) it. By this enhance the level of strength and stamina.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2×90 mins./week sport training (competitive sport, for qualified only): cheerdance, cheerleader, men's football, handball, basketball, volleyball)

COURSE REQUIREMENTS

Order of consultations: -

Prerequisites: -

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results: -

Requirements of the signature at the end of the semester:

Active participation in practice classes 10 times (once a week) (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise

or

2. does sports regularly and submits a certificate of association and federation

Type of the semester-end examination: signature

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate
- or
2. does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes

If you have not completed the course you may be readmitted in the 2. semester of the following academic year.



Pharmaceutical Sciences
2nd year

FACULTY OF PHARMACEUTICAL SCIENCES

3rd–4th semester

Curriculum of the credit-based training for second year students in the 2025/2026 academic year

3. SEMESTER

Subject	Lecture (hour/ week)	Practice (hour/ week)	Credit	Prerequisites	Exam type
Analytical Chemistry II. GYKGYK342E1A	4	4	6	Inorganic Chemistry, Mathematics for Pharmacists	semi-final*
Colloid Chemistry GYKGYI072G1A	2	2	4	Physical Chemistry for Pharmacists Biophysics II.	practical mark
Organic Chemistry II. GYKSZK274337E1A	4	4	8	Organic Chemistry I.	final
Physiology I. GYKTLM275E1A	5	2	5	General and Inorganic Chemistry II.	semi-final
Biochemistry I. GYKBMT343G1A	3	1	4	Anatomy, Biology II.	semi-final
Basic Immunology (theory) GYKGEN070E1A	2	–	2	General and Inorganic Chemistry II. Biology II.	practical mark
Hungarian Pharmaceutical Terminology III. GYKNYE306G3A	–	2	1	Biology II.	semi-final
Physical Education III. GYKTSI116G3A	–	1	–	Hungarian Pharmaceutical Terminology II.	practical mark
Elective or obligatory elective subjects	–	1	–		signature
Total:	–	–	–		examination or practical mark
Subject	19.5	15.5	30		

* Counts to the qualification of the diploma

Analytical Chemistry I.

Full (Hungarian) name of the subject: Analitikai kémia I.
Program: Undivided program (pharmaceutical)
Schedule: full time
Short name of the subject: Anal. Chem.
English name of the subject: Analytical Chemistry I.
German name of the subject: Analytische Chemie I

Neptun-Code of the subject: GYKGYK342E1A
Type of registration: obligatory
Responsible Department: Department of Pharmaceutical Chemistry

Responsible tutor: Prof. Dr. Tibor György Balogh, Head of Department, full professor, DSc, dr. habil.
Email: balogh.gyorgy.tibor@semmelweis.hu
Phone: +36-1-217-0891
Dr. Krisztina Csörgei-Kurin associate professor, PhD, dr. habil. Eötvös Loránd University, Department of Analytical Chemistry
E-Mail: krisztina.kurin@ttk.elte.hu
Phone: +36-1-372-2500/1241

Name of the persons responsible for the teaching of the subject:
Dr. Krisztina Csörgei-Kurin associate professor, PhD
Dr. Gergő Tóth associate professor, PhD
Dr. Viktor Mihucz associate professor, PhD
Dr. Norbert Szoboszlai associate professor, PhD

Dr. Ödön Farkas, associate professor, CSc
Dr. Anikó Vasánits assistant professor, PhD
Dr. István Molnár assistant professor
Dr. Edina Kiss assistant professor
Dr. László Grób PhD student
Dr. Lucia Torma PhD student
Dr. Elina Üveges PhD student

Classes per week: 4 lectures, 4 practices
Credit points: 6

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Theoretical knowledge and practical application of analytical chemistry methods, the formation of the analytical approach in the qualitative determination of the composition of the substances. The development of the student logical thinking ability, the complex application of their theoretical and practical knowledge to the qualitative and quantitative analysis of inorganic materials

Short description of the subject:

The aim of Analytical Chemistry is to obtain quantitative information about the chemical composition and structure of materials. Quantitative Analytical Chemistry is based on the determination of quantity of the components using different chemical and instrumental methods.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
3rd semester	56	56	–	–	112	Autumn semester	upon demand

Program of semester

Topics of theoretical classes (pro week):

- Week 1:** Definition and role of analytical chemistry, classification of methods, history, literature. Major steps in analytical problem solving. Classification of quantitative methods. Sample preparation: sampling, storage, dissolution, fusion.
- Week 2:** Types of chemical reactions in quantitative analytical chemistry. Chemical equilibria, equilibrium constants. Acid-base processes in aqueous solutions. Calculating pH (acids, bases, salts, buffers). Principle of neutralization analysis: titrants, standardization.
- Week 3:** Acid-base titration curves and influencing factors. Indicator error and its calculation. Chemical and instrumental endpoint detection in acid-base titrations.
- Week 4:** Neutralization analysis: determination of acids, bases, salts (examples). Simultaneous acid-base analysis of multi-component mixtures.
- Week 5:** Classification of solvents, advantages/disadvantages of non-aqueous solvents. Reactions in non-aqueous media. Practice of non-aqueous titrations (solvents, titrants, endpoints, determinations). Non-aqueous analyses in pharmacopeia.
- Week 6:** Midterm I. Analytical application of complex formation. Chelate and entropy effect. Effects of pH and auxiliary complexing agents on stability. Non-chelatometric methods of complexometry.
- Week 7:** Chelatometry: titrants, titration curves, endpoint detection. Direct, back, displacement, and indirect titrations. Simultaneous determination of metal ions.
- Week 8:** Solubility product. Factors affecting solubility of precipitates (effect of common ion, pH, complex formation). Precipitation titrations: conditions, curves, titrants. Argentometry: methods, endpoints. Gravimetry: precipita-

tion, filtration, washing, drying, weighing. Electrogravimetry.

- Week 9:** Redox reactions, oxidants and reductants. Redox potential and its calculation. Oxidimetric and reductometric volumetric methods. Factors influencing redox potential. Redox titrations: theory, titrants, curves. Indicator error. Permanganometry: methods, autocatalysis, Cl⁻ interference. Acidic, neutral, and basic conditions.
- Week 10:** Chromatometry, cerimetry, bromatometry (titrants, endpoints, applications). Reductometry: conditions and methods. Iodometry: principle, applications, titrants, endpoints, medium effects.
- Week 11:** Iodometry: reduction with iodide. Determination of oxidizing agents and those convertible to oxidants. Iodimetry: reductants and substances convertible to reductants.
- Week 12:** Electroanalytical methods. Potentiometry: direct and titrimetric methods.
- Week 13:** Midterm II. Conductometry: theory and practice. Amperometry (Dead stop titration), Coulometry.
- Week 14:** Evaluation of results. Random error and its calculation. Confidence limits. Systematic error. Quality assurance procedures. Calibration, Qualification, Validation.

Topics of practical classes (pro week)

- Week 1:** Introduction to lab, safety training, overview of the semester. Quantitative analytical instruments and methods. Equipment handling. Sulfuric acid determination.
- Week 2:** Acid-base titration. Continued sulfuric acid titration; HCl titrant standardization.
- Week 3:** Lactic acid determination. Simultaneous determination of borax and boric acid.
- Week 4:** Simultaneous NaOH and Na₂CO₃ determination. HgO measurement.
- Week 5:** Non-aqueous titration of lidocaine and papaverine HCl.

Week 6:	Chelatometry: simultaneous determination of Ca^{2+} and Mg^{2+} (in mineral water); Bi^{3+} in powder mixture.
Week 7:	Chelatometry: Cu^{2+} and Zn^{2+} , Hg^{2+} and Zn^{2+} ; Al^{3+} in Buro solution.
Week 8:	Argentometry: Br^- via Volhard and Fajans methods.
Week 9:	Permanganometry: KMnO_4 standardization; peroxide in Hyperol tablets; Br^- via Winkler; Fe via Zimmermann-Reinhardt.
Week 10:	Chromatometry: Mohr salt; Cerimetry: aminophenazone; Bromatometry: ascorbic acid in tablets.
Week 11:	Bromatometry-Iodometry: acetylsalicylic acid tablets (e.g. Kalmopyrin); mannitol by Malaprade; Cu^{2+} by iodometry.
Week 12:	Potentiometry: acetic acid determination; fluoride in toothpaste; automatic titration of Cl^- and I^- ; phosphate in cola.
Week 13:	Conductometry: betaine HCl; weak acids in wine; Karl Fischer water content.
Week 14:	Make-up session, lab handover.

Schedule of consultations: upon request (in the period prior to the tests; etc.)

COURSE REQUIREMENTS

Prerequisites: Inorganic Chemistry, Mathematics for Pharmacists

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Attendance is required for at least 75% of the laboratory sessions, which allows for a maximum of 3 absences. Punctual arrival is mandatory. Three instances of tardiness count as one absence. A delay of more than 10 minutes is considered an absence.

All tasks specified in the syllabus must be completed during the laboratory sessions, preferably within the scheduled timetable.

In case of absence, missed laboratory work must be made up within two weeks following the original session, or—if justified—during the last week of the semester.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

The final grade is based on students' understanding of the theoretical foundations of analytical chemistry, including knowledge of the lecture and laboratory content, theoretical background of the covered topics, principles of the laboratory experiments, chemical equation writing, and stoichiometric and equilibrium calculations.

To assess theoretical knowledge, two major midterm written tests (covering two different topics) will be conducted during pre-agreed weeks (Week 6 and Week 13).

Opportunities for make-up or retake tests will be provided after each midterm, as well as an additional make-up period at the end of the semester. In case of retake, the better result will be used for calculating the final grade. Short written or oral quizzes may also be administered at any time during the semester.

Students meet the practical requirements of the semester if they do not exceed the allowed number of absences, complete all required determinations outlined in the syllabus, and achieve a minimum average grade of 2.51 for the laboratory measurements. For "unknown sample" determinations, the final practical grade is based on the average score:

- Average 2.51 – 2.99 → final lab grade: 2 (satisfactory)
- Average 3.00 – 3.49 → final lab grade: 3 (fair)
- Average 3.50 – 4.24 → final lab grade: 4 (good)
- Average 4.25 – 5.00 → final lab grade: 5 (excellent)

At the end of the semester, a written final exam (semi-final) will be conducted covering pre-determined topics from the lecture material.

The final course grade will be determined as follows (with the condition that each component must be passed with at least a satisfactory grade):

- 50%: Final written exam grade
- 50%: Average of the two midterm test grades and the practical grade

Requirements of the signature at the end of the semester:

1. Attendance at laboratory sessions is mandatory.
2. A maximum of 3 excused absences is permitted. A fourth absence results in denial of the course signature. Justifications must be presented to the lab instructor at the next scheduled session following the absence.
3. Labs start strictly according to the timetable. If a student arrives more than 10 minutes late, the instructor may deny participation in the session (based on TVSZ §28 (12)).
4. Students must arrive prepared. Readiness may be assessed at any time, verbally or in writing, without prior notice. Unprepared students may receive a failing mark for that session.
5. Assessments listed in the syllabus must be completed at the scheduled time. Midterm make-up or retake exams are administered at a unified, pre-announced time for the entire cohort.
6. An additional condition for receiving the course signature is achieving at least a satisfactory grade in the final written exam (colloquium), both midterms, and in the semester's practical work.
7. Outside of the regular academic term, the regulations of the University Study and Examination Rules (TVSZ) and any applicable Rector's extraordinary permissions apply.

Number and type of projects students have to perform independently during the semester and their deadlines:

All quantitative measurements listed in the syllabus must be completed during the laboratory sessions. At least 80% of the tasks must be completed to an acceptable standard, which in most cases means achieving a $\pm 4\%$ accuracy in quantitative measurements. Inadequate (failing) measurements may be repeated once during the designated make-up sessions.

Each analysis must be documented in a laboratory report. Calculated results must be included and submitted to the instructor for evaluation no later than the week following the respective lab session. Failure to submit the report is considered an unsuccessful (failing) measurement.

Type of the semester-end examination: semi-final

Examination requirements: as published by the education-research department on the MOODLE interface at the start of the academic term.

Form of the semester-end examination: written

Prescribed external practice: –

Scientific, course related research, publications, essays:

Materials of the lectures and practices and additional notes (solved calculation problems, videos, etc.) can be downloaded from Moodle E-learning interface. List of teaching materials: (List of textbooks, hand-outs, scripts, etc.)

Buvári-Barcza: Quantitative Analytical Chemistry. Bp. (SE)

Skoog, West, Holler: Fundamentals of Analytical Chemistry. Saunders College Publishing

Materials of the lectures and practices can be downloaded from Moodle E-learning system

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

Organic Chemistry I.

Full name of the subject: Szerves kémia I.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Org Chem
English name of the subject: Organic Chemistry I.
German name of the subject: Organische Chemie I

Neptun code of the subject: GYKSZK274E1A
Type of registration: obligatory
Responsible Department: Semmelweis University, Institute of Organic Chemistry

Responsible tutor: Dr. Petra Dunkel assistant professor, PhD
Phone: +36-1-476-3600/53006
E-mail: dunkel.petra@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Balázs Balogh assistant professor, PhD
Dr. Dóra Bogdán assistant lecturer, PhD
Dr. Andrea Czompa assistant professor, PhD
Dr. Ruth Deme assistant lecturer, PhD
Dr. Petra Dunkel assistant professor, PhD
Dr. Zoltán Kaleta assistant professor, PhD
Dr. Róbert Ludmerczki assistant lecturer, PhD
Dr. Krisztina Süttőné Kaczeus research associate
Dr. Márton Ivánczi PhD student
Bence Kontra PhD student
Dr. László Piros PhD student
Patrik Pollák PhD student
Gergő Riszter PhD student

Classes per week: 4 lectures, 4 practices
Credit point(s): 4+4

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The course discusses the state-of the art knowledge of synthetic and structural organic chemistry subjects to develop problem-solving skills for organic chemistry and biomolecular sciences. Students will acquire the basics of organic chemistry, develop an organic chemistry perspective and acquire the theoretical, practical and material knowledge base for their future studies.

Short description of the subject:

The course in Organic Chemistry at the Faculty of Pharmaceutical Sciences has two main objectives:

- to provide a modern organic chemistry curriculum and to develop an organic chemistry approach, by presenting typical synthesis methods for the preparation of the different types of compounds and, with particular emphasis, by illustrating and interpreting their chemical reactivity. Introduction to and practical application of the main methods and tools of preparative organic chemistry.
- To provide a solid molecular, organic chemistry base for subsequent subjects in the curriculum of students at the Faculty of Pharmaceutical Sciences and, in particular, to strengthen the molecular approach necessary for biomedical disciplines.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
3 semester	4	6 (biweekly)	3 (biweekly)	–	56+36 +20	Autumn semester	upon demand

Program of semester

Topics of theoretical classes (pro week):

1. week: Introduction to Organic Chemistry. MO theory 1. Atomic orbitals, LCAO-MO method, σ and π orbitals, molecular orbitals, delocalisation. MO theory 2. Hybridisation, Lewis-Langmuir theory of bonds, valence bond method, resonance. Conjugation: allyl system, pentadienyl system, electron system of butadiene and hexatriene. Classification of organic compounds. Isomers: constitutional and conformational isomers, stereoisomers. Enantiomers and diastereomers.
2. week: Chirality, absolute configuration according to Cahn-Ingold-Prelog. Stereochemistry of organic compounds containing more than one center of chirality. Axial chirality, determination of absolute configuration. Tautomerism. Newman and Fischer-projection. Energy profile of reactions. Reaction mechanisms. Factors affecting reactivity. Electronegativity, reactivity of reagents: inductive, mesomeric and steric effects.
3. week: Classification of reactions. Kinetic and thermodynamic control. Nomenclature of organic compounds I.
4. week: Alkanes and cycloalkanes: physical and chemical properties, preparations, reactions. Mono- and disubstituted cyclohexanes. Alkenes: preparations, physical, chemical and biological properties. Cis-trans isomerization. Addition reactions. Markovnikov and anti-Markovnikov addition. Radical reactions and their mechanism. Addition vs substitution.
5. week: Polymerisation. Diolefins. Diels-Alder reaction. Pericyclic reactions. Woodward-Hoffmann rules. Alkynes: prepara-

tions, physical, chemical and biological properties. Nucleophilic addition reactions.

6. week: Benzene and aromaticity. Extension of the aromatic system. Antiaromatic and non-aromatic structures. SEAr reactions of aromatic compounds. Activating and deactivating groups, direction rules. SNAr reactions of aromatic compounds. Linear free energy relationships. Structure of halogenated hydrocarbons, physical, biological properties, preparations.
7. week: Nucleophilic substitution reactions: SN1, SN2, SNi, elimination reactions: E1, E2, E1cB - factors influencing ratio of SN vs. E reactions: substrate, solvent, temperature effects, role of the base, of the leaving group, stereochemical consequences. Alcohols, phenols, ethers: preparations, physical, chemical and biological properties. Protecting groups. Acid-base theories. Acidity and basicity of organic compounds. Acid-base reactions.
8. week: Organic sulfur compounds: structure, classification, reactivity, chirality, sulfonic acids, sulfonamides.
9. week: Amines: preparations, physical, chemical and biological properties. Aromatic diazonium and nitro compounds, organophosphorus compounds: preparations, physical, chemical and biological properties.
10. week: Nomenclature of organic compounds II. Oxo compounds: aldehydes and ketones - preparations, physical, chemical and biological properties. Addition to the carbonyl group. (Enolate chemistry I.)
11. week: Carboxylic acids and their derivatives: preparation, reactivity, nucleophilic reactions at the acyl carbon atom, physical, chemical and biological properties. (Enolate chemistry II.)

12. week: Substituted carboxylic acids, dicarboxylic acids and their derivatives. Synthetic applications of ethyl acetoacetate and diethyl malonate.
13. week: Carbonic acid derivatives: classification, nomenclature, synthetic applications. Carbamates, polymers, protecting groups, transformations.
14. week: Summary of organic chemical reactions, reaction mechanisms, synthesis planning.

Topics of practical classes (pro week):

1. week: –
2. week: Mesomeric structures, hybridisation states. Type of π -electron systems. Classification of reagents: electrophilic, nucleophilic, radical. Reaction types: S_N1 and S_N2 mechanisms.
3. week: Recrystallization of 4-bromoacetanilide, thin-layer chromatography.
4. week: Identification of cis-trans stereoisomers, E/Z notation. Recognition of chirality (stereogenic) centres in molecules. Identify and draw the enantiomers. Identify the configuration of chirality centres (R/S notation). Identify the stereochemical relationship between two compounds. Recognition of diastereomeric and meso compounds. Determining configuration from Fischer projection, drawing Fischer projection. Conformation analysis using Newman projection. Cyclohexane conformers.
5. week: Preparation of acetanilide and acetylsalicylic acid.
6. week: Aromatic, antiaromatic and non-aromatic systems. Synthesis of aromatic hydrocarbons, reactions of aromatic compounds.
7. week: Preparation of 4-bromoacetanilide, column chromatography.
8. week: Stereochemistry of S_N2 and S_E2 reactions and interpretation of the transition state. Aliphatic and aromatic hydroxy- and halogen compounds: basic properties of substitution and elimination reactions and their mechanism. Kinetic and thermodynamic control
9. week: Preparation of 4-bromo-2-nitroacetanilide and β -naphthol orange.
10. week: Preparations, applications, and reactions of quinones and ethers. Organic sulfur compounds, preparations of sulfonamides, reactions. Chemical properties of amines, basicity, preparations, reactions, diazotation.
11. week: Purification of ethyl acetate with extraction and distillation.
12. week: Aldehydes and ketones: nucleophilic addition reactions. Reactions of α -hydrogen of aldehydes and ketones.
13. week: Introduction into cheminformatics.
14. week: Supplement. Inventory. Reactivity of carboxylic acids and their derivatives (acylation), reactions involving α -hydrogen. Carbonic acid derivatives

Schedule of consultations: consultation upon request, at least 1 week before the date of consultation

COURSE REQUIREMENTS

Prerequisites: GYKASK266E2A General and inorganic chemistry II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

If necessary, students may make up for a limited number of missed or unsuccessful experiments after preliminary agreement with the leading instructor at the end of the semester. Without permission, the repetition of unsuccessful experiments is not allowed. Course material for the seminars (problem sets) are provided in advance to the students via Moodle. Students are expected to consult these materials before the respective seminars. Attendance is mandatory at the seminars. No more than one seminar absence per semester will be accepted without special consequences. A student who

misses more seminar classes in their group may attend a seminar of another group (in the same week) if possible (only a limited number of students may be allowed to do so), always by notifying the seminar leaders in advance. If this is not possible, the student (who has more than 2 absences) will be briefly debriefed by the seminar leader on the relevant topics by the end of the semester (however, regular absences are not permitted). The Study and Examination Regulations also require attendance at 75% of the practical sessions and attendance at the seminars (which count as practical sessions) according to the above criteria in order to be signed off at the end of the semester.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Theory: At the mid-term tests (one/semester) students have to answer in a written form questions on the subject-matter of the main lectures, the practicals and the seminars, the dates of which are fixed at the beginning of the semesters. The value of the midterm test can be either ranging 2-5 or failed. If the test is failed or the student did not attend it, the student must attend the following makeup test. If the makeup test is failed, a second makeup test should be written. If any of the makeup tests reach the passmark, then the midterm test is accepted. If also the second makeup test is failed, the student does not get signature for the semester, they are not allowed to sit in the semi-final examination. Grades for the main and makeup mid-term tests of the same topic are not averaged. Students who have a result of at least 90% in the mid-term test (excluding the retake tests) during the semester will have a 5-point advantage in the written exam.

Practice: at the beginning of each laboratory practical, students must write a short test on the theoretical and practical subject-matter of the experiment. These tests are immediately corrected by the leading instructor, and the practical work can be started only if the short test is accepted. If the test is failed, the experiment in question can be performed only at the end of the semester. Completing successfully the non-preparative practicals during the two semesters is also a condition of the signature and 75% of the maximum number of laboratory notebooks that can be submitted must be also approved.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

mid-term test, obtaining a signature, attending practicals and seminars as specified above

Number and type of projects students have to perform independently during the semester and their deadlines:

completion of the mid-term assessment, completion of practical work, attendance of a sufficient number of seminars (final deadline: last day of the semester)

Type of the semester-end examination: semi-final

Examination requirements: as published by the institute on the MOODLE course site by the start of the academic term.

Form of the semester-end examination written

Scientific, course related research, publications, essays:

Materials of the lectures and practices can be downloaded from Moodle
 P.C. Vollhardt; N.E. Schore: Organic Chemistry: Structure and Function, 8th Edition (W. H. Freeman)
 D.R. Klein: Organic Chemistry, 3rd Edition (Wiley)
 K.L. Williamson, K.M. Masters: Techniques Labs for Macroscale and Microscale Organic Experiments, 7th Edition (Cengage Learning)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assesment basis

The course description was prepared by:

Dr. Petra Dunkel (assistant professor, PhD)

Physiology I.

Full name of the subject: Élettan I.
Program: undivided program (pharmaceutical)
Schedule: full-time
English name of the subject: Physiology I.
German name of the subject: Physiologie I.

Neptun code of the subject: GYKTL275E1A
Type of registration: obligatory
Responsible department: Semmelweis University, Institute of Translational Medicine

Responsible tutor: Dr. Zoltán Benyó Director, professor, PhD, DSc
Phone: 210-0306
E-Mail: benyo.zoltan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Zoltán Benyó Professor, PhD, DSc
Dr. Lea Danics Research fellow, PhD
Dr. Tamás Ivanics Associate professor, PhD
Dr. Margittai Éva Assistant professor, PhD
Dr. Éva Ruisanchez Assistant professor, PhD
Dr. Monori-Kiss Anna Assistant professor, PhD
Dr. Éva Pál Assistant lecturer, PhD
Dr. László Hricisák Assistant lecturer, PhD
Dr. Ákos Zsembery Associate professor, PhD

Dr. Mátyás Szentiványi director (OGYÉI)

Classes per week: 5 hours lecture, 2 hours practice
Credit point(s): 5

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The goal is to teach physiological processes from subcellular, cellular and tissue-level processes all the way to complex regulation on the organism level, including studies in humans. Special emphasis is laid on the presentation of complex adaptation processes playing an important role in health preservation, and on studying how physiological regulatory processes respond to changes in the external or internal environment.

Short description of the subject:

Theoretical lectures and practices are held every week. Seminars/Practices are for discussion of ongoing new lecture material and performing relevant physiological measurements in small groups. Also, the theoretical knowledge of the students is tested systematically in a written form on the seminars. Students are required to take 6 written exams in each semester, and a lab exam at the end of the semester. Based on the results of the tests and the lab exam students get a lab work grade at the end of the semester. Students take a written theoretical examination in the exam period.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
3 semester	70	28	–	–	98	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week):

1. week: Historic overview, concepts of physiological control, homeostasis. Cell membrane. Basics in cell physiology. Signal transduction. Secondary messenger mechanisms.
2. week: Ionic equilibria and resting membrane potentials, ion channels and gates. Action potentials. Synaptic transmission.
3. week: Muscle. Contractile mechanism. Skeletal, cardiac, and smooth muscles. Biomechanics, electrical properties, metabolism. Structure and general functional characteristics of the autonomic nervous system. Vegetative transmitters.
4. week: Functional organization of the cardiovascular system. Dynamics of blood flow. Physiological functions of the blood vessels, their significance in the healthy functioning of the organism.
5. week: Principles of hemodynamics. Rheology of blood. Pressure and flow in large vessels. Circulatory resistance. Measurement of pressure, flow and cardiac output. Physiology of the venous system. Microcirculation. Control of lymphatic flow and interstitial fluid volume.
6. week: Biomechanical basis of cardiac functions. Cardiac pump. Signal transduction in the cardiomyocyte. Cardiac cycle. Electrical activity of the heart.
7. week: Conduction in cardiac fibers, cardiac excitability, cardiac rhythmicity, electrocardiography.
8. week: Cardiovascular control mechanisms. Local control mechanisms. Systemic control mechanisms.
9. week: Control of cardiac output. Circulation through organs and special regions. Coronary circulation. Circulation of blood and cerebrospinal fluid in the brain.
10. week: Splanchnic circulation. Circulation through skeletal muscles. Circulation of the skin. Physiology of respiration. Structure and function of the respiratory system, pulmonary mechanics.

11. week: Gas transport between the lungs and the tissues. Types of hypoxia. Regulation of respiration. Neural and chemical control of respiration. Adaptation of cardiorespiratory system and skeletal muscle to physical exercise.
12. week: Formation and excretion of urine. Structures of the kidneys and the nephron. Renal circulation. Glomerular filtration. Tubular functions. Mechanisms adjusting the composition of urine.
13. week: Fluid compartments. Regulation of extracellular fluid composition and volume.
14. week: Role of the kidneys in the control of blood pressure. Mic-turition. Physiological aspects of different forms of circulatory shock.

Topics of practical classes (pro week):

II. Practice topics/week

Practices are held at every second week (4x45 min). At the beginning of the practice, theoretical knowledge of the ongoing lecture material will be discussed and systematically tested in written form. Then students are to perform out relevant physiological measurements in small (2-3 persons) groups on each other. Topics of the practices:

1st practice: introduction

2nd practice: Study of the electrical properties of the neurons in a simulatory setting (Sim Neuron), Electroneurography, measurement of the impulse conduction velocity of a motor nerve (test)

3rd practice: Electromyography (test)

4th practice: Blood pressure measurement (test)

5th practice: ECG (test)

6th practice: Spirometry (test)

7th practice: Lab exam

Schedule of consultations: -

COURSE REQUIREMENTS

Prerequisites: Anatomy; Biology II.

Practices are obligatory. Missing 25% of practice time (7x45 min) results in denial of admission to semifinal exam. A retake option is provided at the end of the semester when students can make up a missed practice with the corresponding test or improve the grade of a single test. Absence from a test results in a 0 point fail (1). Students are allowed to participate on the semifinal exam only if they performed on all 5 performing practice and test and passed on the lab exam.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Students have to gather 50% of all available points at the tests (calculated as a summary of achieved points at all tests in percentage of the maximal points). Tests will be at practices 2, 3, 4, 5, and 6.

The summary of points will be calculated as percentage of the maximal points and translated to a grade as this scheme resulting the consultation grade:

- <50% fail (1)
- 50-69.9% pass (2)
- 70-79% fair (3)
- 80-89% good (4)
- 90-100% honor (5)

Students can make up a single test and/or the corresponding practice at the end of the semester.

Students will perform on lab exam. In case of need, a retake lab exam will be organized. Their performance during the semester will influence the semifinal grade as the following: Lab grade = (consultation grade x 2 + lab exam grade) / 3 Semifinal grade = (lab grade + test A + test B) / 3 Successful exam requires a pass at each parts of the semifinal grade.

Requirements of signature:

Acceptable amount of missing. Students have to gather 50% of all available points at the tests (calculated as a summary of achieved points at all tests in percentage of the maximal points).

Students are allowed to participate on the semifinal exam only if they performed on all 5 performing practices and tests and passed on the lab exam.

Type of the semester-end examination: signature, semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written (according to STUDY AND EXAMINATION REGULATIONS 30.§)

The possibility and conditions for offering grades: None.

Scientific, course related research, publications, essays:

Dee Unglaub Silverthorn: Human Physiology – An Integrated Approach, 8th edition (Pearson Education, 2019)

Guyton and Hall: Textbook of Medical Physiology 13th Edition (Elsevier, 2016)

Ganong's Review of Medical Physiology 26th Edition (McGraw-Hill & Lange, 2019)

A. Fonyó: Principles of Medical Physiology (Medicina Publishing House, 2002)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

The course description was prepared by: Dr. Anna Monori-Kiss
course coordinator

Biochemistry I.

Full name of the subject: Biokémia I.

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: English name of the subject: Biochemistry I.

German name of the subject: Biochemie I

Neptun code of the subject: GYKBMT276G1A

Type of registration: obligatory

Responsible department: Institute Biochemistry and Molecular Biology, Department of Biochemistry of Semmelweis University

Responsible tutor: Dr. Attila Ambrus D.Sc.

Phone: 06 1 459-1500/60050

E-mail: ambrus.attila@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Tímea Komlódi Ph. D.

Eszter szabó Ph. D.

László Tretter D. Sc.

Bálint Nagy Ph. D.

Erzsébet Maróthy Tóth Ph. D.

Tamás Kósa

Classes per week: 3 contact hrs/week, 2*70 min/week lecture
1 contact h/week, 90 min biweekly seminar

Credit point(s): 2

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The main goal of this course is to introduce students to the mechanisms of human biochemical processes at the molecular level. The program is designed to also provide a broader insight into physiological processes that enables students to connect all their previous studies to metabolic processes, and also provides them with the basic knowledge to understand mechanisms of drug action discussed later in Pharmacology. The skills and knowledge acquired in this program is inevitable for modern rational drug design.

Short description of the subject:

Protein structure, protein analysis. Characteristics, structure, kinetics, regulation of enzymes. Glycolysis and gluconeogenesis. PDH, citric acid cycle, oxidative phosphorylation. Digestion and absorption of carbohydrates. Metabolism of fructose and galactose. Pentose phosphate pathway. Glycogen metabolism. Structure of lipids. Synthesis of fatty acids, TAG, phospholipids and eicosanoids. Degradation of TAG, phospholipids and fatty acids. Metabolism of ketone bodies. Synthesis of cholesterol, bile acids and steroid hormones. Digestion of lipids. Metabolism of lipoproteins.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
3 semester	2.53	–	0.51	–	35+742+14	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week):

- Week 1: Protein composition and structure
- Week 2: Protein purification and analysis
- Week 3: Myoglobin and hemoglobin. Basic concepts and kinetics of enzymes
- Week 4: Enzyme kinetics: inhibitions, enzyme catalytic strategies
- Week 5: Enzyme regulatory strategies
- Week 6: Compounds with high group-transfer potential, Glycolysis, gluconeogenesis
- Week 7: PDH, Citric acid cycle: reactions, enzyme defects. Respiratory chain: components, operation
- Week 8: ATP synthase, shuttles, transporters. Digestion and absorption of carbohydrates
- Week 9: Fructose and galactose metabolism, Glycogen metabolism
- Week 10: Pentose phosphate pathway. Regulation of glycogen metabolism and the blood sugar level. Uronic acid cycle
- Week 11: Structure of lipids. Synthesis, elongation and desturation of fatty acids. TAG synthesis.
- Week 12: Synthesis of phospholipids and eicosanoids. Degradation of triglycerides and phospholipids. Beta-oxidation of fatty acids.
- Week 13: Degradation of odd-chain and unsaturated fatty acids. Metabolism of ketone bodies. Metabolism of cholesterol and bile acids.
- Week 14: Metabolism of steroid hormones. Digestion of lipids. Lipoproteins.

Topics of practical classes (pro week):

- Week 1-2: Amino acid titration graphs, pI and pK_a
- Week 3-4: Enzyme kinetics, the Michaelis-Menten model
- Week 5-6: Enzyme kinetics: inhibitory strategies, rate-limiting steps
- Week 7-8: Midterm I: proteins and enzymes

Week 9-10: Classification of enzymes

Week 11: Vitamins

Week 12-13: Midterm 2: bioenergetics and carbohydrate metabolism

Week 13: Vitamins

Schedule of consultations: upon mutual agreement

COURSE REQUIREMENTS

Prerequisites: Organic chemistry I, Genetics

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Not more than two absences from the practice. Justification of absence is not required.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:
two obligatory written midterm examinations with retakes

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29): all midterms to be successful and not more than two absences from the practice

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Scientific, course related research, publications, assays:

Berg-Tymoczko-Stryer: Biochemistry 9th edition

The course description was prepared by:

dr. Attila Ambrus, dr., Erzsébet Maróthy Tóth

Hungarian Pharmaceutical Terminology (practice) III.

Full name of the subject: Magyar gyógyszerészeti szaknyelv III.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Hung. Pharm. Term. III.
English name of the subject: Hungarian Pharmaceutical Terminology (practice) III.
German name of the subject: Pharmazeutische Fachsprache Ungarisch (Praktikum) III.

Neptun code of the subject: GYKNEY306G3A
Type of registration: obligatory
Institute: Institute of Languages for Specific Purposes

Name of the tutor/lecturer: Katalin Fogarasi PhD, habil.

Name of the persons responsible for the teaching of the subject:
 Borda Szandra language teacher
 Nagyné Górász Judit language teacher
 Zsófia Egedi language teacher
 Lili Szöllősi language teacher

Classes per week: 2
Credit point: 1

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The role of this subject is to help students acquire the basic vocabulary, grammar and language skills they need for the effective communication in the language they use during their field practice both in their everyday life /'survival language/' and in their academic studies.

Short description of the subject:

The third semester is dedicated to learning how to communicate with clients and colleagues at the pharmacy. Students acquire basic structures and the vocabulary for describing the characteristics of medicines. The course places special emphasis on functional language needed for obtaining and providing information, giving recommendations and instructions and on phrases needed in basic communication at a pharmacy. The semester also focuses on preparing students for the final exam (both written and oral) at the end of the 4th semester.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
3 semester	–	2	–	–	28	Autumn semester	–

Program of semester

Topics of practical classes (pro week):

Week 1 Types of medicines (forms of medicines, herbs)
 Week 2 Symptoms and treatment of cold, flu, respiratory diseases
 Week 3 Symptoms and treatment of cold, flu, respiratory diseases
 Week 4 Instructions about specific forms of medicines
 Week 5 Types of medicines 2. (Antibiotics)
 Week 6 Types of medicines 2. (Antibiotics)
 Week 7-8 Taking medication, instructions (verbs)
 Week 9-10 Different symptoms and medicines
 Week 11-12 Dermatological complaints
 Week 13 Revision
 Week 14 Oral interview

Schedule of consultations:

Individual consultations by email or in person on meeting formerly agreed upon with the teacher via email.

COURSE REQUIREMENTS

Prerequisites: GYKNEY306G2A Hungarian Pharmaceutical Terminology II.

Conditions of attending the classes, amount of acceptable absences, way of presentation of leave, opportunity for makeup:

A maximum of 3 absences is allowed (3x90 minutes); if the number of absences exceeds this, the student may make up missed classes in another group (maximum two times) in agreement with the instructor.

A student who misses more than 25% of the practical classes will not be allowed to get a signature (Study and Examination Regulations §29). For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required.

According to the Study and Examination Regulations (§ 28), three tardies count as one absence. Arriving 15 minutes later than the start of the lesson is considered tardiness

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25- 28 of the STUDY AND EXAMINATION REGULATIONS): There are no midterm assessments.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Hungarian Pharmaceutical Terminology III (signature + practical mark)
 an oral interview, week 14

Topic: the material covered

Make-up and upgrade opportunities: to be arranged outside of class with the instructor, at the latest by the end of the first week of the examination period.

Seester acceptance conditions: (signature + practical grade)

An attendance of 75% is required to get the signature.

The oral interview is the basis for the practical grade, which may be modified by the assessment of class work. A minimum of 50% (pass) must be achieved in the oral test. Tests for an upgrade may be completed by the end of the first week of the examination period at a time arranged with the instructor.

Assessment of the oral test:

0-49% = fail (1)
 50-59% = pass (2)
 60-74% = fair (3)
 75-89% = good (4)
 90-100% = excellent (5)

Knowledge testing during the semester:

The instructors may evaluate the students' performance with the help of short tests.

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.
Practical mark.

Requirements of the signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29): An attendance of 75% and taking the oral interview is required.

Individual activity of the student during the semester: Homework in the forms of language practice tasks.

Type of the semester-end examination: Practical mark

Form of the semester-end examination: oral (according to STUDY AND EXAMINATION REGULATIONS 30.§)

List of teaching materials (List of textbooks, hand-outs, scripts, etc.):

Teaching materials and audio recordings containing authentic texts compiled by the instructors of the Institute and uploaded in the Moodle-course. The uploaded teaching materials together form the basis of the oral interview / semester-end examination, where the student's skills of communication in a pharmacy environment are assessed.

The course description was prepared by:

Dr. Schmidtné Dr. Putz Mónika, senior lecturer

Physical Education III.

Full name of the subject: Testnevelés III.

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: P. E. III.

English name of the subject: Physical Education III.

German name of the subject: Sport III

Neptun code of the subject: GYKTSI3353A

Type of registration: obligatory

Responsible department: Semmelweis University, Physical Education and Sports Center

Responsible tutor: Várszegi, Kornélia director, P.E. teacher

Phone: +36-20/825-0611

E-Mail: varszegi.kornelia@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Doharné Buczkó, Anikó P.E. teacher

Farkas, Dominika P.E. teacher

Kalmus, Dániel P.E. teacher

Lehel, Zsolt P.E. teacher

Sótonyiné Hrehuss, Nóra P.E. teacher

Várszegi, Kornélia P.E. teacher

Weisz, Miklós P.E. teacher

Classes per week: 1 hour practice

Credit point: 1

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

Short description of the subject:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
3 semester	0	14	–	–	14	Autumn semester	–

Program of semester

Topics of practical classes (pro week):

1st week: General information

Health and Safety, Fire and Environmental protection. The mid-year adoption requirements, the construction of the classes and the presentation of the university recreational and sports opportunities for extra-curricular activities. Heart rate measurement exercises.

2nd week: Athletic

Differed athletic exercises like throwing, shot put. Preferably outdoors with the aim of learn how to execute the exercise with a proper form and breathing technique.

3rd week: Tennis

Introducing and learning advanced technical elements (serve, volley) and game.

4th week: Agility ladder

To perform different exercises to improve speed, balance and concentration. Preferably outdoors, on grass ground.

5th week: Relay race and competitive games

To improve explosiveness, skills and experience good team spirit.

6th week: Football

Practicing the technical elements of football in pairs and game situation.

7th week: Circuit training

Functional exercises with bodyweight and exercises with basic equipment to improve general coordination skills.

8th week: Badminton

Introducing the technical and tactical elements of doubles game. Game applying all the previously known rules.

9th week: Ruffier test

Comparing the results with the previously recorded one to bring the importance of the health of the cardiovascular system to the attention.

10th week: Meta

Reminders of the basic need to know about META. Learn tactical elements of the game and using them. Aim to improve ball skill development, reaction time, explosiveness and collective gaming experience.

11th week: Obstacle course

To complete a built up obstacle course using different creeping-climbing, hovering, pulling, skipping, throwing techniques for general skill development.

12th week: Mobilisation

Dynamic stretching exercises with and without equipment to prevent the health of the joints by maintaining and developing the mobility of it.

13th week: Skipping rope

Skill developing exercises with skipping rope individually and in pairs, in place and in motion at different levels.

14th week: Kettlebell Different kind of strengthening exercises with kettlebell.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./ week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball)

Course requirements

Prerequisites: –

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The number of active participations for physical education classes is 10 (once a week for trainings 15 times!), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certi-

fied; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Requirements of signature:

Active participation in practice classes 10 times (once a week) (trainings 15 times) under the conditions described above.

Type of the semester-end examination: signature

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate or
2. does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes
If you have not completed the course you may be readmitted in the 1. semester of the following academic year.

The course description was prepared by: Kornélia Várszeg

Basic Immunology (Theory)

Full name of the subject: Immunológia alapjai
Program: Undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Immunológia
English name of the subject: Basic Immunology (theory)
German name of the subject: Grundlagen der Immunologie

Neptun code of the subject: GYKGEN070E1A
Type of registration: obligatory
Institute: Institute of Genetics, Cell- and Immunobiology

Responsible tutor: Prof. Edit Buzas, MD, DSc, Member of Hungarian Academy of Sciences
Phone: 06-30-7444918
E-Mail: buzas.edit@med.semmelweis-univ.hu

Course coordinator: Dr. Marianna Holub PhD
E-Mail: holub.marianna@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
 Edit Buzás, Professor, MD, DSc, Member of Hungarian Academy of Sciences
 András Falus, Professor Emeritus, MD, DSc, Member of Hungarian Academy of Sciences
 Marianna Holub, Associate Professor, PhD
 Zsolt Komlósi, Associate Professor, PhD
 Barbara Molnár-Érsek, Senior research associate, PhD
 Éva Pállinger, Associate Professor, PhD

Classes per week: 2 lecture(s), 0 practice(s)
Credit point: 2

Professional content, intent of acquirement and its function in order to implement the goals of the program:

This course provides a basic knowledge of the structure and mechanisms of the immune system, immunological responses in health and disease, in order to understand the theoretical basis of the mechanisms of targeted biological therapies.

Short description of the subject:

The course discusses the construction of the human immune system: organs, cellular and molecular components involved in the immune response; the development of genetic diversity of antigen receptors, and the role of diversity in an efficient immune response. It introduces the processes of immunological regulation in healthy organism, including the immunology of pregnancy. It also discusses the course and alteration of immunological processes in certain pathological conditions, such as infections, tumors, hypersensitivity reactions, autoimmunity, immunodeficiency and transplantation.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
4 semester	28	0	–	–	28	Spring semester	7

Program of semester

Topics of practical classes (pro week):

Lectures 1.

1. The role, processes, organs and cells of the immune system
2. Principles of natural immunity
3. The complement system
4. Inflammation and acute phase reaction
5. Antigen presentation and MHCs
6. Antigen receptors and their formation
7. T lymphocytes and cell-mediated immune response
8. B lymphocytes and humoral immune response
9. Immune response in infections; immunodeficiencies
10. Hypersensitivity reactions
11. Immunological tolerance; natural and pathological autoimmunity
12. Antitumor and pregnancy immunity
13. Immunology of transplantation
14. Immunotherapies, Immunopharmacology

Schedule of consultations: 1 hour weekly in the examination period
Prerequisites: Cell Biology

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:
 No make-up for lectures.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading

retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

For passing (Grade 2-5), students have to reach 50 % of the total scores. (Total scores 60 points).

Score table:

Scores/Points	Grade
0-29	1
30-39	2
40-46	3
47-53	4
54-60	5

Type of the semester-end examination: semi-final

Examination requirements:

as published by the education-research department on the MOODLE interface by the start of the academic term. The written exam score must reach a sufficient level (>50%) to obtain credit points. It is possible to earn bonus points at the lectures. Students who achieve the appropriate bonus points can take a simplified exam during the exam period.

Form of the semester-end examination: written (according to STUDY AND EXAMINATION REGULATIONS 30.§)*

List of teaching materials (List of textbooks, hand-outs, scripts, etc.):

Lichtmann, Pillai, Basic Immunology 7th Edition, Elsevier, 2023
 Immunology seminars (e-book): <http://gsi.semmelweis.hu/> (The user name and password is on course datasheet of the Neptun.)

Introduction: The concept of immunity, Components (primary, secondary immune organs, cells, molecules) of the immune system. Principles of the immune response: antigen specificity, sensitivity, memory, clonal selection based operation. Features of innate and adaptive, cell-mediated and humoral, primary and secondary response. The immune homeostasis. Migration of immune cells and adhesion molecules; Cytokines and cytokine receptors. Chemokines and chemokine receptors.
The natural immunity: Fc-receptors; PAMP, DAMP, Pattern recognition receptors. Phagocytes and phagocytosis. Role of neutrophils, eosinophils and basophils/mast cells. Types and role of dendritic cells. Inflammasome/inflammasomopathies. Innate lymphoid cells.
The complement system: The activation pathways and the regulation of the complement system; Complement receptors; Complement genetics; the biological role of complement activation.
Inflammation and the acute phase reaction The inflammation and the acute phase response, the provoking factors and mechanisms, periods; The acute phase plasma proteins.
Antigen, antigen presentation, MHC: The major histocompatibility complex; The ways of antigen processing and presentation.
Antigen receptors and their formation: Types and structures of antigen receptors; The immunoglobulin and TCR genes, the sources of antigen receptor diversity; Expression and production of antigen receptors.
T cells and the cell mediated immunity: Differentiation and activation of T cells, types of the T cells, the cell mediated immunity.
B cells and the humoral immunity: The activation and differentiation of B cells, types of the B-cells, the humoral immunity
Immune response in infections Antimicrobial immune response.
Hypersensitivity reactions Type 1-4 reactions (See also the practical presentations)
Immunology of transplantation Immunological background of transplantation and GVH.
Immunological tolerance and autoimmunity Mechanisms of immune tolerance. The natural autoimmunity. Idiotype regulation and network. Pathological autoimmunity.
Immune deficiencies Primer and acquired immune deficiencies.
Anti-tumor-immunity and pregnancy immunity Tumor antigens. Anti-tumor immunity. Escape strategies of tumor cells. Possibilities of anti-tumor immune-therapy. Neonatal immunity. Tolerance to fetal antigens.

The course description was prepared by:

Marianna Csilla Holub, PhD, Associate Professor, Course coordinator of Immunology

Colloid Chemistry

Full name of the subject: Kolloidika (elmélet+gyakorlat)
Program: Undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Colloid Chemistry
English name of the subject: Colloid Chemistry (theory+practice)
German name of the subject: Kolloidik (Vorlesung+Praktikum)

Neptun code of the subject: GYKGYI072G1A
Type of registration: obligatory
Responsible department: Department of Pharmaceutics

Responsible tutor:

Angéla Jedlovsky-Hajdú, associate professor, PhD
 Laboratory of Nanochemistry, Department of Biophysics and Radiation Biology
 Semmelweis University
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Name of the persons responsible for the teaching of the subject:

Dr. Angéla Jedlovsky-Hajdú, associate professor, PhD
 Dr. Krisztina Ludányi, associate professor, PhD
 Dr. István Antal, full professor, PhD

Dr. Andrea Kovács, assistant professor, PhD
 Dr. Kristóf Molnár, assistant professor, PhD
 Dr. Bálint Basa, PhD student
 Dr. Livia Budai, associate professor, PhD
 Dr. Budavári Bálint, PhD student
 Halmóczy Sarolta, PhD student
 Pálos Veronika, PhD student

Classes per week: 2 hours lectures, 2 hours practices
Credit point: 4 credits

Professional content, intent of acquirement and its function in order to implement the goals of the program:

In the lectures, pharmacy students learn about the basic physical and chemical properties, characteristic (intermolecular and interparticular) interactions of nanometer-sized colloidal particles (macromolecules, micelles and microphases), and the factors influencing the stability and structure of simple and complex colloidal systems.

Short description of the subject:

Colloidal particles, colloidal systems. Properties and stability characterization of macromolecular and association colloidal solutions, colloidal and coarse dispersions. Flocculation, stabilization. Characterization of interfaces, interfacial phenomena, wetting, surface activity. Determination of the size and shape of colloidal particles. Electrokinetic phenomena. Rheology of colloidal systems. Relationship of rheological properties to structure.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
3 semester	2	2	–	–	56	Autumn semester	up to the students requirement

Program of semester

Topics of theoretical classes (pro week):

- Homogeneous, heterogeneous and colloidal systems: Classification of colloidal systems (lyophobic, lyophilic). Intermolecular and interparticle (electrostatic and steric) interactions. Colloidal dispersed and cohesive systems.
- Macromolecular colloids: Macromolecular colloids: macromolecules of natural origin and synthetic macromolecular compounds. Solubility of macromolecules, thermodynamic basis of solution formation, determination of polymer molecular weight, size and shape of macromolecules, pharmaceutical relevance. Characterization and interactions of dissolved macromolecules. Polyelectrolytes. Their use from a pharmaceutical point of view.
- Association colloids: Molecular structure and types of amphiphilic compounds. Equilibrium and thermodynamic conditions of micelle formation. Physicochemical properties of surfactant solutions. Solubilization. Properties of self-organizing systems (large micelles, vesicles).
- Characterization of interfaces: Composition of boundary layers. Intermolecular forces, interfacial (excess) energy. Thermodynamic instability. Langmuir Blodgett technique nowadays. Capillarity. Wetting phenomena upon contact of condensed phases.
- Adsorption: Energy changes of adsorption processes, thermodynamic driving force, adsorption enthalpies. Surface excess, adsorbed amount. Characterization, structural analysis and medical use of adsorbents.
- Electrical properties of interfaces: The structure and potential of the electric double layer. Electrokinetic phenomena. The role of zeta potential in pharmaceutical applications.
- Colloidal and coarse dispersions: Kinetic stability and particle aggregation. Preparation of dispersions by condensation. Control of the degree of dispersity. Preparation of coarse dispersions by

dispersion. Mechanism of steric stabilization. Flocculation with electrolytes.

- Principles of determining of the size and shape in case of colloidal particles: Diffusion, sedimentation. Influence of particle size distribution on the effectiveness of dosage forms. DLS (dynamic light scattering measurement), NTA (nanotracking analysis), DSC (differential centrifugal sedimentation).
- Emulsions, microemulsions: Stability, regulation of distribution and coalescence constancy. Regularities of stabilization of emulsions and creams.
- Suspensions: Properties, adhesion forces. Stability of suspensions.
- Aerosols, gas dispersions, foams: Properties, examinations.
- Rheology of colloidal systems: Basic rheological functions. Relationship of rheological properties to structure: ideally flexible, viscous and plastic materials. Flow curves of colloidal systems. Rheological properties of emulsions, suspensions, creams, gels, ointments. Determination and control of viscosity and limit of flow.
- Modern Colloid Chemistry: Industrial Researches.
- Written test

Topics of practical classes (pro week):

- Introduction, methods. Aspects of evaluation of measurements, laboratory order
- Determination of molecular weight of polymers with a capillary viscometer
- Examination of silica gel, gelatin and agar swelling based on volume and mass increase, effect of pH on gelatin swelling
- Determination of the critical micelle concentrations of surface active agents by stalagmometry and Donnan's pipette

5. Determination of the isoelectric point of gelatin with a capillary viscometer
6. Determination of critical micelle concentration by conductometric titration
7. Determination of the solubility of benzoic acid
8. Calculation, consultation
9. Written test
10. Preparation and investigation of monomolecular films (Pockels' experiment), Determination of contact angle based on a photograph
11. Preparation of AgI sol and determination of critical coagulant concentration in the presence of NaCl
12. Study of type and conversion of oil-water emulsion
13. Rotational and oscillatory rheometric measurements
14. Retake practice, consultation, Correction/replacement of written tests

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects: Physical Chemistry for Pharmacists, Nanotechnology There is no overlap

Schedule of consultations: According to individual student demand, at an agreed time.

Prerequisites: Physical Chemistry for Pharmacists Biophysics II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: Absences can be accepted according to the Examination and Studies Regulation. Up to 25% of the practices (3 practices) can be missed, in the event of an additional absence, the head of the institute/head of subject determines the conditions of signing and the order of replacement.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

The 2 test written during the semester is based on the lectures and on the practice materials: the first written test must be completed on practice during the week 9th and the second test on lecture on week 14th. Each student completes the first written test in their own practice time. We provide two options per test to replace/improve the written tests. In the case of a correction, the result of the correction overwrites the result of the previous score.

Completing the practices and uploading the reports to the Moodle system:

- Detailed theoretical background of the practices is presented in the lectures.
- It is not mandatory to complete all the practices, but the uncompleted practices (max. 3 practices) will be evaluated with 0% and will be included in the percentage of the average of practices. The Department provides an opportunity to make up the missing practices at the end of the semester, during the retake practice.
- The student must arrive for the practice with a pre-prepared report that corresponds to the issued form (address, date, name, principle of measurement in 2-5 sentences). - In the practices, the measurement data must be entered in the reports.
- The practice will be completed when the student has completed the experimental work, entered the measurement data in the report and the instructor confirmed this with a signature and date. Without the signature, the reports cannot be accepted. - The lab report is an individual work.
- Reports are evaluated with % (0-100%).

- The report containing the title, date, name and group of the student, theoretical background of the practice, measurement data, calculations, results, diagrams, conclusions must be uploaded to the Moodle system by the end of the week following the completion of the practice (Sunday: 24:00) in PDF format. An additional week (with a 30% reduction) is available for uploading reports overdue (Sunday: 24:00). The results of the reports uploaded after that moment will be evaluated 0% (the completion of the practice is accepted, but the result is 0%). There is no way to improve practices and reports.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

At the end of the semester, the subject is completed with a practical mark with at least a sufficient qualification, for which the following conditions must be met:

- the practical reports must be uploaded to Moodle (to the correct group and practice) with the evaluation of the results, at least 50% of the average percentages obtained for the reports must be reached).
- the two written tests must be completed. The result for each test can be worse than 50%, but a minimum of 50% of the average of the two tests must be achieved.

At the end of the semester, the grade is determined as follows: the percentage result of the two written reports with a double multiplier + the average value obtained for the reports [(2 x percentage of the 1st test + 2 x percentage of the 2nd test + percentage of the average of the reports) / 5].

Mark % of average

very good/excellent (5):	90.00-100%
good (4):	80.00-89.99%
fair (3):	63.00-79.99%
sufficient (2):	50.00-62.99%
insufficient (1):	0-49.99%

Number and type of projects students have to perform independently during the semester and their deadlines:

Upload laboratory records to the Moodle system on a weekly basis during the semester. The report prepared from the given practice must be uploaded by the end of the following week.

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term. The topics of the lectures and practices is the required curriculum.

The possibility and conditions for offering grades: There is no offering grades.

List of teaching materials (List of textbooks, hand-outs, scripts, etc.):

The lectures are presented in slides in an extracted form, which contain the most important theoretical knowledge.

All material for carrying out the lab experiments and preparing the lab reports would be available on Moodle: protocol template in editable form, sample protocol, lab manuals for the lab practices, including a brief summary of the theoretical background of the experiments, the procedure of the measurements, equations and formulae for calculating the results.

Recommended literature

Hunter, R.J.: Foundations of Colloid Science, Oxford Univ. Press (2001)
-Shaw, D.J.: Introduction to Colloid and Surface Chemistry (1992)

The course description was prepared by:

Angela Jedlovsky-Hajdu (associate professor, PhD) and Krisztina Ludányi (associate professor, PhD)

4. SEMESTER

Subject	Lecture (hour/ week)	Practice (hour/ week)	Credit	Prerequisites	Exam type
Analytical Chemistry II. GYKGYK342E2A	2	4	6	Analytical Chemistry I.	final*
Biochemistry (theory+practice) II. GYKBMT069E2A	3	–	3	Biochemistry I., Organic Chemistry I.	final*
Physiological Pharmaceutics and Pharmaceutical dosage forms GYKGYI248G1A	2	2	4	Physiology I., Physic. Chem. for Pharm., History of Pharm. and Prop.	practical mark
Physiology (practice) II. GYKTLM124G2A	–	2	1	Physiology I., Biochemistry I.	practical mark
Physiology (theory) II. GYKTLM124E2A	5	–	6		final*
Nanotechnology (theory+practice) GYKGYI078G1A	2	2	4	Colloid Chemistry	practical mark
Pharmacy Practice I. GYKANG238G1A	–	20/ semester	–	Physic. Chem. for Pharm. Pharmaceutical Terminology	signature
Hungarian Pharmaceutical Terminology (practice) IV. GYKNYE306G4A	–	2	3	Hungarian Pharmaceutical Terminology III.	final
Physical Education IV. GYKTSI116G4A	–	1	–		signature
Summer Practice I. GYSSZG234G4A	–	40/week (4 weeks)	4	Colloid Chemistry, Physiology I.	practical mark elective subject
Elective or obligatory elective subjects	–	–	–		examination or practical mark
Total:	16	13 +20/ semester	33		

Analitical Chemistry II.

Full (Hungarian) name of the subject: Analitikai kémia II.

Program: Undivided program (pharmaceutical)

Schedule: full time

Short name of the subject: Anal. Chem.

English name of the subject: Analytical Chemistry II.

German name of the subject: Analytische Chemie II

Neptun-Code of the subject: GYKGYK342E2A

Type of registration: obligatory

Responsible Department: Department of Pharmaceutical Chemistry

Responsible tutor: Prof. Dr. Tibor György Balogh, Head of Department, full professor, DSc, dr. habil.

Email: balogh.gyorgy.tibor@semmelweis.hu

Phone: +36-1-217-0891

Dr. Krisztina Csörgei-Kurin associate professor, PhD, dr. habil.
Eötvös Loránd University, Department of Analytical Chemistry

E-Mail: krisztina.kurin@ttk.elte.hu

Phone: +36-1-372-2500/1241

Dr. Gergő Tóth associate professor, PhD

Email: toth.gergo@semmelweis.hu

Phone: +36-1-217-0891

Name of the persons responsible for the teaching of the subject:

Dr. Tibor György Balogh full professor, DSc

Dr. Krisztina Csörgei-Kurin associate professor, PhD

Dr. Gergő Tóth associate professor, PhD

Dr. Viktor Mihucz associate professor, PhD

Dr. Norbert Szoboszlai associate professor, PhD

Dr. Ödön Farkas, associate professor, CSc

Dr. Károly Mazák, associate professor, PhD

Dr. Károly Süvegh, associate professor, PhD

Dr. Péter Horváth, associate professor, PhD

Dr. Márta Mazák-Kraszni, associate professor, PhD

Dr. Arash Mirzahosseini, associate professor, PhD

Dr. Elemér Vass associate professor, PhD

Dr. Anikó Vasánits assistant professor, PhD

Dr. Anna Vincze assistant professor, PhD

Dr. István Molnár assistant lecturer

Dr. Vivien Bárdos assistant lecturer

Dr. Rita Szolláth assistant lecturer

Dr. Gergely Dombi PhD student

Classes per week: 2 lectures, 4 practices

Credit points: 6

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Building on the foundation provided by Analytical Chemistry I, the aim of this course is to introduce instrumental analytical techniques. The course presents both the theoretical background and practical application of modern routine and high-end instrumental analytical techniques used in pharmacopeial monographs and the pharmaceutical industry. The objective is to provide students with a comprehensive understanding of the analysis of pharmaceutical raw materials, intermediates, and finished products produced on small, medium, and large industrial scales. Another key aim is to prepare students for smoother integration into the pharmaceutical industry workforce.

Short description of the subject:

The primary aim of the course is to familiarize students with key routine and advanced instrumental analytical techniques required for determining the quality and composition of pharmaceutical products and raw materials. Students will learn about the structure and operation of various analytical instruments. They will gain insight into the application possibilities of each instrument and, through hands-on practice, acquire practical experience in the most important instrumental techniques used in pharmaceutical analysis.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
4th semester	28	56	–	–	84	Spring semester	upon demand

Program of semester

Topics of theoretical classes (pro week):

Week 1: Classification of analytical methods based on the interaction between the analyte and electromagnetic radiation. Review of the physical principles underlying spectroscopy and the general operating principles of the instruments. Application of the Lambert-Beer law. Molecular spectroscopy: introduction to ultraviolet and visible spectrophotometry.

Week 2: Molecular spectroscopy: ultraviolet and visible spectrophotometry in practice, with examples: spectrum analysis, single- and multi-component measurements, calibration and standard addition methods. Principles and practice of fluorescence analysis.

Week 3: Atomic spectroscopy: flame photometry, emission spectroscopy, atomic absorption spectrometry. Overview of modern spectroscopic techniques.

Week 4: Separation methods in analytical chemistry. Theoretical foundations of instrumental chromatographic methods. Principles and practice of gas chromatography. Principles and practice of ion chromatography.

Week 5: HPLC I: Fundamentals, separation mechanisms, instrumentation, chromatographic parameters, and factors influencing separation.

Week 6: Infrared (IR) and Raman spectroscopy.

Week 7: HPLC II: Types of stationary phases, van Deemter equation, chiral HPLC, and UPLC.

Week 8: Electrophoretic techniques; capillary electrophoresis.

Week 9: HPLC III: Detection modes and coupled techniques.

Week 10: Chirality, optical rotation, ORD (Optical Rotatory Dispersion), and CD (Circular Dichroism).

Week 11: Mass spectrometry I: Principles, instrumentation, ionization techniques, analyzers, and fragmentation.

Week 12: Mass spectrometry II: Fundamentals of quantitative analysis and coupled techniques.

Week 13: NMR I: Principles, instrument design, NMR characteristics, basics of ^1H and ^{13}C NMR.

Week 14: NMR II: Analytical applications of NMR and quantitative NMR.

Topics of practical classes (pro week)

Week 1: Laboratory safety training, overview of course syllabus and requirements; Spectroscopy I – Qualification of UV-Vis instruments, identification, and quantitative analysis

Week 2: Application of UV spectroscopy in complex pharmaceutical formulations

Week 3: Spectroscopy II – Fluorescence

Week 4: Flame photometry and Atomic Absorption Spectroscopy (AAS)

Week 5: Gas Chromatography, Ion Chromatography, Thin Layer Chromatography

Week 6: HPLC I

Week 7: Infrared (IR) and Raman spectroscopy

Week 8: HPLC II

Week 9: Capillary Electrophoresis (CE)

Week 10: HPLC III

Week 11: Circular Dichroism (CD) and Optical Rotatory Dispersion (ORD)

Week 12: Mass Spectrometry / LC-MS

Week 13: NMR I

Week 14: NMR II

Schedule of consultations: upon request (in the period prior to the tests; etc.)

COURSE REQUIREMENTS

Prerequisites: Analytical Chemistry I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Students must attend at least 75% of the laboratory sessions, which allows for a maximum of 3 absences. Punctual arrival is mandatory. Three instances of lateness count as one absence. A delay of more than 10 minutes is considered an absence.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Prior to the start of the semester, detailed information about both the lecture and practical schedules will be uploaded to the Moodle platform. These documents include the dates and topics of assessments, as well as the available options for make-up and retake opportunities. At the beginning of each lecture, students will be given a short set of 3–4 review questions focusing on key points from the lecture. These review questions will be scored. If a student achieves 90%, 80%, or 70% correct answers, they will receive bonus points (7.5%, 5.0%, or 2.5%, respectively), which will be added to the corresponding midterm exam score.

The average of the two midterms must reach at least 2.00 (without rounding) in order to be accepted. This average is included in the final exam (comprehensive oral exam) evaluation.

During the final oral exam, students will draw two topics. If both responses are deemed acceptable, the exam grade will be calculated based on a 2/3 weight for the topic evaluations and a 1/3 weight for the average of the midterm results.

Requirements of the signature at the end of the semester:

1. Attendance at laboratory sessions is mandatory.
2. A maximum of 3 excused absences is permitted. A fourth absence results in the denial of the practical course signature. The justification must be presented to the instructor during the lab session following the absence.
3. Lab sessions start strictly according to the timetable. If a student is more than 10 minutes late, the instructor may dismiss the student from the session (according to TVSZ §28 (12)).
4. Students must arrive prepared for the lab. The instructor may assess preparedness at any time, in written or oral form, without prior notice. A student who is unprepared may receive a failing mark for that session.
5. Assessments listed in the syllabus must be completed during the respective laboratory session. Make-up or retake midterm exams will be administered in a unified manner for the entire class, outside of regular lab hours, at the scheduled times indicated in the syllabus.

6. A student will receive a practical grade only if:
 - a) they achieve an average grade of at least 2.00 (without rounding) on the theoretical assessments;
 - b) they reach the minimum required point score from the practical work;
 - c) the number of their absences does not exceed the allowed limit.
7. Beyond the academic term, the rules set forth in the University Study and Examination Regulations (TVSZ) and extraordinary permissions by the Rector apply.
8. A lab report must be kept for each practical session. The results of analyses of unknown samples must be documented in the report by the end of the session or by a deadline agreed upon with the instructor. Failure to do so will result in the session being considered failed (0 points).

Number and type of projects students have to perform independently during the semester and their deadlines:

The tasks specified in the practical syllabus must be completed, and measurement reports (lab records) must be prepared on a weekly basis. Lab reports must be submitted either at the end of the lab session or by a deadline agreed with the instructor.

Type of the semester-end examination: final examination

Examination requirements: The list of exam topics will be uploaded to the MOODLE platform in advance. During the final exam, students will draw two topics from this list. The exam is considered passed only if both topics are completed with at least a satisfactory grade.

Form of the semester-end examination: oral

Prescribed external practice: –

Scientific, course related researches, publications, assays:

Outline summaries of the lecture and practical materials, along with additional supporting resources (videos, worked example problems, etc.), are available for download from the Moodle e-learning platform. In accordance with the syllabus schedule, lecture slides, necessary background materials for laboratory sessions, protocols, lab report templates, and other related documents will be uploaded to the Moodle system no later than the week preceding the relevant session

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

Biochemistry II.

Full name of the subject: Biokémia II.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Biochemistry II.
English name of the subject: Biochemistry (theory) II.
German name of the subject: Biochemie (Vorlesung) II

Neptun code of the subject: GYKBMT276E2A
Type of registration: obligatory
Responsible department: Department of Biochemistry of Semmelweis University
Responsible tutor: Dr. Attila Ambrus D.Sc.
E-mail: ambrus.attila@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Dr. Iordan Iordanov Ph. D.
Dr. Dóra Ravasz Ph. D.
Dr. László Tretter D. Sc.
Dr. Krasimir Kolev, D. Sc.
Olivér Ozohanics Ph. D.
Bálint Nagy Ph. D.
Erzsébet Maróthy Tóth Ph. D.
Tamás Kósa

Classes per week: 1 lecture/week (2 hours/week) and 1 practice/week (2 hours biweekly)
Credit point: 3

Professional content, intent of acquirement and its function in order to implement the goals of the program:
The main goal of this course is to introduce students to the mechanisms of human biochemical processes at the molecular level. The program is designed to also provide a broader insight into physiological processes that enables students to connect all their previous studies to metabolic processes, and also provides them with the basic knowledge to understand mechanisms of drug action discussed later in Pharmacology. The skills and knowledge acquired in this program is inevitable for modern rational drug design.

Short description of the subject:
Digestion of proteins. Urea cycle. Degradation and synthesis of amino acids. Synthesis, degradation and salvage reactions of nucleotides. Integration of metabolism between the organs. Synthesis and degradation of neurotransmitters. Hemostasis, blood coagulation and fibrinolysis.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
4th semester	2	1	no	no	28+14	Spring semester	upon demand

Program of semester

Topics of theoretical classes (pro week):
Week 1: Digestion of proteins. Deamination of amino acids, urea cycle
Week 2: Degradation of amino acids, transamination, role of THF
Week 3: Synthesis of amino acids, methionine cycle, role of vitamin B12
Week 4: Synthesis of purine and pyrimidine nucleotides. Drug targets
Week 5: Degradation of nucleotides, salvage reactions, drug targets
Week 6: Metabolic integration: red blood cell, adipocyte, heart, skeletal muscle
Week 7: Metabolic integration: brain, kidney, intestine
Week 8: Metabolic integration: liver in well-fed and fasting states
Week 9: Synthesis and degradation of neurotransmitters, receptor types: Ach, NA
Week 10: Synthesis and degradation of neurotransmitters, receptor types: DA, 5-HT
Week 11: Synthesis and degradation of neurotransmitters, receptor types: Glu, GABA, Gly
Week 12: Hemostasis: the molecular mechanism of blood coagulation, pharmacological targets
Week 13: Hemostasis: inhibitors, fibrinolysis, pharmacological targets
Week 14: Hemostasis: role of thrombocytes, endothelium and liver, pharmacological targets

Topics of practical classes (pro week):
Week 1-2: Purification of trypsin with affinity chromatography
Week 3-4: Detection of LDH isoenzymes by PAGE
Week 5-6: Determination of blood sugar level
Week 7-8: Determination of TAG and cholesterol levels in serum, 1st midterm: amino acids and nucleotides
Week 9-10: Determination of ASAT and ALAT activities in serum
Week 11-12: Seminar on liver failure, 2nd midterm: metabolic integration, neurochemistry 1-2
Week 13-14: Determination of prothrombin time, activated partial thromboplastin time

COURSE REQUIREMENTS

Schedule of consultations: on demand
Prerequisites: Biochemistry I. GYKBMT343E1A
Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: Not more than two absences from the practice. Justification of absence is not required.**The grading method; the conditions for getting**

the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Grading of the final exam:
0-39.99%: fail,
40-52.99%: pass,
53-66.99%: fair,
67-79.99%: good,
80-100%: excellent

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:
Two midterm exams will be held in the Moodle system. The first midterm exam will take place on week 7-8, the material is amino acid and nucleotide metabolism discussed on week 1-5. The second midterm will take place on week 11-12, the material is metabolic integration and neurochemistry 1-2. Students who do not write the midterm paper in the normal time can make up for it after each paper and in the last week.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29): all midterms to be successful, not more than two absences from the practice

Type of the semester-end examination: final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written examination (continued orally if grade 1-2 is the written part) **(according to STUDY AND EXAMINATION REGULATIONS 30.5)**

The possibility and conditions for offering grades: Offering grades is not possible.

Scientific, course related research, publications, essays:
Berg-Tymoczko-Stryer: Biochemistry 9th edition
Lecture slides and the syllabus uploaded in the Moodle system.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

The course description was prepared by:
dr. Attila Ambrus, dr. Erzsébet Maróthy Tóth

Organic Chemistry II.

Full name of the subject: Szerves kémia II.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Org Chem II.
English name of the subject: Organic Chemistry II.
German name of the subject: Organische Chemie II

Neptun code of the subject: GYKSZK337E2A

Type of registration: obligatory

Responsible Department: Semmelweis University, Institute of Organic Chemistry

Responsible tutor: Dr. Petra Dunkel assistant professor, PhD
Phone: +36-1-476-3600/53006
E-mail: dunkel.petra@pharma.semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Balázs Balogh assistant professor, PhD
Dr. Dóra Bogdán assistant lecturer, PhD
Dr. Andrea Czompa assistant professor, PhD
Dr. Ruth Deme assistant lecturer, PhD
Dr. Petra Dunkel assistant professor, PhD
Dr. Zoltán Kaleta assistant professor, PhD
Dr. Róbert Ludmerczki assistant lecturer, PhD
Dr. Krisztina Süttőné Kaczeus research associate
Bence Kontra PhD student
Dr. László Piros PhD student
Patrik Pollák PhD student

Dániel Remecz PhD student
Gergő Riszter PhD student

Classes per week: 4 lectures, 4 practices
Credit point(s): 8

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The course includes and discusses state-of the art synthetic and structural organic chemistry subjects to develop problem-solving skills for organic chemistry and biomolecular sciences. Students will acquire the basics of organic chemistry, develop an organic chemistry perspective and acquire the theoretical, practical and material knowledge base for their future studies.

Short description of the subject:

The course in Organic Chemistry at the Faculty of Pharmaceutical Sciences has two main objectives:

- a) to provide a modern organic chemistry curriculum and to develop an organic chemistry approach, by presenting typical synthesis methods for the preparation of the different types of compounds and, with particular emphasis, by illustrating and interpreting their chemical reactivity. Introduction to and practical application of the main methods and tools of preparative organic chemistry.
- b) to provide a solid molecular, organic chemical basis for subsequent subjects in the curriculum of students at the Faculty of Pharmaceutical Sciences, and to strengthen the molecular approach necessary for biomedical disciplines.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
3 rd semester	4	6 (biweekly)	3 (biweekly)	–	56+36+20	Autumn semester	upon demand

Program of semester

Topics of theoretical classes (pro week):

1. week: Chemistry literature and databases. Carbon-carbon bond forming reaction with palladium catalysis, organometallic compounds of zinc and magnesium. Inter- and intramolecular reactions.
2. week: Heterocyclic nomenclature. Heterocyclic and heteroaromatic compounds.
3. week: π - Excessive aromatic heterocyclic compounds I.
4. week: π - Excessive aromatic heterocyclic compounds II.
5. week: π - Excessive aromatic heterocyclic compounds III.
6. week: π - Excessive aromatic heterocyclic compounds IV.
7. week: π -Excessive aromatic heterocyclic compounds V.
 π - Deficient aromatic heterocyclic compounds I.
8. week: π - Deficient aromatic heterocyclic compounds II. Heterocyclic polyenes.
9. week: π -Deficient aromatic heterocyclic compounds III. Organic polymers.
10. week: Amino acids, peptides, proteins. Carbohydrates I
11. week: Carbohydrates II.
12. week: Nucleosides, nucleotides and nucleic acids. Natural compounds: terpenes, steroids, representatives of the classes, further natural products I.
13. week: Natural compounds: terpenes, steroids, representatives of the classes, further natural products II. Alkaloids I.
14. week: Natural compounds: alkaloids II. Summary of organic chemical reactions, reaction mechanisms, synthesis planning.

Topics of practical classes (pro week):

1. week: –
2. week: Nomenclature examples from semester I-II, nomenclature of heterocyclic compounds.
Chemical bibliography and databases.
3. week: Heterocyclic compounds – advanced synthetic routes and reaction pathways. 3-, 4- and 5-membered heterocycles and possible benzologues.
4. week: 4-Nitrobenzoic acid and phthalimide.
5. week: Heterocyclic compounds – advanced synthetic routes and reaction pathways. 6-, 7- and 8-membered heterocycles and possible benzologues.
6. week: Ethyl-4-nitrobenzoate (from own 4-nitrobenzoic acid) and cyclohexanone oxime.
7. week: Amino acids, peptides, proteins.
8. week: Ethyl-4-aminobenzoate (from own ethyl-4-nitrobenzoate) and N,N'-ethylenebis(salicylimine)
9. week: Carbohydrates. General properties and applications of polymers.
10. week: (E,E)-1,5-Diphenylpenta-1,4-dien-3-one and students' presentations.
11. week: Solving of stereochemical organic chemistry problems. Alkaloids: chemistry, structure, preparations. Some examples for drug synthesis.
12. week: Diethyl 3,5-dimethylpyrrole-2,4-dicarboxylate.
13. week: Supplement. Inventory. Solving of organic chemistry problems from semester I-II. Steroids, isoprenoids: chemistry, structure, preparations.
14. week:

Schedule of consultations:

consultation upon request, at least 1 week before the date of consultation

COURSE REQUIREMENTS

Prerequisites: GYKSZK337E1A Organic chemistry (theory) I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

If necessary, students may make up for a limited number of missed or unsuccessful experiments after preliminary agreement with the leading instructor at the end of the semester. Without permission, the repetition of unsuccessful experiments is not allowed. Course materials for the seminars (problem sets) are provided in advance to the students via Moodle. Students are expected to consult these materials before the respective seminars. These problem sets will form the basis of the discussion. No more than one seminar absence per semester will be accepted without special consequences. A student who misses more seminar classes in their group may attend a seminar of another group (in the same week) if possible (only a limited number of students may be allowed to do so), always by notifying the seminar leaders in advance. If this is not possible, the student (who has more than 2 absences) will be briefly debriefed by the seminar leader on the relevant topics by the end of the semester (however, regular absences are not permitted). The Study and Examination Regulations also require attendance at 75% of the practical sessions and attendance at the seminars (which count as practical sessions) according to the above criteria in order to be signed off at the end of the semester.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Theory: At the mid-term tests (one/semester) students have to answer in a written form questions on the subject-matter of the main lectures, the practicals and the seminars, the dates of which are fixed at the beginning of the semesters. The value of the midterm test can be either ranging 2-5 or failed. If the test is failed or the student did not attend it, the student must attend the following makeup test. If the makeup test is failed, a second makeup test should be written. If any of the makeup tests reach the passmark, then the midterm test is accepted. If also the second makeup test is failed, the student does not get signature for the semester, they are not allowed to sit in the semi-final examination. Grades for the main and makeup mid-term tests of the same topic are not averaged. Students who have a result of at least 90% in the mid-term test (excluding the retake tests) during the semester will have a 5-point advantage in the written exam.

Practical: at the beginning of each laboratory practical, students must write a short test on the theoretical and practical subject-matter of the experiment. These tests are immediately corrected by the leading

instructor, and the practical work can be started only if the short test is accepted. If the test is failed, the experiment in question can be performed only at the end of the semester. Completing successfully the non-preparative practicals during the two semesters is also a condition of the signature and 75% of the maximum number of laboratory notebooks that can be submitted must be also approved.

Requirements of signaturee (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

mid-term test, obtaining a signature, attending practicals and seminars as specified above

Number and type of projects students have to perform independently during the semester and their deadlines:

completion of the mid-term assessment, completion of practical work, attendance of a sufficient number of seminars (final deadline: last day of the semester)

Type of the semester-end examination: final

Examination requirements: as published by the institute on the MOODLE course site by the start of the academic term.

Form of the semester-end examination: written (according to STUDY AND EXAMINATION REGULATIONS 30.§)

The possibility and conditions for offering grades: -

Scientific, course related research, publications, essays:

1. Materials of the lectures and practices can be downloaded from Moodle
2. P.C. Vollhardt; N.E. Schore: Organic Chemistry: Structure and Function, 8th Edition (W. H. Freeman)
3. D.R. Klein: Organic Chemistry, 3rd Edition (Wiley)
4. K.L. Williamson, K.M. Masters: Techniques Labs for Macroscale and Microscale Organic Experiments, 7th Edition (Cengage Learning)
5. **Necessary equipment:** personal protective equipment for the laboratory practicals
6. **In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission:** on and individual assessment basis
7. **The course description was prepared by:** Dr. Petra Dunkel (assistant professor, PhD)

Physiology II.

Full name of the subject: Élettan II.
Program: undivided program (pharmaceutical)
Schedule: full-time
English name of the subject: Physiology II.
German name of the subject: Physiologie II.

Neptun code of the subject: GYKTL275E2A
Type of registration: obligatory
Responsible department: Semmelweis University, Institute of Translational Medicine

Responsible tutor: Dr. Zoltán Benyó Director, professor, PhD, DSc
Phone: 210-0306
E-Mail: benyo.zoltan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Zoltán Benyó Professor, PhD, DSc
 Dr. Lea Danics Research fellow, PhD
 Dr. Tamás Ivanics Associate professor, PhD
 Dr. Ákos Lukáts Associate professor, PhD
 Dr. Margittai Éva Assistant professor, PhD
 Dr. Éva Ruisanchez Assistant professor, PhD
 Dr. Monori-Kiss Anna Assistant professor, PhD
 Dr. Éva Pál Assistant lecturer, PhD
 Dr. László Hricisák Assistant lecturer, PhD
 Dr. Ákos Zsembery Associate professor, PhD
 Dr. Máttyás Szentiványi director (OGYÉI)

Classes per week: 5 hours lectures, 2 hours practices
Credit point(s): 5

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The goal is to teach physiological processes from subcellular, cellular and tissue-level processes all the way to complex regulation on the organism level, including studies in humans. Special emphasis is laid on the presentation of complex adaptation processes playing an important role in health preservation, and on studying how physiological regulatory processes respond to changes in the external or internal environment.

Short description of the subject:

Theoretical lectures and practices are held every week. Practices are for discussion of ongoing new lecture material and performing relevant physiological measurements in small groups. Also, the theoretical knowledge of the students is tested systematically in a written form on the seminars. Students are required to take 6 written exams in each semester, and a lab exam at the end of the semester. Based on the results of the tests and the lab exam students get a lab work grade at the end of the semester. Students take a written theoretical examination in the exam period.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
4 th semester	70	28	–	–	98	Spring semester	upon demand

Program of semester

Topics of theoretical classes (pro week):

I. Lecture topics/week

1. week: Buffer systems of the blood. Other buffer systems of the body. Principles of acid-base balance. Regulation of acid-base balance in the body.
2. week: Production of blood cells. Blood groups. Blood coagulation. Anemias and pathophysiological conditions.
3. week: Gastrointestinal motility and secretions. Innervation of the GI tract. GI hormones. Regulation of GI motility. Regulation of GI secretion: Salivary secretion; Gastric secretion; Exocrine pancreas. Liver and biliary system.
4. week: Digestion and Absorption. Carbohydrates, lipids and proteins. Absorption of water and electrolytes. Absorption of vitamins and minerals.
5. week: General principles of endocrine physiology. The pituitary gland. Anterior lobe hormones. Growth hormone and physiology of growth. Posterior lobe hormones.
6. week: The adrenal cortex. Structure, blood supply and its control. Innervation. Structure and biosynthesis of adrenocortical hormones. Effects of glucocorticoids and control of their secretion. Effects of mineralocorticoids and control of their secretion. Effects of adrenal androgens and estrogens. Endocrine regulation of calcium metabolism and the physiology of bone.
7. week: The thyroid gland. Formation and secretion of thyroid hormones. Control of synthesis and secretion. Transport and metabolism of thyroid hormones. Effects of thyroid hormones. Clinical correlates. Endocrine functions of the pancreas and the regulation of carbohydrate metabolism.
8. week: Hormonal control of intermediary metabolism. Whole body metabolism. Regulation of feeding and body mass. Starvation and obesity. The reproductive glands. Development and function of the reproductive system. The

- female reproductive system. Pregnancy. Lactation. The male reproductive system. Endocrine function of the testes.
9. week: The autonomic nervous system and its central control. Adrenal medulla. Sympathetic and parasympathetic tone. Principles of sensory systems. Sensory receptors. Electrical and ionic events in receptors. "Coding" of sensory information.
10. week: Somatosensory functions. Cutaneous, deep and visceral sensation; sensory pathways. Inflammation and pain sensation.
11. week: Arousal mechanisms, sleep and the electrical activity of the brain. The reticular formation and the reticular activating system. The thalamus and the cerebral cortex. Evoked cortical potentials and the EEG. Physiologic basis of consciousness and sleep. Regulation of circadian rhythm.
12. week: Spinal organization of motor function. Monosynaptic reflexes. Polysynaptic reflexes. Spinal reflexes. Spinal and supraspinal control of muscular tone. Spinal shock. Control of posture and movement. The vestibular system. Basal ganglia. Cerebellum. Role of the function in motor coordination. Spinal integration, medullary, midbrain and cortical components.
13. week: The visual system. The image-forming mechanism. The photoreceptor mechanism. Responses in the visual pathways and cortex. Color vision. Eye movements. The auditory system. Chemical senses. Physiology of olfaction. Physiology of taste.
14. week: Neural basis of instinctual behavior. Physiology of the hypothalamus. Regulation of body temperature. Fever. Limbic functions. Motivation. Emotion. Higher cerebrocortical functions. Conditioned reflexes, learning and memory. Integrative functions of the neocortex.

Topics of practical classes (pro week):

II. Practice topics/week

Practices are held at every second week (4x45 min). At the beginning of the practice, theoretical knowledge of the ongoing lecture material will be discussed and systematically tested in written form. Then students are to perform relevant physiological measurement in small, 2-3 person group on each other. Topics of the practices:

- 1st practice: Studying the circulatory and respiratory adaptation responses during physical exercise
- 2nd practice: Acid-base disorders in the clinical practice (test)
- 3rd practice: Measurement of pulse wave velocity (test)
- 4th practice: Clinical case studies (test)
- 5th practice: Blood glucose measurement and oral glucose tolerance test (test)
- 6th practice: Examination of motor reflexes and vestibular function, EOG (test)
- 7th practice: Lab exam

Schedule of consultations: –

COURSE REQUIREMENTS

Prerequisites: Physiology I.; Biochemistry I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Practices are obligatory. Missing 25% of practice time (7x45 min) results in denial of admission to final exam. A retake option is provided at the end of the semester when students can make up a missed practice with the corresponding test or improve the grade of a single test. Absence from a test results in a 0 point fail (1). Students are allowed to participate on the final exam only if they performed on all 5 performing practice and test and passed on the lab exam.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Students have to gather 50% of all available points at the tests (calculated as a summary of achieved points at all tests in percentage of the maximal points). Tests will be at practices 2, 3, 4, 5, and 6. The summary of points will be calculated as percentage of the maximal points and translated to a grade as this scheme resulting the consultation grade:

- <50% fail (1)
- 50-69.9% pass (2)
- 70-79% fair (3)
- 80-89% good (4)
- 90-100% honor (5)

Students can make up a single test and/or the corresponding practice at the end of the semester.

Students will perform on lab exam. In case of need, a retake lab exam will be organized. Their performance during the semester will influence the final grade as the following:

Lab grade = (consultation grade x 2 + lab exam grade) / 3

Final grade = (lab grade + test A + test B + test C) / 4

Successful exam requires a pass at each parts of the final grade.

Requirements of signature:

Acceptable amount of missing. Students have to gather 50% of all available points at the tests (calculated as a summary of achieved points at all tests in percentage of the maximal points).

Students are allowed to participate on the semifinal exam only if they performed on all 5 performing practice and test and passed on the lab exam.

Number and type of projects students have to perform independently during the semester and their deadlines: None.

Type of the semester-end examination: signaturefinal

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

Scientific, course related research, publications, assays:

Dee Unglaub Silverthorn: Human Physiology – An Integrated Approach, 8th edition (Pearson Education, 2019)

Guyton and Hall: Textbook of Medical Physiology 13th Edition (Elsevier, 2016)

Ganong's Review of Medical Physiology 26th Edition (McGraw-Hill & Lange, 2019)

A. Fonyó: Principles of Medical Physiology (Medicina Publishing House, 2002)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

The course description was prepared by:

Dr. Anna Monori-Kiss course coordinator

Hungarian Pharmaceutical Terminology (practice) IV.

Full name of the subject: Magyar gyógyszerészeti szaknyelv IV.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Hung. Pharm. Term. IV.
English name of the subject: Hungarian Pharmaceutical Terminology (practice) IV.
German name of the subject: Pharmazeutische Fachsprache
Ungarisch (Praktikum) IV

Neptun code of the subject: GYKNYSE306G4A
Type of registration: obligatory elective
Responsible department: Semmelweis University, Department of Languages for Specific Purposes

Responsible tutor: Katalin Fogarasi PhD, habil.

Name of the persons responsible for the teaching of the subject:
Szandra Borda, language teacher
Zsófia Egedi, language teacher
Judit Nagyné Górász, language teacher

Classes per week: 2
Credit point: 3

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
4 semester	0	2	–	–	28	Spring semester	–

Program of semester

Topics of practical classes (pro week):

Week 1	Revision
Week 2	Home medicine cabinet
Week 3	Herbs
Week 4	Vitamins and minerals
Week 5	Gastrointestinal complaints
Week 6	Stress and sleep disorders
Week 7	Cardiovascular complaints
Week 8	Form and application of medicines
Week 9	Effect of medicines
Week 10	Side effects of medicines
Week 11	Contraindications of medicines
Week 12	Patient Information Leaflets: Reading Comprehension Practice
Week 13	Revision
Week 14	Mock-exam (oral interview)

COURSE REQUIREMENTS

Schedule of consultations: Individual consultations by email or in person on meeting formerly agreed upon with the teacher via email.

Prerequisites: GYKNYSE306G3A Hungarian Pharmaceutical Terminology III.
Conditions of attending the classes, amount of acceptable absences, way of presentation of leave, opportunity for makeup: A maximum of 3 absences is allowed (3x90 minutes); if the number of absences exceeds this, the student may make up missed classes in another group (maximum two times) in agreement with the instructor.
A student who misses more than 25% of the practical classes will not be allowed to get a signature (Study and Examination Regulations §29). For more than the allowed number of absences, a medical certificate of long-term illness or hospitalization is required.
According to the Study and Examination Regulations (§ 28), three tardies count as one absence. Arriving 15 minutes later than the start of the lesson is considered tardiness.
The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25- 28 of the STUDY AND EXAMINATION REGULATIONS): There are no midterm assessments.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:
Hungarian Pharmaceutical Terminology IV (signature + final exam - oral interview) a mock-exam, week 14

Professional content, intent of acquirement and its function in order to implement the goals of the program:
The role of this subject is to help students acquire the basic vocabulary, grammar and language skills they need for the effective communication in the language they use during their field practice both in their everyday life /'survival language/' and in their academic studies.

Short description of the subject:
The fourth semester is dedicated to learning how to communicate with clients and colleagues at the pharmacy. Students acquire basic structures and the vocabulary for describing the characteristics of medicines. The course places special emphasis on functional language needed for obtaining and providing information, giving recommendations and instructions and on phrases needed in basic communication at a pharmacy. The semester also focuses on preparing students for the final exam (both written and oral) at the end of the semester.

Topic: the material covered
Make-up and upgrade opportunities: according to the Study and Examination Regulations

Semester acceptance conditions:
An attendance of 75% and taking part in the mock exam is required to get the signature.

Knowledge testing during the semester:
The teacher may evaluate the students' performance with the help of short tests.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS): An attendance of 75% minimum and taking the final test.

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.
Final exam – oral interview
A detailed sample exam is provided in the study material, which students can download from the moodle interface.

The possibility and conditions for offering grades: -

Individual activity of the student during the semester: Homework in the forms of language practice tasks.
Performance control in the examination period: final exam (oral interview)

Prescribed external practice: -

List of teaching materials (List of textbooks, hand-outs, scripts, etc.):
Teaching materials and audio recordings containing authentic texts compiled by the instructors of the Institute.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on an individual assesment basis

The course description was prepared by: dr. Schmidtné dr. Putz Mónika, senior lecturer

Physical Education IV.

Full name of the subject: Testnevelés IV.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: PE IV.
English name of the subject: Physical Education IV.
German name of the subject: Sport IV

Neptun code of the subject: GYKTSI3354A
Type of registration: obligatory
Responsible department: Semmelweis University, Physical Education and Sports Center

Responsible tutor: Várszegi, Kornélia director, P.E. teacher
titkarsag.tsk@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Doharné Buczkó, Anikó P.E. teacher
Farkas, Domninka P.E. teacher
Kalmus, Dániel P.E. teacher
Lehel, Zsolt P.E. teacher
Sótonyiné Hrehuss, Nóra P.E. teacher

Várszegi, Kornélia P.E. teacher
Weisz, Miklós P.E. teacher

Classes per week: 1 hour practice
Credit point(s): 1

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice – so that they can represent those in their later practice, through their own health-promoting behavior.

Short description of the subject:

One aim of the course is to improve the health status of medical students, maintaining and increasing physical performance, creating the conditions for better physical quality of life.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
4 semester	0	14	–	–	14	Spring semester	–

Program of semester

Topics of practical classes (pro week):

1st. week: General information

Accident, fire and environmental knowledge. Requirement for acceptance of the semester system, the structure of the classes and the presentation of the university recreational sports opportunities for extra-curricular activities.

2nd. week: Basketball

Dribbling and shooting skill improving drills. Games: 1 on 1; 2 on 2; shooting contests, king of the court. Scrimmage.

3rd. week: Wall-bar exercises

Enhance strength and balance by climbing, declining, hanging, skipping, pulling, pushing etc. exercises.

4th. week: Circuit training

A chain of compete drills in a certain time period with and without equipment. The aim is to improve the general level of strength and stamina.

5th. week: Floorball

Passing and receiving skill improving drills. Exposing shots on goal (wrist- slap- and snapshots). Scrimmage.

6th. week: Drills in pairs

Strength, agility, coordination and battling skill improving exercises with a partner incorporated.

7th. week: Volleyball

Introducing the defensive elements of the game (receiving serves, blocks). Exposing unknown rules. Games.

8th. week: Game-day

Introducing and practicing different kind of cohesion enhancing games (Tick-Tac-Toe, etc.)

9th. week: Ruffier test

Comparing the results with the previously recorded one to bring the importance of the health of the cardiovascular system to the attention.

10th. week: Circuit training

Specialized chain of drills for strengthen the shoulder, back, chest, arm and leg muscles, considering the fitness level of the Students.

11th. week: Tennis

Introducing variations of ground strokes and grip types (slice, topspin, lobs etc.) Exposing the rules of doubles. Games (all around the world, etc.)

12th. week: Badminton

Exposing the rules and the basic tactical elements of the doubles game. Scrimmage.

13th. week: Core exercises

Body-weight exercises targeting to strengthen the muscles of the trunk thus develop a strong fascia to protect it from the harmful effects of overdose sitting (studying)

14th week: Medicine-ball exercises

Strength and coordination (complex) skill developing exercises by throwing, rolling, passing, lob, shot-put, etc. with a partner incorporated.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes! (2x90 mins./ week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball)

COURSE REQUIREMENTS

Prerequisites: –

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Requirements of signature(as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Active participation in practice classes 10 times (once a week) (trainings 15 times) under the conditions described above.

Type of the semester-end examination: signature

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate or
2. does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes

If you have not completed the course you may be readmitted in the 2. semester of the following academic year.

The course description was prepared by: Kornélia Várszegi

Nanotechnology (theory+practice)

Full name of the subject: Nanotechnológia (elmélet+gyakorlat)

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject:

English name of the subject: Nanotechnology (theory+practice)

German name of the subject: Nanotechnologie (Vorlesung+Praktikum)

Neptun code of the subject: GYKGYI078G1A

Type of registration: obligatory elective

Responsible department: Semmelweis University, Department of Pharmaceutics

Responsible tutor: Dr. István Antal professor

Contact information: phone: +36 1 217 0914

email: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. István Antal, professor

Dr. Romána Zelkó, professor

Dr. Andrea Kovács, assistant lecturer

Dr. Csaba Dobó-Nagy, professor

Dr. Angéla Jedlovsky-Hajdú, associate professor

Dr. Nikolett Kállai-Szabó, associate professor

Dr. Nóra Mike-Kaszás, senior lecturer

Dr. Livia Budai, assistant lecturer

Dr. Bálint Basa, resident

Dr. Bence Borbás, resident

Dr. Zsófia Kohod, resident

Dr. Zsófia Vilimi, resident

Number of lectures /week: 2 hours lectures, 2 hours practices

Credit point: 4 credits

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the 'Nanotechnology' subject is to acquaint the pharmacy student with the basics of nanotechnology, different types of nanoparticles and nanostructures, important physicochemical properties, physiological and toxicological aspects. It also aims to provide insight into the different areas of application of nanotechnology through practical examples in addition to general knowledge. In addition to general knowledge about nanotechnology, the subject provides practical insights into various areas of application of nanotechnology through practical examples.

Short description of the subject:

The subject "Nanotechnology" provides an overview of the main concepts of nanotechnology, the importance of different nanoparticles, their possible applications, and preparation methods. The potential toxicological aspects of drug delivery systems used in nanomedicine will be also discussed.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
4 semester	2	2	–	–	56	Spring semester	–

Program of semester

Topics of theoretical classes (pro week):

- Week: Introduction to nanotechnology, its history, and significance. Nanotechnology concepts, definitions, classifications (nanoparticles, nanostructures, nanomaterials)
- Week: Particle size reduction I: particle characteristics
- Week: Particle size reduction II: Effect of particle characteristics on dissolution; nanomilling
- Week: Vesicular systems: micelles, liposomes
- Week: Quantum dots and nanoparticles
- Week: Solid state, amorphous form
- Week: Nano- and microemulsion systems
- Week: Characterization methods in nanotechnology
- Week: Nanofibers as drug delivery systems
- Week: Bioactive materials, orthopedic implants, bone grafting, and bactericidal surfaces
- Week: Nanochemistry and biomedical applications
- Week: Nanomaterials in dentistry
- Week: Physiological and toxicological aspects of nanotechnology
- Week: Nanomedicine: Nanotechnology in drug therapy, targeted drug delivery, medical imaging, and diagnostics

Topics of practical classes (pro week):

- Week: Introduction to nanotechnology laboratory practices, methods, and devices
- Week: Preparation of quantum dots
- Week: Preparation, examination and evaluation of liposomes
- Week: Inhibition and study of the eutectic formation
- Week: Morphological characterization of nanoparticles, related calculations, SEM/TEM image analysis, particle size, and distribution analysis and evaluation; modelling
- Week: Written test

- Week: Nanosuspension preparation, examination and evaluation
- Week: Preparation, examination and evaluation of nanoemulsions/microemulsions
- Week: Preparation, examination and evaluation of nano-, micro-fibers
- Week: Project work and presentations: On the topic of nanoparticles and nanomedicine
- Week: Project work and presentations: On the topic of nanotechnology in different industries
- Week: Holiday
- Week: Written test
- Week: Consultation, replacement practice

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects: Physical Chemistry, Colloid Chemistry, Pharmaceutical Technology

Schedule of consultations: At the times indicated in the practice schedule or at an agreed time according to the individual student's needs.

COURSE REQUIREMENTS

Prerequisites: Colloid Chemistry

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Up to 25% of the practices (3 practices) can be missed, with the possibility of making up the time according to the practice schedule (on the 14th weeks), in the event of an additional absence, the head of the institute/head of subject determines the conditions of signing and the order of replacement.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Mid-term assessments:

1. The completion of 2 written tests (on 6 th and 13th weeks) from the material of the lectures and practices with the results at least 50% of each of the written tests. Possibility of retake according to the Examination and Studies Regulation.
2. There are 6 practice-related Moodle tasks during the semester divided into two blocks the final deadline for completing the tasks is Friday midnight (on 5 th and 12th weeks) before the written midterms.
3. The students must work in groups to develop and present a pre-determined nanotechnological topic within the framework of project work during the 10 th and 11 th educational weeks.

At the end of the semester, the grade is determined as follows:

Based on a percentage calculation from the sum of the points obtained on the two written tests (max. 36-36 points), the points of the practice-related tasks (max. 12 points) and the points received for the project work (max. 16 points), as follows:

90,00-100%	excellent (5)
80,00-89,99%	good (4)
63,00-79,99%	medium (3)
50,00-62,99%	sufficient (2)
0-49,99%	Insufficient (1)

Requirements of signature(as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Completion according to the SE Examination and Studies Regulation, completion of the practices and laboratory reports, as well as with a minimum of 50% in each written test and preparation of the student project work.

Number and type of projects students have to perform independently during the semester and their deadlines:

The completion of 6 practice-related Moodle tasks (deadline: Friday midnight on 5th and 12th weeks), preparation and presentation of a project work in groups (the deadline of the Moodle uploading: 10 th weeks Monday 8:00 am., presentation weeks: on 10 th and 11 th educational week), 2 written tests (on 6 th and 13th weeks).

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades: -

List of teaching materials (List of textbooks, hand-outs, scripts, etc.):

The lectures are presented in slides in an extracted form, which contain the most important theoretical knowledge. Materials are provided to help students to carry out and learn the practices. A guide to the literature research needed to complete the project work.

The course description was prepared by: Dr. Andrea Kovács, Dr. István Antal

Physiological Pharmaceuticals and Pharmaceutical dosage forms (theory+practice)

For details on this subject please contact the department or visit their website.



Pharmaceutical Sciences
3rd year

FACULTY OF PHARMACEUTICAL SCIENCES

5th–6th semester

Curriculum of the credit-based training for second year students in the 2025/2026 academic year

5. SEMESTER

Subject	Lecture (hour/ week)	Practice (hour/ week)	Credit	Prerequisites	Exam type
Pharmaceutical Chemistry and Analysis I. GYKGYK279E1A	4	4	8	Analytical Chemistry II. Organic Chemistry II.	semi-final
Pharmaceutical Technology I. GYKGYI281G1A	2	3	5	Physiological Pharm. and pharmaceutical dosage forms, Nanotechnology, Pharmaceutical and medical terminology	practical mark
Pharmaceutical Botany GYKFMG278E1A	2	2	3	Biochemistry I.	semi-final
Biotechnology GYKGYI074E1A	1	-	1	Biochemistry I.	semi-final
Dietetics GYKGYI168E1A	1	-	1	Physiology II. Biochemistry II.	semi-final
Pharmaceutical Microbiology GYKMIK280E1A	3	2	4	Basic Immunology	semi-final
Products of Veterinary Medicine (theory) GYKGYI085E1A	1	-	1	Physiological Pharmaceutics and Pharmaceutical dosage forms	semi-final
Clinical Chemistry and Laboratory Diagnostics (theory) GYKLMIO82E1A	2	-	2	Physiology II. Biochemistry II.	semi-final
Basic Medical Pathophysiology I. (theory+practice) GYKGYH128G1A	2	1	2	Physiology II. Biochemistry II. First Aid	practical mark
Physical Education V. GYKTSII16G5A	-	1	-	-	signature
Elective or obligatory elective subjects	-	-	-		examination or practical mark
Total:	18	13	27		

Pharmaceutical Chemistry and Analysis I.

Full (Hun) name of the subject: Gyógyszerkémia és analízis I.

Program: Undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject:

English name of the subject: Pharmaceutical Chemistry and Analysis I.

German name of the subject: Pharmazeutische Chemie und Analytik I

Type of registration: obligatory

Neptun code of the subject: GYKGYK279E1A

Responsible Department: Department of Pharmaceutical Chemistry

Responsible tutor: Dr. György Tibor Balogh

Contact information: Semmelweis University, Department of Pharmaceutical Chemistry

1092 Budapest, Högyes Endre u. 9.

phone: 06-1-217-0891

email: balogh.gyorgy.tibor@semmelweis.hu

Title, academic degree: Head of department, full professor, PhD, DSc, dr. habil

Name of the persons responsible for the teaching of the subject:

Dr. György Tibor Balogh Head, full professor, PhD, D.Sc, dr. habil

Dr. Balázs Volk director of drug substance development, Egis Pharmaceutical Plc., DSc.

Dr. Péter Horváth Associate professor, PhD

Dr. Károly Mazák Associate professor, PhD

Dr. Márta Mazák-Kraszni Associate professor, PhD

Dr. Gergő Tóth Associate professor, PhD

Dr. Arash Mirzahosseini Associate professor, PhD

Dr. Ádám Golcs Assistant professor, PhD

Dr. Tamás Pál Assistant professor, PhD

Dr. Réka Angi Assistant professor, PhD

Dr. Anna Vincze, Assistant professor, PhD

Dr. Vivien Bárdos Assistant lecturer

Dr. Balázs Simon Assistant lecturer

Dr. Rita Szolláth Assistant lecturer

Marcell Stifter-Mursits PhD student

Class per week: 4 lectures, 4 practices

Credit point(s): 8

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Integration of the curriculum of various chemical and biological courses and extension with specific chemical knowledge regarding properties, mechanism of action and analytics of drug substances.

Short description of the subject:

theory: Teaching of synthesis, analytics, physico-chemical and chemical properties, structure-activity relationships, receptor-bindings and biochemical background of biological effects of drug substances.

practice: Teaching of analytics, physico-chemical and chemical properties of drug substances.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
5 semester	56	56	–	–	112	Autumn semester* Spring semester Both semesters (* Please underline)	–

Program of semester

Topics of theoretical classes (pro week):

Week

- Week 1: Introduction. (Pharmaceutical Chemistry, Pharmacopoeias)
Preliminary testing of inorganic and organic compounds, classification
Methods for identification of inorganic compounds
Identification of organic functional groups
- Week 2: General purity tests in Pharmacopoeia
Structural and physical chemistry of drug action I
- Week 3: Proton speciation of drugs, Determination of protonation constants, optimization of pH-dependent processes
Characterization of lipophilicity, determination of partition coefficient
- Week 4: The role of solubility in drug discovery. Kinetic and thermodynamic solubility and methods of determination
Role of active substance permeability in ADME processes
- Week 5: Separation techniques TLC and HPLC
Application of UV-VIS spectrophotometry in the analysis of drugs
- Week 6: Determination of organic acids and bases
Opioid analgetics I.
- Week 7: Opioid analgetics II.
Minor analgetics
- Week 8: Nonsteroidal antiinflammatory drugs
Sedato-hypnotics and anxiolytics
- Week 9: Narcotics
Local anaesthetics

- Week 10: Psychopharmacons I.
Psychopharmacons II.
- Week 11: Cholinergic and adrenergic agents I.
Cholinergic and adrenergic agents II.
- Week 12: Cholinergic and adrenergic agents III.
Antiepileptics
- Week 13: Drugs acting on the digestive system
Drug discovery and research
- Week 14: Drug development

Topics of practical classes (pro week):

- Week 1: Equipping, rules to be observed in the laboratory
Burning test demonstration and discussion.
- Week 2: Preliminary testing and classification of inorganic and organic drugs I. Identification of inorganic drugs
- Week 3: Preliminary testing and classification of inorganic and organic drugs II. Identification of inorganic drugs.
- Week 4: General purity tests for inorganic ions.
- Week 5: Determination of protonation constants (potentiometry, UV spectroscopy)
- Week 6: Identification of organic functional groups
- Week 7: Opioid analgetics
- Week 8: Minor analgetics
- Week 9: Non-steroidal anti-inflammatory drugs
- Week 10: Determination of logP
- Week 11: Local anesthetics
- Week 12: Sedato-hypnotics, anxiolytics
- Week 13: Drugs effecting the vegetative nervous system
- Week 14: Psychopharmacons

**Other subjects (both obligatory and optional) relating to the trans-
versal issues of the subject. Possible overlaps between subjects:**
General chemistry, Inorganic chemistry, Analytical chemistry, Or-
ganic chemistry, Biophysics, Biochemistry, Physiology

Schedule of consultations: based on the student's request

COURSE REQUIREMENTS

Prerequisites:

Analytical Chemistry II., Organic Chemistry II.

**Conditions of attending the classes, amount of acceptable ab-
sents, way of presentation of leave, opportunity for makeup:**

Based on the Study and Examination Regulation

**The grading method; the conditions for getting the signature; the
number, topic(s) and date(s) of the mid-term assessments, (re-
ports, term tests), and the process in which they contribute to the
final grade; and the possibility of their retake or their upgrading
retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION
REGULATIONS):**

The average of the three midterm tests written during the semester
counts for 1/3rd of the exam grade, while the result of the semi-final
examination counts for 2/3rd.

**Requirements of signature (as provided for in STUDY AND
EXAMINATION REGULATIONS § 29):**

The average grade for the scheduled midterm tests must be at least
2.0 and at least two of the tests must be passed. A minimum 50% of
the total points must be accumulated during the practices and no
more than three practices can be missed.

Attendance of lectures. (Extent of the absence is based on the Study
and Exam Regulation)

Attendance of practices. (Extent of the absence is based on the
Study and Exam Regulation)

A maximum of three absences from practices is permitted during the
semester.

**Number and type of projects students have to perform inde-
pendently during the semester and their deadlines: no**

Type of the semester-end examination: signature*/practical grade*/
comprehensive examination*/final/end-term examination*

* Please underline

Examination requirements: (list of topics, test examination topics,
mandatory parameters, diagrams, concepts, list of calculations, prac-
tical skills, and project tasks recognised as examinations, criteria for
completion and assessment):

Identification of inorganic compounds

(identification of anions and cations in Ph. Eur.)

Identification of organic functional groups

(identification of acidic, basic and neutral functional groups; identi-
fication of phenols; identification of amine functional groups)

Purity tests in Ph. Eur.

(principles, classification of impurities; general tests for ammonium,
arsenic, phosphate, calcium, potassium, chloride, magnesium, sul-
phate, iron and heavy metals; clarity and degree of opalescence, co-
lour of liquids; calculations)

Structural and physical chemistry of drug action

(general description of drug action; description of acid-base charac-
ter; requirements of the formation of the drug-target molecule com-
plex, types of drug-target molecule interactions, characterization of
drug-target molecule interactions, types of the biological response)

Protonspeciation of drugs

(macro- and microconstants /logK, pKa/, relationships; determination
of the concentration of species; $\bar{n}$, $\bar{H}$, average charge, isoelec-
tric point; calculations)

Determination of protonation macroconstants

(direct potentiometry, UV/pH titrations; calculations)

Lipofilicity, solubility, permeability

(definitions, relationships; experimental methods; calculations of
logP, logD, logS, kinetic and thermodynamic solubility, effects act-
ing on solubility, biological and artificial membranes, transport pro-
cesses, sink process)

UV/VIS spectroscopy

(theoretical principles; chromophore and auxochrom groups; spec-
trum shifts; Lambert-Beer law; practice of spectrophotometric mea-
surement; pharmacopoeial applications;)

Chromatographic methods, TLC, HPLC

(classification of chromatographic systems; principles; stationary-
and mobile phases; TLC: practice of TLC, Rf, RM, pharmacopoeial ap-
plications, validation; HPLC: apparatus, principles, definitions, chro-
matogram, chromatographic parameters (dead time, retention time,
capacity factor, resolution, selectivity), pharmacopoeial applications)

Determination of organic acids and bases

(classification of solvents; measurement options with examples, cal-
culations, multicomponent drug preparations)

Analgetics

(classification; structure, properties and analytics of morphine;
semi-synthetic agents, structure-activity relationships; synthetic opi-
oid compounds; receptor model; (structures: morphine, codeine, eth-
ylmorphine, dihydrocodeine, oxycodone, naloxone, naltrexone, dex-
trometorphan, pethidine, fentanyl, methadone, tramadol)

Minor analgetics

(classification; properties, analytics, metabolism; structures: salicylic
acid, sodium salicylate, acetylsalicylic acid, paracetamol, phenazone,
metamizole sodium)

Nonsteroidal anti-inflammatory drugs

(mechanism of action; classification; structures, properties, analytics,
structure-activity relationships; structures: niflumic acid, diclofenac,
indometacin, ibuprofen, naproxen, phenylbutazone, piroxicam, cele-
coxib, nimesulide)

Local anaesthetics

(mechanism of action; classification; structures, properties, analyt-
ics; structures: cocaine, benzocaine, procaine, tetracaine, lidocaine,
mepi-, ropi-, bupivacaine)

General anaesthetics

(classification; structures, structural criteria of action, partition equi-
libria, properties, structure-activity relationships; structures: sevoflu-
rane, propofol)

Sedato-hypnotics

(classification; structure, properties, analytics, mechanism of action
and structure-activity relationships of barbiturates; structures: chloral
hydrate, chlorobutanol, phenobarbital)

Anxiolytics

(classification; structure, properties, mechanism of action and struc-
ture-activity relationships of benzodiazepines; structures: nitrazepam,
diazepam, chlordiazepoxide, midazolam, alprazolam)

Antipsychotics

(classification; structure, properties, mechanism of action, struc-
ture-activity relationships of phenothiazines and thioxanthenes;
structure, properties and mechanism of action of atypical antipsy-
chotics (benzamides, tricyclic compounds, aryl-piperazines; (struc-
tures: chlorpromazine, levomepromazine, fluphenazine, fluphenazine
decanoate, chlorprothixene, flupentixol, sulpiride, clozapine)

Antidepressants

(classification; structure, properties, mechanism of action, struc-
ture-activity relationships of I. and II. generation drugs; structures:
imipramine, amitriptyline, maprotiline, fluoxetine, sertraline)

Parasympathomimetics

(receptors, receptor binding of acetylcholine; classification; structure, properties, analytics, structure-activity relationships of direct and indirect acting parasympathomimetics; structure: acetylcholine, carbachol, pilocarpine, physostigmine, pyridostigmine)

Parasympatholytics

(classification; structure, properties, receptor binding, analytics, structure-activity relationships of natural and synthetic parasympatholytics; structures: atropine, scopolamine (hyoscine), homatropine, homatropine methylbromide, ipratropine, thiotropium)

Sympathomimetics

(receptors, receptor binding of noradrenaline; classification; structure, properties, analytics and structure-activity relationships of phenylalkylamines; structures: noradrenaline, adrenaline, isoprenaline, terbutaline, phenylephrine, ephedrine, naphazoline)

Form of the semester-end examination: written

The possibility and conditions for offering grades:

No grades offered

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:

Theoretical and practical material uploaded to Moodle system.

Lecture notes

Thomas L. Lemke, David A. Williams, Victoria F. Roche, S. William Zito: Foye's Principles of medicinal chemistry

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission:
no

The course description was prepared by:

Dr. Péter Horváth

Pharmaceutical Botany

Full (Hungarian) name of the subject: GYÓGYSZERÉSZI NÖVÉNYTAN

Program: Undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: Botany

English name of the subject: Pharmaceutical Botany

German name of the subject: Pharmazeutische Botanik

Type of registration: obligatory/obligatory elective/elective/criteria requirement

Neptun code of the subject: GYKFMG278E1A

Responsible Department: Department of Pharmacognosy

Responsible tutor: Dr. Ágnes Alberti

Contact information: email: alberti.agnes@semmelweis.hu

Title, academic degree: associate professor, Ph.D.

Name of the persons responsible for the teaching of the subject:

Imre Boldizsár associate professor, Ph.D.

Attila Ványolós assistant professor, Ph.D.

Bernadett Szögi-Tatár Ph.D. student

Class per week: 2 lectures 2 practices

Credit point(s): 2 credits (lectures)

1 credit (practice)

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The main aims of the subject are as follows:

1. To get familiar with the botanical features of plants at the cytological, histological, and organizational levels in order to gain basic knowledge essential for pharmacopeial drug analysis
2. To obtain a comprehensive picture of general and specific metabolic processes and physiological phenomena of plants to understand the production and accumulation of biologically active substances (and their mode of storage).
3. To study the chemotaxonomy of plants in order to be able to recognize medicinal herbs (and poisonous plants) and to understand their kinship and chemism.

Short description of the subject:

The subject summarizes current knowledge on the structure and function of plant cells and their participation in biochemical processes. It presents the anatomical (histological) and macroscopic morphological characteristics of the plant organs, that also represent drugs, and their physiological processes, highlighting their role in the production and accumulation of biologically active substances. It describes the systematization of the flora most important from the pharmaceutical point of view: chemotaxonomy with special emphasis on chemism. In this context, it presents important medicinal herbs (and poisonous plants) and their morphological characteristics necessary for their recognition

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
5 semester	28	–	–	–	28	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week):

1. week: Introduction to Pharmaceutical Botany. Aims and Scope. Cellular Plant Anatomy. Cell organelles. Cell wall structure. Plant tissues: parenchyma, sclerenchyma, collenchyma
2. week: Vascular Plant tissues: phloem and xylem. Vascular bundles. Epidermis. Stomata. Secretory tissues
3. week: Roots. Root system and morphology
4. week: Stems. Morphology, primary and secondary growth, woody stem
5. week: Leaves: macroscopic and microscopic morphology
6. week: Flowers: parts of a flower, floral types. The main types of inflorescences.
7. week: Development of seeds and fruits, double fertilization. Fruit types. Histological features of seeds and fruits.
8. week: Introduction to taxonomy. Kingdom of fungi: ecology, distribution, importance, Ascomycota, and Basidiomycota.
9. week: Pteridophyta: Filicopsida, Equisetopsida, Lycopodiopsida. Gymnosperms: Conifers, Ginkgo, Gnetales
10. week: Introduction to Angiosperms. Families of Magnoliidae, Caryophyllidae and Hamamelididae subclasses
11. week: Rosidae subclass: Rosaceae, Aerialiaceae, Fabaceae, Apia-ceae, Malvaceae
12. week: Dilleniidae subclass: Malvaceae, Salicaceae, Euphorbia-ceae, Urticaceae, Cannabaceae, Brassicaceae.
13. week: Lamiidae and Asteridae subclasses: Solanaceae, Borag-inaceae, Schrophulariaceae, Lamiaceae, Asteraceae.
14. week: Characterization of monocot plants. Alliaceae, Aspho-delaceae, Amaryllidaceae, Zingiberaceae, Poaceae

Topics of practical classes (pro week): -

Schedule of consultations: on demand

COURSE REQUIREMENTS

Prerequisites: Biochemistry II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: Based on the current Study and Exam regulations

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (re-ports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS): two midterm tests taken on dates specified in the beginning of the semester, retake possibilities on the week following the midterm, and also on the last week

Number, topics, and dates of tests during the semester, opportu-nities of makeup and improvement of results: -

Requirements of signature (as provided for in STUDY AND EXAM-INATION REGULATIONS § 29):

Participation at the practices. Submission and acceptance of reports. Passing every midterm during the semester.

Number and type of projects students have to perform inde-pendently during the semester and their deadlines: -

Type of the semester-end examination: signature*/practical grade*/semi-final*/final* (* Please underline)

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Topic list for oral exam

- A/1. Characteristics of plant cells. Structure and chemistry of cell walls. Thickening of cell wall in plants. Sclerenchyma
- A/2. Plastid types and structure, main steps of photosynthesis. Plant tissues: collenchyma, parenchyma.
- A/3. Secretory tissues: types, structure, role in the synthesis of secondary metabolites.
- A/4. Epidermis, trichomes, stoma (types and examples). Periderm and rhytidome.
- A/5. Roots: types; young/primary roots, secondary growth; specialized roots.
- A/6. Stems: young/primary stems. Specialized stem structures.
- A/7. Secondary growth of stems. Woody stem, periderm.
- A/8. Leaves: macroscopic and microscopic structure.
- A/9. Flowers: parts of a flower, floral types. The main types of inflorescences.
- A/10. Development of seeds and fruits, double fertilization. Fruit types. Histological features of seeds and fruits.
- B/1. Kingdom of fungi: ecology, distribution, importance, Ascomycota, and Basidiomycota.
- B/2. Pteridophyta: general features, Filicopsida, Equisetopsida and Lycopodiopsida.
- B/3. Gymnosperms: Conifers, Ginkgo, Gnetales.
- B/4. Magnoliidae subclass: Magnoliaceae, Myristicaceae, Lauraceae, Piperaceae, Ranunculaceae, Papaveraceae
- B/5. Caryophyllidae subclass: Caryophyllaceae, Cactaceae, Chenopodiaceae, Polygonaceae.
- B/6. Hamamelididae subclass: Fagaceae, Betulaceae, Juglandaceae families.
- B/7. Rosidae subclass: Crassulaceae, Rosaceae, Mimosaceae, Cuscutaceae, Fabaceae.
- B/8. Rosidae subclass: Myrtaceae, Rutaceae, Anacardiaceae, Araliaceae, Apiaceae.
- B/9. Dilleniidae subclass: Malvaceae, Salicaceae, Euphorbiaceae, Urticaceae, Cannabaceae, Brassicaceae.
- B/10. Cornidae subclass: Ericaceae, Rubiaceae, Loganiaceae, Valerianaceae, Apocynaceae.
- B/11. Lamiidae and Asteridae subclass: Solanaceae, Boraginaceae, Scrophulariaceae, Lamiaceae, Asteraceae.
- B/12. Characterization of monocot plants. Alliaceae, Asphodelaceae, Amaryllidaceae, Zingiberaceae, Poaceae.

Form of the semester-end examination: oral

The possibility and conditions for offering grades: -

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:

Lectures and practice seminars available for the study of each topic:

- A/1. Characteristics of plant cells. Structure and chemistry of cell walls. Thickening of cell wall in plants. Sclerenchyma (Lectures 1-2, Practice 5-6)
- A/2. Plastid types and structure, main steps of photosynthesis. Plant tissues: collenchyma, parenchyma. (Lectures 1-2, Practices 5-6)
- A/3. Secretory tissues: types, structure, role in the synthesis of secondary metabolites. (Lectures 1-2, Practice 6-7)
- A/4. Epidermis, trichomes, stoma (types and examples). Periderm and rhytidome. (Lectures 2-4, Practices 6-7)
- A/5. Roots: types; young/primary roots, secondary growth; specialized roots. (Lecture 3, Practices 10)
- A/6. Stems: young/primary stems. Specialized stem structures. (Lecture 3, Practice 10)
- A/7. Secondary growth of stems. Woody stem, periderm. (Lecture 4, Practice 11)
- A/8. Leaves: macroscopic and microscopic structure. (Lecture 5, Practice 12)
- A/9. Flowers: parts of a flower, floral types. The main types of inflorescences. (Lecture 6, Practice 1-3)
- A/10. Development of seeds and fruits, double fertilization. Fruit types. Histological features of seeds and fruits. (Lecture 7, Practice 13)
- B/1. Kingdom of fungi: ecology, distribution, importance, Ascomycota, and Basidiomycota. (Lecture 8)
- B/2. Pteridophyta: general features, Filicopsida, Equisetopsida and Lycopodiopsida. (Lecture 9)
- B/3. Gymnosperms: Conifers, Ginkgo, Gnetales. (Lecture 9)
- B/4. Magnoliidae subclass: Magnoliaceae, Myristicaceae, Lauraceae, Piperaceae, Ranunculaceae, Papaveraceae (Lecture 10)
- B/5. Caryophyllidae subclass: Caryophyllaceae, Cactaceae, Chenopodiaceae, Polygonaceae. (Lecture 10)
- B/6. Hamamelididae subclass: Fagaceae, Betulaceae, Juglandaceae families. (Lecture 10)
- B/7. Rosidae subclass: Crassulaceae, Rosaceae, Mimosaceae, Cuscutaceae, Fabaceae. (Lecture 11)
- B/8. Rosidae subclass: Myrtaceae, Rutaceae, Anacardiaceae, Araliaceae, Apiaceae. (Lecture 11)
- B/9. Dilleniidae subclass: Malvaceae, Salicaceae, Euphorbiaceae, Urticaceae, Cannabaceae, Brassicaceae. (Lecture 12)
- B/10. Cornidae subclass: Ericaceae, Rubiaceae, Loganiaceae, Valerianaceae, Apocynaceae. (Lecture 12)
- B/11. Lamiidae and Asteridae subclass: Solanaceae, Boraginaceae, Scrophulariaceae, Lamiaceae, Asteraceae. (Lecture 13)
- B/12. Characterization of monocot plants. Alliaceae, Asphodelaceae, Amaryllidaceae, Zingiberaceae, Poaceae. (Lecture 14)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission:
no

The course description was prepared by: Dr. Attila Ványolós

Pharmaceutical Microbiology

Full (Hun) name of the subject: Gyógyszerészi mikrobiológia

Program: Undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject:

English name of the subject: Pharmaceutical Microbiology

German name of the subject: Mikrobiologie für Pharmazeuten

Type of registration: obligatory/obligatory elective/elective/criteria requirement

Neptun code of the subject: GYKMIK280E1A

Responsible Department: Semmelweis University, Institute of Medical Microbiology

Responsible tutor: Dr. Agoston Ghidan

Contact information: phone: 06208259715

email: ghidan.agoston@semmelweis.hu

Title, academic degree: Master teacher, PhD

Name of the persons responsible for the teaching of the subject:

Dr. Szabó Dóra full professor, DSc

Dr. Dobay Orsolya associate professor, PhD

Dr. Ghidán Ágoston master teacher, PhD

Dr. Andrea Horváth professor's assistant

Class per week: 3 hours lectures

2 hours practices

Credit point(s): 4 credits lectures

0 credits practices

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The importance of microbiology in the medical curriculum, including the education of students of Faculty of Pharmacy is permanently growing. The knowledge about new types of microbial agents - beside the well known old ones -, new diseases caused by microbes, the more and more frequent nosocomial infections and the epidemics believed overcome, but recently emerging is necessary for the pharmacist, too. They have to be familiar with the continuously growing possibilities of methods used in diagnostic work, prevention and therapy of infectious diseases caused by microbes.

The goal of the training course is that the students of Faculty of Pharmacy learn about the nature of the most important human pathogenic agents, their appearance, the ways of their transmission, the possibilities of killing them inside as well as outside the human body. In addition to the basic knowledge of microbiology an increasing emphasis is placed on the topics connected with the utilization of microbes in pharmacy, in pharmacological research and industry.

Short description of the subject:

The students learn about the physiological and pathological effects of microbes in the organism, i.e. in the human body. Beside the general characterization of the most important pathogens (bacteria, viruses, fungi, and parasites), the students learn about the possibilities of sterilization and disinfections, mode of actions of antimicrobial agents, control of infectious diseases as well as the basic methods of laboratory diagnosis of infectious diseases. Because microorganisms have special importance in pharmaceutical industry, the most important new results, methods (i.e. recombinant technologies) are also summarized.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
5 semester	42	28	-	-	70	Autumn semester	-

Program of semester

Topics of theoretical classes (pro week):

- Week 1. Brief history, subject and aim of Microbiology. Occurrence and importance of microbes in nature. General microbiology. Morphology, reproduction and physiology of bacteria. Microbial genetics.
- Week 2. Disinfection. Principles and practice of sterilization. Introduction to antimicrobial chemotherapy.
- Week 3. Mode of action of the antibiotics. Resistance to antibiotics.
- Week 4. Principles of microbial pathogenicity. Immunity to microbes. Active and passive immunization.
- Week 5. Cocci causing purulent diseases (Staphylococcus, Streptococcus, Neisseria)
- Week 6. Normal flora of the intestinal tract and the importance of it. Bacteria causing enteral diseases.
- Week 7. Causative agents of respiratory tract infections.
- Week 8. Endospore forming bacteria. Parasitology (protozoa and helminths).
- Week 9. Causative agents of human mycosis and their therapy.
- Week 10. General virology. Antiviral chemotherapy. DNA viruses.
- Week 11. Enteral viruses and diseases caused by them. Hepatitis viruses.
- Week 12. Respiratory pathogenic viruses. Arbo- and reoviruses, Rhabdoviruses.
- Week 13. Retroviruses. AIDS. Tumor viruses. The role of viruses in carcinogenesis.
- Week 14. Production of therapeutic substances by recombinant DNA technology. Microorganisms in pharmaceutical sciences. Nosocomial infections

Topics of practical classes (pro week):

- Week 1. Introduction to basic microbiology, laboratory rules. Microscopic examination of microbes.
- Week 2. Cultivation of bacteria.
- Week 3. Methods for sterilization and disinfection.
- Week 4. Determination of antibiotic susceptibility of bacteria.
- Week 5. In vitro antigen-antibody reactions (serological methods).
- Week 6. Gram-positive and Gram-negative cocci (Cultures, smears, biochemical reactions, serological tests, antibiotic susceptibility, vaccines).
- Week 7. Enteral Gram-negative rods (Enterobacteriales). Cultures, smears, biochemical reactions, serological tests, antibiotic susceptibility, vaccines; Vibrio, Helicobacter, Campylobacter.
- Week 8. Pseudomonas. Gram-negative coccobacilli (Cultures, smears, antibiotic susceptibility, vaccines).
- Week 9. Non-spore forming Gram-positive bacteria. Mycobacteria (Cultures, smears, enzyme reactions, serological tests, antibiotic susceptibility, vaccines).
- Week 10. Endospore-forming Gram-positive aerobic and anaerobic bacteria (Cultures, smears, enzyme reactions, serological tests, antibiotic susceptibility, vaccines).
- Week 11. Spirochetes. Rickettsiae, Chlamydiae, Mycoplasmas (Cultures, smears, enzyme reactions, serological tests, antibiotic susceptibility, vaccines).
- Week 12. Medically important fungi (Cultures, smears).
- Week 13. Medical parasitology (macroscopic and microscopic preparations).
- Week 14. General virology (cultivation and morphology of viruses, cell-virus interactions, serological tests).

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:
Not available

Schedule of consultations: as demanded

COURSE REQUIREMENTS

Prerequisites:

Basic Immunology

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Presence on at least 75 % of the total number of practices based on the Study and examination regulations

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

1st Midterm on the 6th week. Topic: general microbiology (1-3 Lectures and 1-5 practices)

2nd Midterm on the 12th week. Topic: systemic bacteriology (4-12 Lectures and 6-11 practices)

Both midterm retake on the following week.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Active participation at the lab practice, no more than 3 absences and passing successfully both midterms

Number and type of projects students have to perform independently during the semester and their deadlines:

not applicable

Type of the semester-end examination: signature*/practical grade*/comprehensive examination*/final/end-term examination*

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

Written test from minimum questions and if is passed successfully followed by MOODLE test. The second retake exam (third one) is an oral exam.

The possibility and conditions for offering grades:

Not applicable

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics), as well as the main technical and other aids and study aids that can be used:

Szabó: Basics of Medical Microbiology. E-book, Semmelweis; 2022

Murray, Rosenthal, Pfaller: Medical Microbiology. 9th Edition, Elsevier/Saunders 2020

The handouts of the lectures uploaded to the MOODLE surface

The handouts of the practices

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission:

no

The course description was prepared by:

Dr. Agoston Ghidan, tutor

Clinical Chemistry and Laboratory Diagnostics

Full name of the subject: Klinikai kémia és laboratóriumi diagnosztika
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Laboratory Diagnostics
English name of the subject: Clinical Chemistry and Laboratory Diagnostics (theory)
German name of the subject: Klinische Chemie und Labordiagnostik (Vorlesung)

Neptun code of the subject: GYKLM1082E1A
Type of registration: obligatory
Responsible department: Department of Laboratory Medicine of Semmelweis University

Responsible tutor: Prof. Dr. Barna Vásárhelyi M.D., Ph.D., D. Sc.
Phone: +36 20 666 3246
E-mail: vasarhelyi.barna@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
 Dr. Adrienne Fehér Medical doctor, specialist of laboratory medicine, specialist of hematology and hemostasis
 Dr. Gellért Karvaly
 Dr. Ibolya Kocsis Pharmacist, specialist of laboratory medicine, Ph.D.
 Dr. Györgyi Molnár-Világos Pharmacist, specialist of laboratory medicine, Ph.D.
 Dr. Zsófia Szabó Pharm. Pharmacist, specialist of laboratory medicine, Ph.D.
 Dr. Zoltán Vajda Barna Vásárhelyi Professor of medicine, specialist of laboratory medicine, Ph.D., D.Sc.

Classes per week: Theory: 2 Practice: 0
Credit point(s): 2

Professional content, intent of acquirement and its function in order to implement the goals of the program:
 Discussion of the role of laboratory tests in clinical decision-making, with particular regard to areas requiring pharmaceutical knowledge.

Short description of the subject:

- Pharmacists encounter questions related to laboratory diagnostics several times during their daily work. A general request from laymen concerns the proper conduction of home tests (e.g. blood sugar, blood fat level), and the interpretation of laboratory results. In clinical care, there is a particularly high demand for the appropriate interpretation of laboratory findings with a focus on the effects and side effects of drugs. The pharmacist's approach represents a significant added value in this respect. Therapeutic drug level monitoring is a separate field in which pharmacists play a prominent role.
- The clinical diagnostic laboratory also relies on the knowledge of pharmacists. A special qualification (specialist of laboratory medicine) is acquired by experts working in his field.
- In the lectures the main aspects of reporting laboratory tests, the most frequently performed analytical procedures, and the interpretation of test results are presented.

The following topics are addressed with a special focus:

- point-of-care tests performed at the patient's bedside (in pharmacies),
- major tests employed for investigating the diseases of individual organ systems,
- clinical laboratory analysis of the pharmacodynamic effects of drugs,
- therapeutic drug monitoring,
- clinical laboratory quality assurance.

In the lectures, the theoretical background of the topics listed in the "Topics of theoretical classes" section will be presented and illustrated.

In the framework of the course, clinical diagnostic laboratory visits will be arranged in a pre-organized way, and the application of point-of-care tests performed at the patient's bedside, in the pharmacy, or by the patients for self-checking will be demonstrated (2x70 minutes, 2x1.5 theoretical classes).

The discussion of laboratory test reports will be conducted to help students with the better understanding and proper application of the acquired knowledge (4 theoretical classes).

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
5 semester	28	–	–	–	28	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week):

- Introduction: the scope, position and functions of laboratory diagnostics in healthcare organisations
- Blood collection procedure, types of blood collection tubes, and examples of their use. Preanalytical factors which affect laboratory results
- Major laboratory analytical procedures and analytical systems used in clinical diagnostic laboratories. Quality assurance
- Point-of-care tests, tests available for pharmacy self-monitoring
- Interpretation of laboratory findings, basics of the statistical evaluation of test results. Data-oriented clinical laboratory: the importance of bioinformatics
- Laboratory diagnosis of inflammation. Acute phase reaction
- Liver function tests
- Urinalysis
- Diagnosis of tissue injury
- Laboratory diagnosis of tumours. Molecular biology tests in the laboratory
- Endocrinology tests: diagnosis of metabolic disorders (diabetes, hyperlipidaemia)
- Endocrinology tests: thyroid hormones, adrenal and sex hormones
- Therapeutic drug monitoring: basic concepts, pharmacokinetic principles, aims, factors influencing the fate of the drug in the body
- Therapeutic drug monitoring: the role of laboratory tests in the implementation of individualised drug therapy. Precision pharmacotherapy software
- Drugs influencing laboratory test results. Clinical drug testing
- Fundamentals of clinical toxicology and its laboratory implications
- Immunological tests: autoimmunity
- immunological tests: hypersensitivity reactions, allergy tests, and immunodeficiency conditions
- Blood count elements. Anaemias. Iron deficiency
- Basics of blood grouping
- Haemostasis tests. Anticoagulant monitoring
- Discussion of laboratory test reports
- Discussion of laboratory test reports
- Discussion of laboratory test reports
- Discussion of laboratory test reports
- Laboratory visit, demonstration of point-of-care tests

Schedule of consultations: No additional consultations will be scheduled.

COURSE REQUIREMENTS

Prerequisites:

Biochemistry II.
Physiology II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Attendance at lectures in accordance with the Study and Examination Regulations in force at the Faculty of Pharmacy

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

The grade is based on the end-of-semester colloquium (attainable score: 50), as follows: 46 – 50 points: excellent, 41 – 45 points: good, 36 – 40 points: average, 31 – 35 points: sufficient, 30 points or below: insufficient. There is no midterm partial performance evaluation.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results: None

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

. No special criteria have been set.

Number and type of projects students have to perform independently during the semester and their deadlines:

No individual projects are required.

Type of the semester-end examination: Examination requirements:

The scope, position and functions of laboratory diagnostics in healthcare organisations. Blood collection procedure, types of blood collection tubes, and examples of their use. Preanalytical factors which affect laboratory results. Major laboratory analytical procedures and analytical systems used in clinical diagnostic laboratories. Quality assurance. Point-of-care tests, tests available for pharmacy self-monitoring. Interpretation of laboratory findings, basics of the statistical evaluation of test results. Data-oriented clinical laboratory: the importance of bioinformatics. Laboratory diagnosis of inflammation. Acute phase reaction. Liver function tests. Renal function tests. Urinalysis. Diagnosis of tissue injury. Laboratory diagnosis of tumours. Molecular biology tests in the laboratory. Endocrinology tests: diagnosis of metabolic disorders (diabetes, hyperlipidaemia). Endocrinology tests: thyroid hormones, adrenal and sex hormones. Therapeutic drug monitoring: basic concepts, pharmacokinetic principles, aims, factors influencing the fate of the drug in the body. Therapeutic drug monitoring: the role of laboratory tests in the implementation of individualised drug therapy. Precision pharmacotherapy software. Drugs influencing laboratory test results. Clinical drug testing. Fundamentals of clinical toxicology and its laboratory implications. Immunological tests: autoimmunity. Immunological tests: hypersensitivity reactions, allergy tests, and immunodeficiency conditions. Elements of blood count. Anaemias. Iron deficiency. Basics of blood grouping. Haemostasis tests. Anticoagulant monitoring.

Form of the semester-end examination: Written test

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades: None

Scientific, yourse related researches, publivations, assays:

- The scope, position and functions of laboratory diagnostics in healthcare organisations.
- Blood collection procedure, types of blood collection tubes, and examples of their use. Preanalytical factors which affect laboratory results.
- Major laboratory analytical procedures and analytical systems used in clinical diagnostic laboratories.
- Quality assurance.
- Point-of-care tests, tests available for pharmacy self-monitoring.
- Interpretation of laboratory findings, basics of the statistical evaluation of test results.
- Data-oriented clinical laboratory: the importance of bioinformatics.
- Laboratory diagnosis of inflammation. Acute phase reaction.
- Liver function tests
- Renal function tests

- Urinalysis
- Diagnosis of tissue injury
- Laboratory diagnosis of tumours
- Molecular biology tests in the laboratory
- Endocrinology tests: diagnosis of metabolic disorders (diabetes, hyperlipidaemia)
- Endocrinology tests: thyroid hormones, adrenal and sex hormones
- Therapeutic drug monitoring: basic concepts, pharmacokinetic principles, aims, factors influencing the fate of the drug in the body
- Therapeutic drug monitoring: the role of laboratory tests in the implementation of individualised drug therapy
- Precision pharmacotherapy software
- Drugs influencing laboratory test results
- Clinical drug investigations
- Fundamentals of clinical toxicology and its laboratory implications
- Immunological tests: autoimmunity
- Immunological tests: hypersensitivity reactions, allergy tests, and immunodeficiency conditions
- Elements of blood count
- Anaemias
- Iron deficiency
- Basics of blood grouping
- Haemostasis tests
- Anticoagulant monitoring
- Barna Vásárhelyi: Trace reading in healthcare (presentation)
- Barna Vásárhelyi: Trace reading in healthcare (presentation)
- Györgyi Molnár-Világos: Major analytical procedures employed in clinical laboratories (presentation)
- Györgyi Molnár-Világos: Quality management in the laboratory (presentation)
- Ibolya Kocsis: Diagnostic analysis directly at patient's bed. Point-of-care testing (POCT) (presentation)
- Barna Vásárhelyi: Questions of postanalytical phase (presentation)
- Barna Vásárhelyi: Questions of postanalytical phase (presentation)
- Zsófia Szabó: Laboratory diagnosis of inflammation, acute phase reactants, ainfectious diseases (presentation)
- Ibolya Kocsis: Evaluation of liver function (presentation)
- Ibolya Kocsis: Urine studies – monitoring of kidney function (presentation)
- Ibolya Kocsis: Urine studies – monitoring of kidney function (presentation)
- Barna Vásárhelyi: Metabolic disorders 2 (presentation)
- Barna Vásárhelyi: Tumor markers: principles and their clinical use (presentation)
- Béla Blaha: Nucleic acid-based molecular diagnostics (presentation)
- Ibolya Kocsis: Labordiagnostical examination of metabolic disorders (presentation). Barna Vásárhelyi: Metabolic disorders 2 (presentation)
- Ibolya Kocsis: Labordiagnostical examination of metabolic disorders (presentation).
- Gellért Balázs Karvaly: Therapeutic drug monitoring (presentation)
- Gellért Balázs Karvaly: Therapeutic drug monitoring (presentation)
- S. Goutelle, J-B. Woillard, T. Buclin, et al. Parametric and nonparametric methods in population pharmacokinetics: experts' discussion on use, strengths, and limitations. J Clin Pharmacol 2022; 6: 158-170.
- Gellért Balázs Karvaly: Therapeutic drug monitoring (presentation)
- Gellért Balázs Karvaly: Therapeutic drug monitoring II. (presentation)
- Gellért Balázs Karvaly: Therapeutic drug monitoring II. (presentation)
- Gellért Balázs Karvaly: Therapeutic drug monitoring II. (presentation)
- Zsófia Szabó: Immunological tests I. Laboratory diagnosis of autoimmune disease (presentation)
- Zsófia Szabó: Immunological tests II. Hypersensitive reactions, allergy tests, immunodeficiency (presentation)
- Adrienne Fehér: The elements of basic blood test (presentation)
- Adrienne Fehér: The elements of basic blood test (presentation)
- Adrienne Fehér: The elements of basic blood test (presentation)
- Adrienne Fehér: Blood group evaluation (presentation)
- Adrienne Fehér: The examination of hemostasis.
- Anticoagulant monitoring (presentation)
- Adrienne Fehér: The examination of hemostasis.
- Anticoagulant monitoring (presentation)

The course description was prepared by:

Prof. Dr. Barna Vásárhelyi, dr. Gellért Balázs Karvaly

Products of Veterinary Medicine (theory)

For details on this subject please contact the department or visit their website.

Physical Education V.

Full name of the subject: Testnevelés V.

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: P.E.

English name of the subject: Physical Education V.

German name of the subject: Sport V

Neptun code of the subject: GYKTSI116G5A

Type of registration: obligatory

Responsible department: Semmelweis University, Physical Education and Sports Center

Responsible tutor: Várszegi, Kornélia director

Phone: +36-20/825-0611

E-mail: varszegi.kornelia@semmelweis.hu,
sportkozpont@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Kalmus, Dániel P.E. teachers

Katona, László hiking, badminton, boulder trainer

Lehel, Zsolt P.E. teachers

Rimay, István football trainer

Weisz, Miklós P.E. teachers

Doharné Buczkó Anikó P.E. teachers

Farkas Dominika P.E. teachers

Kovács Imre tennis trainer

Nagy-Kismarci Bence cheerleading trainer

Balogh Orsolya aerobic and zumba trainer

Dr. Herbert – Minkó Krisztina yoga trainer

Tóth Balázs dance, zumba, salsa trainer

Kiss Valéria Bless You Gym trainer

Kunos Gábor hiking trainer

Classes per week: 1 practice

Credit point(s): 0

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice – so that they can represent those in their later practice, through their own health-promoting behavior

Short description of the subject:

Upon completion of the course the student will be able to carry out regular physical activity.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
5 semester	0	14	–	–	14	Autumn semester	–

Program of semester

Topics of practical classes (pro week):

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations. 1107 Bp, Zágrábi utca 14.

1×60 min./week sessions:

Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, male football, salsa, step aerobics, badminton, beginner ultimate Frisbee, advanced ultimate Frisbee, Zumba

1× 90 mins./week sessions: women's football, ice hockey, beginner tennis, beginner tennis 2,

4×3 hrs. and 1×2 hrs. session packages: Hiking 1, Hiking 2.

2×90 mins./week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball

Fee-based: at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

COURSE REQUIREMENTS

Prerequisites: –

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The number of active participations for physical education classes is 10, regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams.

As teams take part in championships during the school year, we only accept applications from professional athletes!

Type of the semester-end examination: signature

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Active participation in practice classes 10 (trainings 15 times) times under the conditions described above.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate
- or
2. does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes

If you have not completed the course you may be readmitted in the 1. semester of the following academic year.

The course description was prepared by: Kornélia Várszegi

Basic Medical Pathophysiology I.

Full name of the subject: Kórtani és klinikai alapismeretek (elmélet+gyakorlat) I.

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: Pathophysiology I.

English name of the subject: Basic Medical Pathophysiology (theory+practice) I.

German name of the subject: Grundlagen der Pathophysiologie (Vorlesung+Praktikum) I.

Neptun code of the subject: GYKGYH128G1A

Type of registration: obligatory

Responsible department: Semmelweis University, Department of Pharmacodynamics

Responsible tutor: Gabriella Juhász, MD associate professor, DSc

Contact information:

phone: +36-1-210-29-30/56362

email: juhasz.gabriella@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Gabriella Juhász, MD associate professor, DSc

Kornélia Tekes, PharmD university professor, DSc

Ervin Finta, MD head physician, PhD

Noémi Papp, PharmD resident lecturer, PhD

Kinga Gecse, PharmD pharmacist, assistant lecturer

Class per week: 2 hours lectures, 1 hour practice

Credit point(s): 2 credits

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The goal of the subject is to provide pathophysiological background to understand the mechanism of action of drugs, to prepare pharmacists for professional advising and for the collaboration with other health professionals.

Short description of the subject:

Basic medical pathophysiology focuses on common disorders, especially those ones that can be important for pharmacists during their work. The students learn about the epidemiology of common disorders, pathophysiological mechanisms that can lead to them, acquire knowledge about the main clinical symptoms and the basic therapeutic considerations. The subject has special emphasis on tasks that pharmacists may carry out as healthcare professionals, for example identification of symptoms that require urgent medical help or providing advice for the patients regarding their pharmacological treatment. During the practicals, students deepen their knowledge by working on clinical cases and solving tests.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
5th semester	28	14	–	–	42	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week):

1. week: Fundamental pathological processes, ageing
2. week: Inflammation, tissue repair, pain, edema
3. week: Disorders of erythropoiesis and haemostasis
4. week: Peripheral vascular diseases
5. week: Atherosclerosis, hypertension, stroke
6. week: Ischaemic heart disease, arrhythmias
7. week: Heart failure, circulatory shock, inflammatory diseases of the heart
8. week: Gastrointestinal diseases I.
9. week: Gastrointestinal diseases II.
10. week: Gastrointestinal diseases III.
11. week: Genitourinary diseases
12. week: Ophthalmologic diseases
13. week: Dermatologic diseases
14. week: Disorders caused by physical effects

Topics of practical classes (pro week):

1. week: Medical documentation: medical summaries and letters
2. week: Case reports: inflammation, tissue damage
3. week: Case reports: disorders of erythropoiesis and haemostasis
4. week: Written test exam on Moodle system
5. week: Case reports: peripheral vascular diseases
6. week: Case reports: cardiovascular diseases I.
7. week: Case reports: cardiovascular diseases II.
8. week: Written test exam on Moodle system
9. week: Case reports: gastrointestinal diseases I.
10. week: Case reports: gastrointestinal diseases II.
11. week: Case reports: genitourinary diseases
12. week: Written test exam on Moodle system
13. week: Case reports: dermatologic diseases
14. week: Group work

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

The subject of Basic Medical Pathophysiology builds on the basic biomedical subjects such as Biochemistry and Physiology and prepares the students for the subjects Pharmacology and Toxicology and Pharmacotherapy.

Schedule of consultations: for personal request during practicals.

COURSE REQUIREMENTS

Prerequisites:

Successful exam in:
Physiology II.
Biochemistry II.
First Aid

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Attendance at lectures and practicals will be checked in accordance with the current Study and Examination Regulations. Under the current regulations, students are allowed to miss a maximum of 25% (3 times) of the practicals. It is only possible to make up for absences from practicals with an official certificate, and at a time agreed with the tutors. Participation in the practicals is conditional on reading the lecture materials.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

The practical grade is calculated from two elements: written test exams and group work.

1. Three written test exams will be completed by students during the semester, on Moodle, in weeks 4, 8 and 12. The first test will cover the material from weeks 1-3, the second test will cover the material from weeks 4-7 and the third test will cover the material from weeks 8-11. A maximum of 3x30 points can be achieved for the tests. Students will have the opportunity to retake the tests in the week following the test, at an agreed time outside the practical.
Missing or unsuccessful tests can also be retaken on the first week of the examination period in the form of a written test exam covering the entire course content of the semester.
A minimum grade of satisfactory is required for each of the three written tests during the semester for the end-of-semester signature.
2. The topics for the group work will be given to the students in the 9th week of the practical course. The groups will be allocated based on the marks obtained in the first two tests, so as to ensure an even distribution of students in each group. Each member of the group should take an equal part in the preparation and presentation of the case. Each member of the group will receive the same score (0-10) for the presentation. Exceptions to this may be made if a student's performance is extremely different from the rest of the group (e.g. inactivity, not participating in the presentation) - in which case he/she may receive a different score from the rest of the group.

Practical grade calculation:

90-100 points (5)
80-89 points (4)
70-79 points (3)
50-69 points (2)

In addition, at the beginning of the practicals, students will take warm-up tests on Moodle from the material of the weekly lecture. A minimum of 50% of the points must be obtained on each warm-up test to pass. For a maximum of 5 warm-up tests can be retaken in the last week of the semester at an agreed time. Passing the small tests is a prerequisite for the end-of-semester signature.

Requirements of signature(as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

1. Attendance of lectures and practicals in accordance with the current Study and Examination Regulations. If a student has more practical absences than the number of practical absences described in the regulations, the semester grade will be "fail" and no practical grade will be given.
2. A grade of at least "pass" in each of the three written tests during the semester.
3. Pass all the warm-up tests
4. A passing grade (5-10 points) on the group work.

Number and type of projects students have to perform independently during the semester and their deadlines: -

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Scientifiy, yourse related researches, publivations, assays:

Lecture slides and practice slides will be provided on Moodle to help students learn the course material. These form the basis for the assessments. In addition, the Moodle system contains other supplementary materials (e.g. schedules of lectures and practicals, information on written tests) to help students prepare for the course.

Recommended literature, the relevant parts of which are referred to in lectures and exercises:

Hammer-McPhee: Pathophysiology of Disease (McGraw-Hill, 2018)
Kumar-Abbas-Aster: Robbins Basic Pathology (Elsevier, 2017)

The course description was prepared by:

Gabriella Juhász associate professor

Dietetics

For details on this subject please contact the department or visit their website.

Pharmaceutical Technology I.

For details on this subject please contact the department or visit their website.

6. SEMESTER 2021/2022/2

Subject	Lecture (hour/ week)	Practice (hour/week)	Credit	Prerequisites	Exam type
Pharmacognosy I. GYKFMG284G1A	2	4	5	Pharmaceutical Botany	practical mark
Pharmaceutical Chemistry and Analysis II. GYKGYK279E2A	4	4	7	Pharmaceutical Chem. and Anal. I.	final*
Pharmaceutical Technology II. GYKGYI281E2A	2	6	6	Pharmaceutical Technology I. Pharmaceutical Chemistry I. and Anal. I.	semi-final
Basic Medical Pathophysiology II. (theory+practice) GYKGYH128E2A	2	1	3	Basic Med. Path. I. Dietetics Pharm. Microbiology	final*
Statistics for Pharmacists (theory+practice) GYKGYH282G1A	2	2	3	Mathematics for Pharm., Physiological Pharmaceutics and Pharmaceutical dosage forms, Informatics	practical mark
Pharmacology and Toxicology I. GYKGYH283E1A	2	2	4	Basic Medical Pathophysiology I., Physiological Pharmaceutics and Pharmaceutical dosage forms	semi-final
Physical Education VI. GYKTSI116G6A	–	1	–	-	signature
Pharmacy Practice II. GYKANG238G2A	–	20 hours/semester	–	Pharmaceutical Technology I. Pharmaceutical Chemistry I. and Anal. I.	signature
Summer Practice II. GYSSZG239G4A	–	4 weeks (40 hour/week)	4	Pharmaceutical Technology I.	practical mark
Total:	14	20 20/semester 4 weeks	28+4		

Pharmacognosy I.

Full (Hungarian) name of the subject: Gyógynövény- és drogismeret I.

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: Pharmacognosy I.

English name of the subject: Pharmacognosy I.

German name of the subject: Pharmakognosie I.

Neptun code of the subject: GYKFMG284G1A

Type of registration: obligatory

Responsible Department: Semmelweis University, Department of Pharmacognosy

Responsible tutor: Szabolcs Béni head of department, associate professor, Ph.D.

Phone: 06-20-825-0489

E-mail: beni.szabolcs@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Szabolcs Béni associate professor, Ph.D.

Phone: 06-20-825-0489

Ágnes Alberti associate professor, Ph.D.

Andrea Böszörményi assistant professor, Ph.D.

Orsolya Csernák assistant professor, Ph.D.

Ida Fejős assistant professor, Ph.D.

Eszter Riethmüller assistant professor, Ph.D.

Attila Ványolós assistant professor, Ph.D.

Nóra Gampe assistant lecturer, Ph.D.

Csenge Anna Felegyi-Tóth, trainee

Classes per week: 2 lectures, 4 practices

Credit point: 5 credits

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The aim of the course is to acquaint pharmacy students with medicinal plants, herbal drugs and the analytical methods applied in

their quality assurance. By doing so, it contributes to the education of pharmacy students to become key experts in herbal medicines. It contributes to the training of students with modern knowledge of pharmacognosy at a time when the knowledge about natural substances and herbs has come to the fore and has expanded with new aspects due to European harmonization.

Short description of the subject:

The topics of the classes follow the biogenetic system of plant materials. It represents a shift in proportion and, in part, selection in the curriculum that sufficiently emphasizes the importance of knowledge of herbal drugs and their active ingredients that are important in therapeutic practice. At the same time, it provides knowledge in the context of structure-activity relationships for the sufficient processing of newly emerging herbal drugs, possibly of foreign origin, based on their chemical groups. It also introduces the requirements of the European Pharmacopoeia (Ph. Eur.) regarding herbal drugs and preparations. Thus, it provides knowledge of all herbal drugs and active substances that serve as raw materials for phytopharmaceuticals (including those that will soon become traditional OTC medicines) and preventive products (dietary supplements).

Knowledge of plant material: drug recognition; macroscopic and microscopic examination.

Detection of active ingredients and constituents of herbal drugs (preparation, extraction and purification techniques, general and specific chemical reactions, chromatographic methods), quantitative evaluations (pharmacopoeial and standard methods) and isolation of individual components or selective determination by complex chromatographic and spectroscopic methods. Application of herbal drugs based on their positive effects in prevention, phytotherapy and improving quality of life.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
6 th semester	28	56	–	–	84	Spring semester	–

Program of semester

Topics of theoretical classes (pro week):

Week 1:

Introductory lecture, the concept and history of pharmacognosy. Cultivation and processing of medicinal plants. The place of the subject Herbal and Drug Knowledge in the curriculum. From herbal medicine to the production of herbal drugs, herbal medicines.

Historical overview. Nomenclature of plant drugs, aspects of their grouping. Collection of herbs, protected plants. Cultivation and breeding of medicinal plants. Processing, trade and qualification of herbal drugs. Pharmacopoeias (Ph. Hg. VIII., Ph. Eur. II.), FoNo, herbal medicine standards specifications. Therapeutic use of herbal drugs (EMA/HMPC and ESCOP monographs).

Week 2:

Biogenetic system of plant materials. Saccharides, carbohydrates. The concept and relationship of universal and special (primary and secondary) metabolism.

Monosaccharides: Honey, and other bee products.

Oligosaccharides: cyclodextrins

Homopolysaccharides and their drugs: Glucans (starches, cellulose). Fructans: Taraxaci officinalis radix, Cichorii intybi radix, Graminis rhizoma, Arctii radix

Heteropolysaccharides and their drugs

Pectins, gums: Acaciae gummi, Tragacantha

Mucilages, plant fibers: Lichen islandicus, Althaeae radix, Althaeae folium, Malvae folium, Malvae sylvestris flos, Lini semen, Trigonellae foenugraeci semen, Psyllii semen, Plantaginis ovatae semen, Salviae hispanicae semen, Cyamopsisidis seminis pulvis

Mushroom polysaccharides. Algae polysaccharides: alginates, agar, fucoidan, carrageenan

Week 3:

Vegetable acids. Polyketides. Acid metabolism, acid drugs

Organic acids: Pulpa tamarindorum, Rosae pseudo-fructus, Hippophaeae fructus, Malpighiae fructus, Hibisci sabdariffae flos

Inorganic acids: Urticae folium, Equiseti herba

Fatty oils: Biosynthesis, production, analysis, effects of fatty acids, triglycerides, waxes

Oils rich in saturated fatty acids: Theobromatis oleum, Gossypii oleum

Oleic acid-rich oils: Olivae oleum, Amygdalae oleum, Rapae oleum, Sesami oleum

Linoleic acid-rich oils: Helianthi annui oleum, Carthami oleum, Soiae oleum, Cucurbitae oleum

α -Linolenic acid-rich oils: Lini oleum

γ -Oils rich in linolenic acid: Boraginis oleum, Oenotherae oleum

Oils containing special fatty acids: Ricini oleum

Week 4:

Grouping phenoloids. Cinnamic acid derivatives. Biosynthesis and grouping of phenolics. Degraded cinnamic acid derivatives and their drugs

Phenolic glycosides: *Uvae ursi folium*

Salicylic glycosides: *Salicis cortex*, *Filipendulae ulmariae herba*

Benzoic and cinnamic acid esters: Benzoic drugs, *Balsamum perruvianum*

Caffeic acid derivatives and their drugs: *Cynarae folium*, *Taraxaci officinalis herba cum radice*, *Melissae folium*, *Rosmarini folium*, *Rhodiolae roseae rhizoma et radix*, *Echinacea* drugs

Week 5:

Coumarins

Formation, chemical structure and grouping of coumarins. Medicinal significance of coumarins, phototoxicity and other toxicity issues, aflatoxins.

Coumarins: *Meliloti herba*, *Hippocastani semen*, *Herniariae herba*, *Pelargonii radix*, *Fraxini folium*

Furanocoumarins, pyranocoumarins: *Heracleum-species*, *Rutae herba*, *Aurantii amari epicarpium et mesocarpium*, *Angelicae radix*, *Ammi fructus*, *Ammi visnagae fructus*

Week 6:

Lignans, styrylpyrrols, diarylheptanoids, arylalcanones, stilbenoids

Lignans: *Eleutherococci radix*, *Podophylli peltati rhizoma*, *Schisandrae chinensis fructus*, *Arctii radix*

Styrylpyrones: *Piperis methystici rhizoma*

Diarylheptanoids: *Curcumae longae rhizoma*, *Curcumae xanthorrhizae rhizoma*

Arylalcanones: *Zingiberis rhizoma*

Stilbenoidok: *Vitis viniferae cement*, *Vitis viniferae rubrae folium*

Week 7:

Flavonoids I

The formation, chemical structure and biological properties of flavonoids.

Flavone and flavonol O-glycosides: *Fagopyri herba*, *Sophorae japonicae flos*, *Ginkgonis folium*, *Betulae folium*, *Solidaginis herba*, *Tiliae flos*, *Verbasci flos*, *Sambuci flos*

Flavon-C-glikozidok: *Crataegi folium flore*, *Passiflorae herba*, *Violae herba flore*

Metoxilált flavonok, flavánonok: *Aurantii amari epicarpium et mesocarpium*, *Lupuli flos*

Week 8:

Flavonoids II: additional structures

Isoflavonoids: *Ononidis radix*, *Liquiritiae radix*, *Glycini semen*

Chalcones: *Carthami flos*, *Lupuli flos*, *Aspalathi linearis herba*

Anthocyanins: *Myrtilli fructus recens*, *Vitis viniferae fructus*, *Hibisci sabdariffae flos*

Flavonolignans: *Silybi mariani fructus*

Week 9:

Tannins

Biosynthesis, grouping, chemical structure, biological effect of tanning agents.

Hydrolysable tannins: *Quercus cortex*, *Cotini folium*, *Alchemillae herba*, *Epilobii herba*, *Hamamelidis cortex*, *Rubi idaei folium*

Proanthocyanidins: *Crataegi folium flore*, *Crataegi fructus*, *Vaccinii macrocarpi fructus*, *Agrimoniae herba*, *Tormentillae rhizoma*, *Ratanhiae radix*, *Hamamelidis folium*, *Myrtilli fructus siccus*, *Cammelliae sinensis non fermentata folia*

Week 10:

Naphthoquinones, anthraglycosides. Biosynthesis, biological properties of plant quinones. Pharmacological action of anthraglycosides and issues of their medicinal use.

Drugs containing naphthoquinones: *Juglandis folium*, *Lawsoniae herba*

Drugs containing anthraglycosides: *Sennae foliolum*, *Sennae fructus*, *Frangulae cortex*, *Rhei radix*, *Aloe* drugs, *Rhamni purshianae cortex*

Week 11:

Naphthodiantrons, terpenophenolics.

Naphthodiantrons: *Hyperici herba*

Phloroglucin derivatives: *Lupuli flos*

Cannabinoids: *Cannabis herba*

Week 12 :

Summary presentation: preparation for the midterm exam

Week 13:

Midterm

Week 14:

Medicinal potential and toxicological significance of fungi.

Molds: aflatoxins, fusarium toxins. Mushrooms: killer agaric, panther agaric, wrinkled ink mushroom, psilocybin. Mushrooms as sources of medicinal ingredients, edible mushrooms.

Topics of practical classes (pro week):

1. week: Introduction, safety rules. Macroscopic and microscopic knowledge. European Pharmacopoeia.
2. week: General methods in Pharmacognosy
3. week: Instrumental phytoanalytics
4. week: Vegetable drugs containing carbohydrates (starches, mucilages, etc.).
5. week: Plant lipids and their drugs.
6. week: Plant acids and their drugs.
7. week: Phenolic glycosides, lignans, coumarins and diarylheptanoids.
8. week: Flavonoids and chief drugs I.
9. week: Flavonoids and chief drugs II.
10. week: Tannins and chief tannin drugs.
11. week: Anthraglycoside containing crude drugs I. Chemical tests, quantitative determinations.
12. week: Anthraglycoside containing crude drugs II. Quantitative determination of sennosides.
13. week: Terpenophenolics and phloroglucine derivatives.
14. week: Individual task I.: Natural product development. Natural product development.

Schedule of consultations: ondemand

COURSE REQUIREMENTS

Prerequisites: – Pharmaceutical botany

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Based on the current Study and Exam Regulation

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

During the term-time: three written or oral examinations based on the material of the practices and the lectures. Test of the knowledge of herbal drugs: examination of unknown drug mixtures, identification of unknown drug powders, recognition of microscopic preparations.

The first test takes place during the 7-8th week practice. The midterm consists of a theoretical and macromorphological examination part, including the studies carried out and described during the exercises in weeks 1-7, as well as the material of seminars and classroom lectures. The grade obtained in this process will be counted with a single weight when determining the practical grade.

The second assessment takes place during the 12-13th week practice, which consists of theoretical and macromorphological examinations. The report covers the entire theoretical and practical material of weeks 1-12. The grade obtained in this process will be counted with a single weight when determining the practical grade.

At the 13th week lecture, an obligatory midterm will take place, the material of which covers the entire theoretical and practical material of the semester. At least a sufficient (2) grade must be achieved in the test. The grade is counted with double weight when determining the practical grade.

Midterm examinations may be replaced and corrected two times each. The results of the first report can be corrected during the two practices following the announcement of grades. We provide an opportunity to retake the obligatory midterm in an out-of-class time in week 14.

Requirements of signature:

Participation at the practices. Submission and acceptance of reports. The average of the grades of the midterm examinations is at least 2.0. Successful completion of the obligatory midterm test.

Number and type of projects students have to perform independently during the semester and their deadlines:

Presentation of a chosen topic. performed at weeks 8-14.

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Necessary equipment: Lecture hall, projection, wi-fi.

Laboratory equipped with microscopes, labwares, extractors, distillation equipment, instruments (UV-VIS, HPLC, GC), chemicals.

Pharmaceutical Chemistry and Analysis II.

Full (Hun) name of the subject: Gyógyszerkémia és analízis II.

Program: Undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject:

English name of the subject: Pharmaceutical Chemistry and Analysis II.

German name of the subject: Pharmazeutische Chemie und Analytik II

Type of registration: obligatory

Neptun code of the subject: GYKGYK279E2A

Responsible Department: Department of Pharmaceutical Chemistry

Responsible tutor: Dr. György Tibor Balogh

Contact information: Semmelweis University, Department of Pharmaceutical Chemistry

1092 Budapest, Hőgyes Endre u. 9.

phone: 06-1-217-0891

email: balogh.gyorgy.tibor@semmelweis.hu

Title, academic degree: Head of department, full professor, PhD, DSc, dr. habil

Name of the persons responsible for the teaching of the subject:

Dr. György Tibor Balogh Head, full professor, PhD, DSc, dr. habil

Dr. András Kotschy managing director, Servier Research Institute of Medicinal Chemistry, DSc

Dr. György Miklós Keserű director, Research Center for Natural Sciences, Drug Innovation Center, DSc

Dr. Zoltán Urbányi director of biologics development, VRG Therapeutics, PhD

Dr. Péter Horváth Associate professor, PhD

Dr. Károly Mazák Associate professor, PhD

Dr. Márta Mazák-Kraszni Associate professor, PhD

Dr. Gergő Tóth Associate professor, PhD

Dr. Arash Mirzahosseini Associate professor, PhD

Dr. Ádám Golcs Assistant professor, PhD

Dr. Tamás Pál Assistant professor, PhD

Dr. Réka Angi Assistant professor, PhD

Dr. Anna Vincze, Assistant professor, PhD

Dr. Vivien Bárdos Assistant lecturer

Dr. Balázs Simon Assistant lecturer

Dr. Rita Szolláth Assistant lecturer

Marcell Stifter-Mursits PhD student

Class per week: 4 lectures, 4 practices

Credit point(s): 7

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Integration of the curriculum of various chemical and biological courses and extension with specific chemical knowledge regarding properties, mechanism of action and analytics of drug substances.

Short description of the subject:

Theory: Synthesis, analytics, physicochemical and chemical properties, structure-activity relationships, receptor binding and biochemical background of biological effects of drug substances and related instrumental methods are taught.

Practice: Teaching the analytical, physico-chemical and chemical properties of drugs and their testing methods.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
6th semester	56	56	–	–	112	Autumn semester* Spring semester Both semesters (* Please underline)	–

Program of semester

Topics of theoretical classes (pro week):

- Week 1. Cardiovascular drugs: Cardiac glycosides. Chemistry, analytics of cardiac glycosides, sugars
Cardiovascular drugs: antiarrhythmic agents
- Week 2. Cardiovascular drugs: antianginal agents
Cardiovascular drugs: antihypertensive agents
- Week 3. Cardiovascular drugs: antihyperlipidemic agents
Cardiovascular drugs: anticoagulants
- Week 4. Diuretics
Antidiabetics
- Week 5. Vitamins I.
Vitamins II.
- Week 6. Antihistamines
Corticosteroids
- Week 7. Sexual hormones
Disinfectants
- Week 8. Chemotherapeutics: sulphonamides
Chemotherapeutics: antimalarial drugs, fluoroquinolones
- Week 9. Chemotherapeutics: antituberculous, antifungal agents
Antibiotics: tetracyclines, aminoglycosides
- Week 10. Antibiotics: β -lactams, macrolides
Antiviral drugs
- Week 11. Anticancer drugs
New approaches in drug therapy (biologics) I
- Week 12. New approaches in drug therapy (small molecules) II
Drugs acting on the thyroid gland

Week 13. Antiparkinson drugs. Nootropic agents.

Analysis of medicinal products I.

Week 14. Analysis of medicinal products II. (Instrumental)
Consultation

Topics of practical classes (pro week):

- Week 1. Equipping, identification.
- Week 2. Digitalis glycosides, sugars.
- Week 3. β -receptor blockers, antianginal drugs.
- Week 4. Antihypertensive agents, anticoagulants.
- Week 5. Diuretics.
- Week 6. Vitamins
- Week 7. Antihistamines.
- Week 8. Steroid hormones.
- Week 9. Disinfectants and chemotherapeutics i.
- Week 10. Chemotherapeutics ii. and antibiotics.
- Week 11. Chemotherapeutics ii. and antibiotics ii.
- Week 12. Identification and quantitative determination of drug mixtures.
- Week 13. Practical final exam
- Week 14. Make-up practice, lab handover

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

General chemistry, Inorganic chemistry, Analytical chemistry, Organic chemistry, Biophysics, Biochemistry, Physiology

Schedule of consultations: based on the student's request

COURSE REQUIREMENTS

Prerequisites: Pharmaceutical Chemistry and Analysis I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Based on the Study and Examination Regulation

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

- The average of the three midterm tests written during the semester counts for 1/3rd of the examination grade, while the result of the final exam counts for 2/3rd.
- The final examination consists of two parts, a written and an oral part. The oral examination can be taken if the written examination is passed with at least 50% result.
- The average of the marks obtained in the midterm tests during the semester counts for 1/3rd of the examination grade and both grades obtained in the two oral examination topics count for 1/3rd of the examination grade, but both part must be at least satisfactory.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

The average grade for the scheduled midterm tests must be at least 2.0 and at least two of the tests must be passed. A minimum 50% of the total practical points must be accumulated during the practices and no more than three practices can be missed. The practical examination (both the written test and the practical part) must be passed.

- Attendance of lectures. (Extent of the absence is based on the Study and Exam Regulation)
- Attendance of practices. (Extent of the absence is based on the Study and Exam Regulation)
- A maximum of three absences from practices is permitted during the semester.

Type of the semester-end examination:

signature/final/end-term examination*

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment):

First topic: pharmacological groups

- 1/1 General anaesthetics, sedative-hypnotics and anxiolytics. Classification. Representatives of barbituric acid derivatives and benzodiazepines. Structure, chemical and physical characteristics, structure-activity relationships.
Structures: sevoflurane, propofol, phenobarbital, nitrazepam, diazepam, chlordiazepoxide, midazolam, alprazolam
- 1/2 Main groups of opioid analgetics. Morphine and its semi-synthetic and synthetic derivatives. Main representatives of agonist and antagonist derivatives. Structure, chemical, physical and pharmacological characteristics.
Structures: morphine, codeine, ethylmorphine, dihydrocodeine, oxycodone, naloxone, naltrexone, dextrometorphan, fentanyl, methadone, tramadol
- 1/3 Minor analgetics and non-steroid anti-inflammatory agents. Classification and structural characterization. Chemical and physical characteristics.
Structures: salicylic acid, sodium salicylate, acetylsalicylic acid, paracetamol, phenazone, metamizole sodium, niflumic acid, diclofenac, indometacin, ibuprofen, naproxen, phenylbutazone, piroxicam, celecoxib, nimesulide
- 1/4 Antipsychotics. Classification. Phenothiazines and related compounds. Major representatives of atypical antipsychotic agents. Structure, chemical and physical characteristics, structure-activity relationships.
Structures: chlorpromazine, levomepromazine, fluphenazine, fluphenazine decanoate, chlorprothixene, flupentixol, sulpiride, clozapine,

- 1/5 Antidepressive agents. Classification. More details about the tricyclic compounds and SSRI drugs. Structure, chemical and physical characteristics, structure-activity relationships.
Structures: imipramine, amitriptyline, maprotiline, fluoxetine, sertraline
- 1/6 Antiepileptics: classification, structures, properties, structure-activity relationships, analytics.
Structures: phenobarbital, phenytoin, levetiracetam, clonazepam, carbamazepine, valproic acid, gabapentin
- 1/7 Representatives of parasympathomimetic and parasympatholytic drugs. Structure, chemical and physical characteristics and their interactions with the receptor.
Structures: acetylcholine, carbachol, pilocarpine, physostigmine, pyridostigmine, atropine, hyoscine (=scopolamine), homatropine, homatropine methylbromide, ipratropium, tiotropium
- 1/8 Sympathomimetic drugs and their major representatives. Selective β_2 -agonists, as bronchodilators. Structure, chemical and physical characteristics and their relationship with the activity.
Structures: noradrenaline, adrenaline, isoprenaline, terbutaline, phenylephrine, ephedrine, naphazoline
- 1/9 Classification of drugs acting on the digestive system. Agents inhibiting gastric secretion: antacids, proton pump inhibitors and H₂-receptor antagonists.
Structures: omeprazole, cimetidine, loperamide, apomorphine
- 1/10 Local anaesthetics, classification, major representatives. Structure, chemical and physical characteristics, structure-activity relationships.
Structures: cocaine, benzocaine, procaine, tetracaine, lidocaine, mepivacaine, ropivacaine, bupivacaine
- 1/11 Cardiac glycosides, structure and properties of main representatives. Mechanism of action.
Structures: digitoxin, digoxin, deslanoside, lanatoside C, gitoxin
- 1/12 Antihypertensive agents. Classification. In more detail about the ACE-inhibitors. Structure, chemical and physical characteristics. Criteria of the receptor-binding. Structural features of AT receptor antagonists.
Structures: captopril, enalapril, lisinopril, ramipril, quinapril, losartan
- 1/13 Classification of antiarrhythmic agents. More details about the sodium channel antagonists and β -receptor blockers. Chemical properties, structure-activity relationship.
Structures: quinidine, procainamide, lidocaine, mexiletine, propafenone, propranolol, metoprolol, bisoprolol
- 1/14 Antianginal drugs. Main representatives of nitrites and nitrates. General structure of 1,4-dihydropyridines, some representatives. Structure, chemical and physical properties.
Structures: amyl nitrite, glyceryl trinitrate, isosorbide mononitrate, nifedipine, nitrendipine, amlodipine
- 1/15 Antihyperlipidemic agents, classification. Phenoxy-isobutyric acid derivatives, structures, properties. General structure of natural statins, pharmacophore group, properties. Synthetic statins with example.
Structures: clofibrate, ciprofibrate, lovastatin, fluvastatin
- 1/16 Cardiovascular agents. Anticoagulants. Vitamin K antagonists, structures, properties, analysis. Heparin, structure, properties. Characterization of dihydrotienopyridines.
Structures: warfarin, acenocoumarol, glucosamine, glucuronic acid, iduronic acid, acetylsalicylic acid, ticlopidine, clopidogrel
- 1/17 Diuretics. Classification. Saluretics and loop diuretics in detail. Structures, properties, mechanism of action, analysis.
Structures: hydrochlorothiazide, chlorthalidone, indapamide, etacrynic acid, furosemide
- 1/18 Antidiabetics. Insulin and analogs: structure and properties. Orally administered antidiabetics, chemical groups with examples.
Structures: gliclazide, nateglinide, metformin, vildagliptin
- 1/19 Vitamins. Structure of A- and D-vitamins, chemical and physical characteristics. Structure of vitamin B₁, B₂, B₆ and C. Chemical and physical characteristics.
Structures: retinol, retinol acetate, cholecalciferol, calcitriol, thiamine, riboflavin, pyridoxine, ascorbic acid
- 1/20 Classification of steroid hormones. Main representatives of corticosteroids. Chemical and physical characteristics.
Structures: cortisone, hydrocortisone, prednisone, prednisolone, triamcinolone, dexamethasone, betamethasone, hydrocortisone acetate, triamcinolone acetonide, fluocinolone acetonide, budesonide

- 1/21 Classification of sex hormones. Estrogens and antiestrogens in detail. Structures, properties, structure-activity relationships, analysis.
Structures: estrone, estradiol, estriol, ethinylestradiol, diethylstilbestrol, tamoxifen
- 1/22 Antihistamines, classification and their major representatives. Structure, chemical and physical characteristics. New generation non-sedative drugs.
Structures: histamine, diphenhydramine, dimetindene, hydroxyzine, promethazine, cetirizine, loratadine, desloratadine,
- 1/23 Classification of chemotherapeutic drugs. China-alkaloids and synthetic fluoroquinolones. Structure, chemical and physical characteristics.
Structures: quinine, ciprofloxacin, norfloxacin, ofloxacin, levofloxacin
- 1/24 Desinfectants and Classification of sulfonamides. Structural elements of antibacterial sulfonamides. Chemical, physical and pharmacological properties.
Structures: chloramine, resorcinol, sulfacetamide, sulfadimidine, sulfaguanidine
- 1/25 General structure of β -lactam antibiotics, classification and major representatives. Reactivity, physical and chemical characteristics.
Structures: benzylpenicillin, ampicillin, amoxicillin, sultamicillin, clavulanic acid, sulbactam, cefalexin, cefaclor
- 1/26 Tetracycline-type antibiotics. Structure of main representatives, chemical and physical properties. General structure of aminoglycoside antibiotics exemplified on the structure of streptomycin.
Structures: tetracycline, oxytetracycline, doxycycline, streptomycin
- 1/27 Antifungal drugs, classification and major representatives. 14α -demethylase-inhibitors in detail. Main structural elements of membrane-damaging polyene antibiotics (e.g. nystatin), their mechanism of action.
Structures: bifonazole, clotrimazole, miconazole, fluconazole
- 1/28 Main groups of antiviral agents and their representatives. Structure, physical and chemical properties.
Structures: aciclovir, zidovudine, amantadine, oseltamivir
- 1/29 Strategies used in cancer therapy, grouping of agents used. Details of chemotherapy and targeted therapy options. (Cross-linking /covalent- noncovalent/, alkylation, typical structures of topoisomerase inhibiting antibiotics, characterisation of antimetabolites, main groups of kinase inhibitors, their mechanism of action)

Structures. cyclophosphamide, cisplatin, fluorouracil,

Second topic: general part

- 2/1 Distinction of inorganic and organic compounds. Preliminary investigations: burning test; dissolution test. Identification reactions of cations (aluminium; zinc; calcium; magnesium; potassium).
- 2/2 Distinction of inorganic and organic compounds. Preliminary investigations: burning test; dissolution test. Identification reactions of anions (chloride; bromide; iodide; phosphate).
- 2/3 Distinction of inorganic and organic compounds. Preliminary investigations: burning test; dissolution test. Identification reactions of functional groups in Ph. Eur. (aromatic primary amines; phenols; quaternary amines).
- 2/4 The role of lipophilicity in the transport of drugs. Definition and determination methods of the $\log P$ value.
- 2/5 Solubility parameters and their characterization. Relationship between solubility and pH. Possibilities of increasing solubility. Methods for determining solubility. (Kinetic and thermodynamic solubility, excipients)
- 2/6 Basicity of drugs and bio-molecules in terms of macro- and microconstants. Calculation of the pH-dependent concentration of the various macro- and microforms. Determination of the protonation constants of bases and dissociation constants of acids. Calculation of the pH-dependent number of bound hydro-

- gen ions and the charge of the molecule.
- 2/7 The role of active substance permeability in ADME processes. Transport processes, biological membranes and artificial membranes, the concept of sink.
- 2/8 Theory and practice of the impurity tests in the Ph. Eur. (heavy metals, iron, chlorides).
- 2/9 Theory and practice of the impurity tests in the Ph. Eur. (arsenic, potassium, ammonium, sulphates).
- 2/10 Theory and practice of the impurity tests in the Ph. Eur. (calcium, magnesium, phosphates).
- 2/11 Appearance of solution (clarity and degree of opalescence, colour of liquids). The practice of the pH measurement in the Ph. Eur. Examples for the application of the potentiometric titrations in the Ph. Eur.
- 2/12 Special aspects in the qualitative and quantitative analysis of drug preparations.
- 2/13 Determination of organic bases and salts of organic bases. Examples.
- 2/14 Determination of organic acids. Examples.
- 2/15 UV and VIS spectrophotometry in the pharmaceutical analysis. Principles (chromophore; auxochrome groups; shifts in spectrum; pH-dependence; Lambert-Beer law; quantitative measurement of a single component, ratio method).
- 2/16 Classification of chromatographic methods. Theory and practice of thin-layer chromatography. Application in drug analysis. System suitability test.
- 2/17 Classification of chromatographic methods. Theory and practice of high-performance liquid chromatography. Main chromatographic parameters. Application in drug analysis.
- 2/18 Stages and system of drug research. Trends in drug research. Finding new chemical entities by fragment based research, biologics.
- 2/19 Analysis of major analgetics (morphine, codeine, ethylmorphine, papaverine).
- 2/20 Analysis of minor analgetics (salicylic acid, acetylsalicylic acid, paracetamol, phenazone, metamizole sodium).
- 2/21 Analysis of xanthine derivatives (caffeine, theophylline, theobromine).
- 2/22 Identification and distinction of sugars (glucose, fructose, lactose, sucrose).
- 2/23 Analysis of local anaesthetics (benzocaine, procaine, tetracaine, lidocaine).

Form of the semester-end examination: combined examination

The possibility and conditions for offering grades: no possibility

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:

Theoretical and practical material uploaded to Moodle system.

Lecture notes

Thomas L. Lemke, David A. Williams, Victoria F. Roche, S. William Zito: Foye's Principles of medicinal chemistry

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**

no

The course description was prepared by:

Dr. Péter Horváth

Pharmacology and Toxicology I.

For further information contact directly with the Department.

Statistics for pharmacists (theory+practice)

Full name of the subject: Statisztika gyógyszerészeknek (elmélet+gyakorlat)
Program: undivided program (pharmaceutical)
Schedule: full-time

Short name of the subject:
English name of the subject: Statistics for pharmacists (theory+practice)
German name of the subject: Statistik für Pharmazeuten (Vorlesung + Praktikum)

Neptun code of the subject: GYKGYH282G1A

Type of registration: obligatory

Responsible department: Department of Pharmacodynamics

Responsible tutor: László Tóthfalusi

Contact information: totlasz@net.sote.hu
Title, academic degree: D.Sc.

Name of the persons responsible for the teaching of the subject:
László Tóthfalusi D.Sc.

Classes per week: 2 lecture(s)
2 practice(s)
Credit point(s): 3

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the course is to give an overview of statistical methods from a pharmaceutical viewpoint.

Short description of the subject:

In the lectures we review the theoretical basis of the methods. The purpose of the exercises is twofold: On the one hand, to provide examples of the use of statistical tools in different fields of pharmacy (quality control, analytical chemistry, technology development, clinical trial design, pharmacovigilance, economic activity). On the other hand, an introduction to the free and widely used statistical program, the R programming environment.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
6 th semester	2	2	–	–	56	Autumn semester* Spring semester Both semesters* <i>Please underline)</i>	–

Program of semester

Topics of theoretical classes (pro week):

Week 1: Descriptive statistics
Week 2: Probability theory
Week 3: Sample distributions, estimation
Week 4: Parametric and nonparametric statistical tests
Week 5: Linear regression
Week 6: Multivariate linear regression model
Week 7: Extension of the linear regression model
Week 8: Multivariate ANOVA, study design
Week 9: Categorical data analysis
Week 10: Survival analysis
Week 11: Longitudinal data, nonlinear regression
Week 12: Statistical evaluation of clinical trial data
Week 13: Statistical foundation of epidemiology
Week 14: Time series, economic applications

Topics of practical classes (pro week):

Week 1: Using R and RStudio, Data Types
Week 2: Elements of the R programming language
Week 3: Data import, Data cleansing, Descriptive statistics in R
Week 4: Statistical graphics, making a presentation in R.
Week 5: Simulation in R
Week 6: Group comparison in R
Week 7: Linear regression problems
Week 8: Quiz 1
Week 9: Multivariate linear regression problems

Week 10: Experimental design task
Week 11: Statistical processing of experimental data
Week 12: Quiz 2
Week 13: Project presentation 1
Week 14: Project presentation 2

Schedule of consultations:

At scheduled times.

COURSE REQUIREMENTS

Prerequisites:

GYKEGY112E1A Mathematics for pharmacists
GYKGYI248G1A Physiological pharmaceuticals and pharmaceutical dosage forms
GYKDEI107G1A Informatics

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:
Participation in at least 75% of the practice sessions is mandatory. The retake quiz on the last week of the semester is needed if one of the quiz opportunities are missed or if a quiz result is below the acceptable minimum. Accepted project presentation.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

Two quizzes scheduled at weeks 8 and 12. Retake is possible at the last week.

Requirements of signature:

Both quizzes must be above the passing level.

Number and type of projects students have to perform independently during the semester and their deadlines:

One independent project must be presented.

The topic is free but should be suitable to demonstrate of the application of statistical tests and graphics.

Type of the semester-end examination: signature/practical grade/semi-final/final

Form of the semester-end examination:
none

Prescribed practices outside of the university:
none

Scientific, course related researches, publications, essays:
Recommended textbooks:
David Bock, Paul Velleman, Richard De Veaux, Floyd Bullard. Stats: Data and Models, Pearson (2019)
William Mendenhall, Robert J. Beaver, Barbara M. Beaver. Introduction to Probability and Statistics, Cengage (2019)

Necessary equipment:
Internet access

The course description was prepared by:
László Tothfalusi. D.Sc.

Physical Education VI.

Full name of the subject: Testnevelés VI.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: P. E. VI.
English name of the subject: Physical Education VI.
German name of the subject: Sport VI

Neptun code of the subject: GYKTSII16G6A
Type of registration: obligatory
Responsible department: Semmelweis University, Physical Education and Sports Center

Responsible tutor: Várszegi, Kornélia director
Phone: +36-20/825-0611
E-Mail: varszegi.kornelia@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Kovács, Imre tennis trainer
 Orsolya, Balogh aerobics and zumba trainer
 Kalmus, Dániel P.E. teachers
 Katona, László hiking, badminton, boulder trainer
 Lehel, Zsolt P.E. teachers
 Nagy-Kismarci, Bence cheerleading trainer
 Weisz, Miklós P.E. teachers

Doharné Buczkó Anikó P.E. teachers
 Farkas Dominika P.E. teachers
 Dr. Herbert – Minkó Krisztina yoga trainer
 Tóth Balázs dance, zumba, salsa trainer
 Kiss Valéria Bless You Gym trainer
 Kunos Gábor hiking trainer

Classes per week: 1 practice
Credit point(s): 0

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice – so that they can represent those in their later practice, through their own health-promoting behaviour

Short description of the subject:

Upon completion of the course the student will be able to carry out regular physical activity.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
6 th semester	0	14	–	–	14	Spring semester*	–

COURSE REQUIREMENTS

Prerequisites: –

Topics of practical classes (pro week):

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.
 1107 Bp, Zágrábi utca 14.

1×60 min./week sessions:

Aerobics, Bless You Gym, boulder, functional circuit training, golf, beginner Yoga, advanced Yoga, male football, salsa, step aerobics, badminton, beginner ultimate Frisbee, advanced ultimate Frisbee, Zumba

1×90 mins./week sessions: women's football, ice hockey, beginner tennis, beginner tennis 2,
 4×3 hrs. and 1x 2 hrs. session packages: Hiking 1, Hiking 2.

2×90 mins./week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is

to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Except for the Sport Hiking courses, where you have to attend 4 times due to blocking. 3 of these are on your own course and 1 can be made up by arrangement with the instructor!

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

Type of the semester-end examination: signature

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate
- or
2. does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission:

If you have not completed the course you may be readmitted in the 2. semester of the following academic year

Basic Medical Pathophysiology II.

Full name of the subject: Kórtani és klinikai alapismeretek (elmélet+gyakorlat) II.

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: Pathophysiology II.

English name of the subject: Basic Medical Pathophysiology (theory+practice) II.

German name of the subject: Grundlagen der Pathophysiologie (Vorlesung+Praktikum) II

Neptun code of the subject: GYKGYH128E2A

Type of registration: obligatory

Responsible department: Semmelweis University, Department of Pharmacodynamics.

Responsible tutor: Gabriella Juhász, MD associate professor, DSc

Contact information:

phone: +36-1-210-29-30/56362

email: juhasz.gabriella@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Gabriella Juhász, MD associate professor, DSc

Kornélia Tekes, PharmD university professor, DSc

Ervin Finta, MD head physician, PhD

Noémi Papp, PharmD resident lecturer, PhD

Kinga Gecse, PharmD pharmacist, assistant lecturer

Sandor Krause, MD psychiatrist

Class per week: 2 hours lectures 1 hour practice

Credit point(s): 3 credits

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The goal of the subject is to provide pathophysiological background to understand the mechanism of action of drugs, to prepare pharmacists for professional advising and for the collaboration with other health professionals.

Short description of the subject:

Basic medical pathophysiology focuses on common disorders, especially those ones that can be important for pharmacists during their work. The students learn about the epidemiology of common disorders, pathophysiological mechanisms that can lead to them, acquire knowledge about the main clinical symptoms and the basic therapeutic considerations. The subject has special emphasis on tasks that pharmacists may carry out as healthcare professionals, for example identification of symptoms that require urgent medical help or providing advice for the patients regarding their pharmacological treatment. During the practicals, students deepen their knowledge by working on clinical cases and solving tests.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
6th semester	28	14	–	–	42	Spring semester*	–

Program of semester

Topics of theoretical classes (pro week):

1. week: Psychiatry: diagnostic systems; neurocognitive disorders
2. week: Schizophrenia, depressive disorders, addictive disorders
3. week: Anxiety disorders, sleep disorders
4. week: Eating disorders, headaches
5. week: Epilepsy, neurodegenerative disorders
6. week: Inflammatory diseases of the nervous system
7. week: Ear disorders. Respiratory diseases I.
8. week: Respiratory diseases II.
9. week: Infectious diseases.
10. week: Musculoskeletal diseases I.
11. week: Musculoskeletal diseases II.
12. week: Endocrine and metabolic diseases I.
13. week: Endocrine and metabolic diseases II.
14. week: Immunologic diseases, oncologic diseases

Topics of practical classes (pro week):

1. week: Case reports: psychiatric disorders I.
2. week: Case reports: psychiatric disorders II.
3. week: Practical class: psychiatric disorders.
4. week: Written test exam on Moodle system
5. week: Case reports: neurological diseases I.
6. week: Case reports: neurological diseases II.
7. week: Case reports: diseases of the ear
8. week: Case reports: respiratory diseases
9. week: Case reports: infectious diseases
10. week: Written test exam on Moodle system
11. week: Case reports: musculoskeletal diseases
12. week: Case reports: endocrine diseases
13. week: Practical class: recognition of emergency situations, first aid
14. week: Group work

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

The subject of Basic Medical Pathophysiology builds on the basic biomedical subjects such as Biochemistry and Physiology and prepares the students for the subjects Pharmacology and Toxicology and Pharmacotherapy.

Schedule of consultations: for personal request during practicals.

COURSE REQUIREMENTS:

Prerequisites:

Basic Medical Pathophysiology I., Pharmaceutical microbiology, Diagnostics

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Attendance at lectures and practicals will be checked in accordance with the current Study and Examination Regulations. Under the current regulations, students are allowed to miss a maximum of 25% (3 times) of the practicals. It is only possible to make up for absences from practicals with an official certificate, and at a time agreed with the tutors. Participation in the practicals is conditional on reading the lecture materials

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Elements of the mid-semester evaluations: written test exams, warm-up tests at the beginning of the practicals, group work.

1. Students will write two written tests during the semester, on

Moodle, in weeks 4 and 9. The first test will cover the course material of weeks 1-4 (up to and including eating disorders), the second test will cover the course material of weeks 4-8 (from and including headaches). A maximum of 30-30 points can be achieved for each tests, 50% of which must be achieved to be considered a pass.

It will be possible to retake the written test exams in the week following the test, at an agreed time outside the practical.

Missing or failed written test exams can be retaken in the first week of the examination period in the form of a written test exam covering the entire course material of the semester.

Successful completion of the written test exams is a prerequisite for the end-of-semester signature.

2. A minimum of 50% of the points must be earned on each warm-up-test in order to achieve pass. A maximum of 5 small tests can be retaken during the last exercise. Successful completion of the warm-up tests is a prerequisite for the end-of-semester signature.
3. The topics for the group work will be given to the students on the 10th week of the practicals. The groups will be allocated on the basis of the marks obtained in the two written test exams, so that there is an even distribution of students in each group. Each member of the group will be required to contribute equally to the preparation of a poster or other informative material, which the group leader will upload to Moodle by midnight on the day before the last exercise, describing the subtasks that the team members will have completed. The uploaded work will receive an equal pass/fail grade for each team member. Exceptions to this may be made if a student's performance is extremely different from the rest of the group (e.g. inactivity, nonparticipation) - in which case he/she may receive a different grade from the rest of the group.

A passing grade for group work is a condition of the end-of-semester signature.

At the end of the semester, the students will receive a signature and then take an oral examination.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

1. Attendance of lectures and practicals in accordance with the current Study and Examination Regulations. If a student has more

practical absences than the number of practical absences described in the regulations, the semester grade will be "fail" and no signature will be given.

2. A grade of at least pass in each of the two written tests during the semester.
3. Pass all the warm-up tests
4. Pass on the group work.

Number and type of projects students have to perform independently during the semester and their deadlines: -

The possibility and conditions for offering grades:

Based on the total score of the 5 written test exams and 20 warm-up tests written during the academic year, students with the highest level of knowledge will be offered a topic exemption as follows: Of the three exam topics, a) students in the top 10% will take one topic, b) students in the top 10.1-20% will take two topics instead of three topics. Of the three items drawn, it is up to the student to decide which one (or which two) to answer, but questions arising from answering the item may cover the whole course material.

Scientifiy, yourse related researches, publivations, assays:

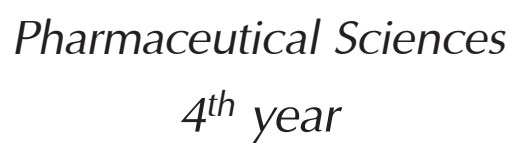
Lecture slides and practice slides will be provided on Moodle to help students learn the course material. These form the basis for the assessments. In addition, the Moodle system contains other supplementary materials (e.g. schedules of lectures and practicals, information on written tests, a help with basic knowledge for the final exam) to help students prepare for the exam. Recommended literature, the relevant parts of which are referred to in lectures and practicals: Hammer-McPhee: Pathophysiology of Disease (McGraw-Hill, 2018) Kumar-Abbas-Aster: Robbins Basic Pathology (Elsevier, 2017)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on and individual assesment basis

The course description was prepared by: Gabriella Juhasz associate professor

Pharmaceutical Technology II.

For further information contact directly with the Department.



7th-8th semester

Curriculum of the credit-based training for second year students in the 2024/2025 academic year

7. SEMESTER 2022/2023/1

Subject	Lecture (hour/ week)	Practice (hour/ week)	Credit	Prerequisites	Exam type
Pharmacognosy (practice) II. GYFMG130G2A	–	4	2	Pharmacognosy I.	practical mark
Pharmacognosy (theory) II. GYFMG130E2A	2	–	3		final*
Instrumental Pharmaceutical Analysis (practice) GYKGYK087G1A	–	5	4	Pharmac. Chem. and Analytics II Pharmaceutical Technology II.	practical mark
Instrumental Pharmaceutical Analysis (theory) GYKGYK087E1A	2	–	2		semi-final
Pharmacology and Toxicology (practice) II. GYKGYH086G2A	–	2	2	Pharmacology and Toxicology I. Basic Medical Pathophysiology II.	practical mark
Pharmacology and Toxicology (theory) II. GYKGYH086E2A	3	–	3		semi-final
Pharmacoeconomics (practice) GYKETE131G1A	0,5	0,5	1	Pharmacology and Toxicology I. Basics of Economy Statistics for Pharmacists	practical mark
Pharmaceutical Technology (practice) III. GYKGYI249G3A	–	8	5	Pharm. Techn. II.	practical mark
Pharmaceutical Technology (theory) III. GYKGYI249E3A	2	–	2		semi-final
Pharmacy Administration (theory) I. GYKEGY090E1A	2	–	2	History of Pharmaceutics and Propedeutics Pharmaceutical Technology II	semi-final
Biological Drugs (theory) GYKGYI088E1A	2	0	2	Pharmac. Chem. and Analytics II. Pharmacology and Toxicology I. Biotechnology	semi-final
Physical Education VII. GYKTSI116G7A	–	1	–		signature
Semmelweis Symposium GYKFRM288E1A	24/sem	–	–		signature
Total:	13,5 24/sem	20,5	28		

Pharmacognosy (theory) II., Pharmacognosy (practice) II.

Full name of the subject: Gyógynövény és drogismeret (elmélet) II., Gyógynövény és drogismeret (gyakorlat) II.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Pharmacognosy II.
English name of the subject: Pharmacognosy (theory) II., Pharmacognosy (practice) II.
German name of the subject: Pharmakognosie II.

Neptun code of the subject: GYKFMG130E2A; GYKFMG130G2A
Type of registration: obligatory
Responsible Department: Semmelweis University, Department of Pharmacognosy

Responsible tutor: Szabolcs Béni head of department, associate professor, Ph.D.
Phone: 06-20-825-0489
E-mail: beni.szabolcs@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Szabolcs Béni associate professor, Ph.D.
 Ágnes Alberti associate professor, Ph.D.
 Orsolya Csernák assistant professor, Ph.D.
 Ida Fejős assistant professor, Ph.D.
 Eszter Riethmüller assistant professor, Ph.D.
 Attila Ványolós assistant professor, Ph.D.
 Nóra Gampe assistant lecturer, Ph.D.
 Csenge Anna Felegyi-Tóth trainee
 Ákos Rácz assistant lecturer, Ph.D.

Classes per week: 2 lectures, 4 practices,
Credit point: 3 credits lecture, 2 credits practice

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the course is to acquaint pharmacy students with medicinal plants, herbal drugs and the analytical methods applied in their quality assurance. By doing so, it contributes to the education of pharmacy students to become key experts in herbal medicines. It contributes to the training of students with modern knowledge of pharmacognosy at a time when the knowledge about natural substances and herbs has come to the fore and has expanded with new aspects due to European harmonization.

Short description of the subject:

The topics of the classes follow the biogenetic system of plant materials. It represents a shift in proportion and, in part, selection in the curriculum that sufficiently emphasizes the importance of knowledge of herbal drugs and their active ingredients that are important in therapeutic practice. At the same time, it provides sufficient knowledge in the context of structure-activity relationships for the sufficient processing of newly emerging herbal drugs, possibly of foreign origin, based on their chemical groups. It also introduces the requirements of the European Pharmacopoeia (Ph. Eur.) regarding herbal drugs and preparations. Thus, it provides knowledge of all herbal drugs and active substances that serve as raw materials for phytopharmaceuticals (including those that will soon become traditional OTC medicines) and preventive products (dietary supplements).

Knowledge of plant material: drug recognition; macroscopic and microscopic examination.

Detection of active ingredients and constituents of herbal drugs (preparation, extraction and purification techniques, general and specific chemical reactions, chromatographic methods), quantitative evaluations (pharmacopoeial and standard methods) and isolation of individual components or selective determination by complex chromatographic and spectroscopic methods. Application of herbal drugs based on their positive effects in prevention, phytotherapy and improving quality of life.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Semester	Consultation
7 semester	28	56	–	–	84	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week):

- Week 1:** Biosynthesis and grouping of terpenoids. Essential oils in the plant kingdom, their medicinal significance.
- Week 2:** Essential oils containing monoterpene components. Acyclic monoterpenes: Lavandulae flos, Aurantii amari epicarpium et mesocarpium, Citri bergamiae pericarpium, Coriandri fructus, Melissa folium, Monocyclic monoterpenes: Menthae crispae folium, Menthae piperitae folium, Carvi fructus, Eucalypti folium, Melaleuca folium, Bicyclic monoterpenes: Rosmarini folium, Juniperi galbulus, Salviae officinalis folium Aromatic monoterpenes: Thymi herba, Serpylli herba
- Week 3:** Volatile phenylpropane and sesquiterpene-containing essential oils. Balms, resins. Phenylpropane derivatives: Caryophylli flos, Anisi fructus, Foeniculum drugs, Cinnamomi cortex, Myristicae semen, Levistici radix Volatile sesquiterpenes: Matricariae flos, Chamomillae romanae flos, Millefolii herba, Absinthii herba, Zingiberis rhizoma, Curcuma drugs, Balms, resins: Terebinthina drugs, Balsamum peruvianum, Benzoe drugs, Myrrha

- Week 4:** Iridoids, sesquiterpene lactones, diterpenes: valepotriate iridoid esters, bitter substances and other types of plant metabolites. Monoterpene derivatives: Valepotriate iridoid esters: Valerianae radix Iridoids and secoiridoids: Gentianae radix, Menyanthis trifoliatae folium, Centaurii herba, Harpagophyti radix, Plantaginis lanceolatae folium, Agni casti fructus, Oleae folium Sesquiterpene derivatives Sesquiterpene lactones: Cardui benedicti herba, Taraxaci officinalis radix, Cynarae folium, Arnicae flos Diterpenes: Marrubii herba, Ginkgonis folium, Stevia rotundifolia Triterpene derivatives: Lanosterol derived bitter substances: Colocynthis fructus Secotriterpene bitter substances: Quassiae lignum
- Week 5:** Triterpenes, sterane saponins, tetraterpenes, polyterpenes Triterpene saponins: Hederae folium, Liquiritiae radix, Primulae radix, Saponariae albae radix, Hippocastani semen, Centellae asiaticae herba, Quillajae cortex Triterpene acids and alcohols: Olibanum indicum, Calendulae flos, Taraxaci officinalis herba cum radice Drugs with adaptogenic action: Ginseng radix, Poria, Eleutherococci radix Steroidal saponins: Rusci rhizoma, Sarsaparillae radix Tetraterpenes: Stigma crosses, Lycii fructus Polyterpenes: Resina elastica

- Week 6:** Cardiac sterane glycosides, special steroids
sterane glycosides: *Digitalis purpureae* folium, *Digitalis lanatae* folium, *Convallariae* folium, *Strophanthi* semen, *Scillae* bulbus
Specific triterpenes, phytosterols: *Pruni africanae* cortex, *Sabal serrulatae* fructus, *Cucurbitae* semen, *Urticae* radix, *Epilobii* herba, *Cimicifugae* rhizoma
Ecdisteroids: *Leuzeae* radix
- Week 7:** Azotoids, nitrogen metabolism in plants. Biosynthesis and grouping of alkaloids. Alkaloids of ornithine origin. Amino acids, peptides, biogenic amines
Alkamides: *Echinacea* drugs
Lectins: *Visci albae* herba
Herbal enzymes: *Carica papaya*, *Ananas comosus*, *Ficus* spp.
Alkaloids
Alkaloids of ornithine origin
Tropane alkaloids: *Belladonnae* folium, *Stramonii* folium, *Cocae* folium
- Week 8:** Alkaloids of ornithine, lysine and tryptophan origin
Alkaloids of ornithine origin
Pyrrolidine and pyrrolizidine alkaloids: *Nicotianae* folium, *Boraginis* herba, *Symphyti* radix, *Farfarae* folium
Alkaloids of lysine origin
Piperidine alkaloids: *Lobeliae* herba
Alkaloids of tryptophan origin
Simple indol alkaloids: *Physostigmae* semen
Hemiterpenoid indol alkaloids: *Secale cornutum*
Monoterpenoid indol alkaloids: *Rauwolfiae* radix, *Vincae minoris* herba, *Uncaria*-drugs, *Catharanthi rosei* herba, *Strychni* semen, *Loganiaceae*-*Curare*
Monoterpenoid quinoline alkaloids: *Cinchonae* cortex
- Week 9:** Phenylalanine alkaloids
Benzyl isoquinoline alkaloids: *Aporfin*-framed alkaloids: *Boldi* folium
Morphinane alkaloids: *Papaveris maturi* fructus, *Opium crudum*
Protoberberine, benzophenanthridine, phthalidizoquinoline alkaloids: *Chelidonii* herba, *Fumariae* herba, *Hydrastis* rhizoma
Bisbenzylisoquinoline alkaloids: *Menispermaceae*-*Curare*
Monoterpenoid isoquinoline scaffolds: *Ipecacuanhae* radix
Amaryllidaceae-alkaloids: *Galanthi* bulbus
- Week 10:** Histidine alkaloids. Protoalkaloids of phenylalanine origin. Pseudoalkaloids: alkaloids of phenylalanine and nucleotide origin.
Histidine alkaloids
Imidazole alkaloids: *Jaborandi* folium
Protoalkaloids
Protoalkaloids of phenylalanine origin
Tropolon alkaloids: *Colchici* semen
Pseudoalkaloids
Pseudoalkaloids containing exocyclic nitrogen of phenylalanine origin
 β -amino-phenyl-propane alkaloids: *Ephedrae* herba, *Cathae edulis* folium
Benzyl amine alkaloids: *Capsici* fructus
Piperidine alkaloids: *Conii* fructus
Pseudoalkaloids of nucleotide origin
Purin alkaloids: *Camelliae sinensis non fermentata* folia, *Mate* folium, *Cacao* semen, *Coffeae* semen, *Colae* semen, *Guaranae* semen
- Week 11:** Pseudoalkaloids of terpene origin. Cyanogenic and mustard oil glycosides
Pseudoalkaloids of terpene origin
Diterpene alkaloids: *Aconiti* tuber, *Taxi* cortex
Steroid alkaloids: *Dulcamarae* stipes, *Solani nigri* herba, *Veratri* rhizoma et radix
Cyanogenic and mustard oil glycosides: *Amygdalae* semen, *Pruni armeniacae* semen, *Sinapis nigrae* semen, *Sinapis albae* semen
Other drugs containing sulfur-containing compounds: *Allii sativi* bulbus, *Allii cepae* bulbus
- Week 12:** Plant Biotechnology
- Week 13:** Midterm
- Week 14:** Summary presentation: preparation for the exam.

Topics of practical classes (pro week):

- Week 1: Work and fire safety. Requirements of the semester. Investigation of unknown sample.
- Week 2: Essential oil containing drugs. I.
- Week 3: Essential oil containing drugs II.
- Week 4: Investigation of drugs containing valepotriates and bitter substances.
- Week 5: Saponins and chief saponin drugs. Methods used in the identification and quality control of saponins.

- Week 6: Cardioactive glycosides and their main drugs I
- Week 7: Cardioactive glycosides and their main drugs II.
- Week 8: Tropane alkaloid containing drugs. Methods of extracting alkaloids from plant materials.
- Week 9: Isoquinoline alkaloids, their chief drugs
- Week 10: Quinoline and indole alkaloids, their main drugs
- Week 11: Pseudo- and protoalkaloids, their main drugs I.
- Week 12: Pseudo- and protoalkaloids, their main drugs II.
- Week 13: Plant biotechnology
- Week 14: Individual task.: Natural product development. Identification of crude drugs based on the methods prescribed in the Ph. Eur.

Schedule of consultations: as demanded

Schedule of consultations: as demanded

Prerequisites:

Pharmacognosy I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:
Based on the current Study and Exam regulations

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

During the semester, two midterms will be written based on the material of the exercises in writing and/or orally. Verification of material knowledge (examination of unknown drug mixtures, identification of unknown drug powders, recognition of microscopic preparations).

The first test takes place during the 7-8th week practice. The report consists of a theoretical and macromorphological examination part, including the studies carried out and described during the practices in weeks 1-7, as well as the material of the seminars. The grade obtained in this process will be counted with a single weight when determining the practical grade.

In the 13th week lecture, an obligatory midterm exam will take place, the material of which covers the entire practical material of the semester. The midterm result of the grade is counted with double weight when determining the practical grade. Students who do not achieve at least sufficient (2) grades in the obligatory test must answer an additional part of the exam (herbal drug).

Midterm examinations may be replaced and corrected two times each. The results of the first report can be corrected during the two practices following the announcement of grades. We provide an opportunity to retake the obligatory midterm in an out-of-class time in week 14.

Requirements of signature: Participation at the practices. Submission and acceptance of reports. Attendance on every midterm during the semester.

Number and type of projects students have to perform independently during the semester and their deadlines:

Preparation of a presentation in a chosen topic, performed at the weeks 8-14

Type of the semester-end examination:

Lecture: final

Practice: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination:

Lecture: oral examination

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

Instrumental Pharmaceutical Analysis

Full (Hun) name of the subject: MŰSZERES GYÓGYSZERANALÍZIS
Program: Undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: MGYA
English name of the subject: Instrumental Pharmaceutical Analysis
German name of the subject: Instrumentelle Arzneimittelanalytik

Type of registration: obligatory/obligatory elective/elective/criteria requirement

Neptun code of the subject: GYKGYK285E1A

Responsible Department: Department of Pharmaceutical Chemistry

Responsible tutor: Dr. György Tibor Balogh Head of department, DSc, PhD, dr. habil

Contact information: Semmelweis University, Department of Pharmaceutical Chemistry 1092 Budapest, Hőgyes Endre u. 9. phone: 06-1-217-0891 email: balogh.gyorgy.tibor@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. György Tibor Balogh Head, full professor, PhD
 Dr. Péter Horváth Associate professor, PhD
 Dr. Károly Mazák Associate professor, PhD
 Dr. Márta Mazák-Krasznai Associate professor, PhD
 Dr. Gergő Tóth Associate professor, PhD
 Dr. Arash Mirzahassemi Associate professor, PhD
 Dr. Anna Vincze Assistant professor, PhD
 Dr. Vivien Bárdos PhD student
 Dr. Balázs Simon PhD student
 Dr. Rita Szolláth PhD student
 Dr. Gergely Dombi PhD student

Class per week: 2 hours lectures 5 hours practices

Credit point(s): 6 credits

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The theoretical presentation and practical application of modern routine and large-scale analytical techniques used in the pharmaceutical industry, as found in the monograph of the pharmacopoeia, aiming to provide a comprehensive understanding of the testing of pharmaceutical raw materials, intermediates, and products produced through small, medium, and large-scale processes. Additionally, this encompasses the interpretation of the advanced instrumental methods employed in various sections of the Pharmacopoeia. Another objective is to equip our students for easier integration into the pharmaceutical industry.

Short description of the subject:

The fundamental objective of the course is to acquaint students with the essential routine and large-scale analytical measurement methods necessary for determining the quality of pharmaceutical preparations and raw materials. Students will become familiar with the construction and operation of various instruments. They will gain insight into the potential applications of each instrument and, through hands-on experience, acquire knowledge of the key instrumental techniques in pharmaceutical analysis.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
7th semester	28	70	-	-	98	Autumn semester* Spring semester Both semesters (* Please underline)	-

Program of semester

Topics of theoretical classes (pro week):

Week 1: UV/VIS spectroscopy
Week 2: Electroanalytical methods (potentiometry, amperometry)
Week 3: IR, Raman spectroscopy
Week 4: HPLC I.
Week 5: HPLC II.
Week 6: ORD, CD spectroscopy
Week 7: Capillary electrophoresis
Week 8: Mass spectrometry, LC-MS
Week 9: MS II.
Week 10: NMR spectroscopy I
Week 11: NMR spectroscopy II.
Week 12: HTS methods
Week 13: Analytical techniques in solid state characterization. Nondestructive and Process Analytical Technology (PAT) approaches
Week 14: Consultation

Topics of practical classes (pro week):

Week 1: UV spectroscopy, optical rotation
Week 2: UV spectroscopy II, amperometry
Week 3: IR, RAMAN
Week 4: Potentiometry
Week 5: HPLC I

Week 6: ORD, CD
Week 7: HPLC II
Week 8: Capillary electrophoresis
Week 9: HPLC III
Week 10: MS
Week 11: NMR
Week 12: NMR II
Week 13: Plate-based methods, permeability measurements
Week 14: Consultation

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:
 Biophysics, analytical chemistry

Schedule of consultations: based on requests

COURSE REQUIREMENTS

Prerequisites:

Pharmaceutical Chemistry and Analysis II.
 Pharmaceutical Technology II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Based on study and examination regulations

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Before the start of the semester, detailed information regarding both the lecture and practical course topics will be uploaded to the Moodle system. These materials will include the dates and topics of assessments, as well as the possibilities for retake and grade improvement. At the beginning of each lecture, a short quiz consisting of 3–4 questions will be given, focusing on the key points of the lecture. The answers to these questions will be scored. If the rate of correct answers reaches 90%, 80%, or 70%, bonus points (7.5%, 5%, or 2.5%, respectively) will be added to the final written exam score.

The average of the midterm tests must reach at least 2.00 (without rounding) for getting the signature.

The final exam grade will be composed of two parts: **2/3 from the written exam** and **1/3 from the average of the midterm tests**.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

- 1) It is obligatory to be present on the practices.
- 2) Maximum 3 absences are acceptable. In case of a further absence the semester has to be repeated.
- 3) The practices begin and finish punctually. Latecomers can be sent home by the instructor.
- 4) You have to be prepared for the practices. Your preparation can be checked by the instructor at any time, without former notification, both in written and oral form. Unprepared students can be sent home by the instructor.
- 5) Scheduled project reports must be written on the designated practice. Students absent during scheduled project reports must retake them within a week.
- 6) A practical course grade can only be given to a student if
 - a) the average of the scheduled project reports is at least 2.00 and at least 2 of them must be passed;
 - b) he/she accumulates the required minimum number of points (min 50%) during practices;
 - c) the number of the absences does not exceed the acceptable limit.
- 7) After the end of the study programme the practical course grade can only be improved in the first week of the exam period.
- 8) A laboratory report must be kept about your work in the lab. All the examination results of the unknowns must be written into this and handed in by the end of the practice or until a deadline agreed with the instructor. Otherwise, no points will be rewarded for the practice.

Number and type of projects students have to perform independently during the semester and their deadlines:

Completing the tasks defined in the practical curriculum, creating reports on the measurements conducted on a weekly basis. The reports must be submitted by the end of the lab session or within the timeframe agreed upon by the lab instructor and the students.

Type of the semester-end examination: semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written examination

REQUIREMENTS FOR EXAM

- UV/VIS Spectroscopy (Electronic excitation, HOMO-LUMO orbitals, chromophore, auxochrome, spectral shifts, solvent cut-off values, steps of spectrophotometer qualification (wavelength, intensity, linearity; scattered light); Transmittance-absorbance; Lambert-Beer law, specific and molar absorptivity (+calculation), quantitative analytical possibilities (overlapping/non-overlapping/partially overlapping spectra, difference spectroscopy

+calculation examples), concept of derivative spectroscopy, its application)

- ORD, CD Spectroscopy (Optical (physical) background of ORD spectrum formation, Cotton effect curve, specific rotation and calculation;
- Optical (physical) conditions for CD spectrum formation, chiral and chiral perturbed chromophore, rotator strength concept, TEM, TMM, and relationship to rotator strength. Comparison of CD and ORD spectroscopy, range of applicability. Induced CD, its uses, protein structural analysis, absolute configuration determination, concept of dissymmetry factor (g) and its application)
- Electroanalytical Methods (Potentiometry (description of electrode potential using Nernst and Nikolsky-Eisenmann equations, classification of indicator electrodes with examples, pH measurement with combination glass electrode (examples from the pharmacopoeia));
- Voltammetry (cell setup, types of electrodes, polarographic curve and segments, cyclic voltammetry), Amperometry (titration curve, examples from the pharmacopoeia); Coulometry; Bio-catalytic electrodes (three generations of amperometric glucose electrodes in detail)
- Vibrational Spectroscopy IR and RAMAN (Infrared spectroscopy ranges and characteristics, normal modes of vibration, selection rules, basics of quantitative and qualitative analysis, IR spectrum, ATR measurement setup, FT-IR, sample preparation and measurement setups, theory of Raman spectroscopy, Raman scattering, Raman spectrum, Raman spectrometer setup, comparison of NIR and Raman spectroscopy, chemical mapping, applications)
- HPLC (classification of chromatographic methods, separation mechanisms, HPLC instrument structure, concepts, detection methods, comparison of UPLC and HPLC, causes and consequences of peak broadening in HPLC, reversed-phase chromatography, C18 column classification, normal-phase chromatography, normal-phase fillers, HILIC, polar organic mode, chiral chromatography, main chiral selectors)
- MS, LC-MS (definitions: mass spectrometry, monoisotopic mass, mass spectrum, molecular ion, base peak, fragment ion, mass spectrometer structure, ion sources (electron impact, chemical, ESI, MALDI), comparison of ionization types, analyzers (TOF, Q), comparison of analyzers, tandem mass spectrometry, uses of mass spectrometry, qualitative LC-MS)
- Capillary Electrophoresis (apparatus structure, separation principles, electroosmotic flow, factors influencing electroosmotic flow, injection, detectors, UV detection in capillary electrophoresis, CZE, MEKC, chiral capillary electrophoresis, capillary electrochromatography)
- NMR (spin, spin quantum number, and magnetic quantum number relationship, NMR-active/inactive nuclei, precession, magnetic energy levels, Larmor frequency (formula), NMR experiment, FID definition and characteristics, NMR spectrum, instrument structure, calculation of chemical shift, ¹H and ¹³C chemical shift scales, spin-spin coupling, Karplus equation, multiplicity of NMR signals, magnetic equivalence, splitting caused by equivalent and non-equivalent nuclei, intensity/integrated area of NMR signals, relaxation definition and types, inversion recovery pulse sequence and T1 relaxation time measurement, effect of field strength on spectrum, ways to increase signal-to-noise ratio, ¹³C acquisition modes and their comparison in terms of sensitivity and quantitateness, nuclear Overhauser effect, basis of quantitative NMR measurement, advantages over other analytical methods, parameters for quantitative NMR acquisition and processing, ¹³C satellite signal, inverse gated decoupling mode, actual concentration determination, criteria for quantitative NMR standard materials and 2 examples, determination of hydroxypropylbetadex molar substitution by NMR)
- Solid-Phase Analysis (DSC, XRD, thermoanalytical methods, distinction between amorphous and crystalline forms)
- Plate-Based Methods (HTS method principles, practical applications, possibilities of permeability determination)

The possibility and conditions for offering grades:

There are no possibilities for offering grades.

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:

All the lectures will be available in the Moodle system with the syllabus and main questions regarding each topic.

Hansen, Pedersen-Bjergaard, Rasmussen: Introduction to Pharmaceutical Chemical Analysis
(Wiley, 2012)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**

yes*/no*/on and individual assessment basis*

(* Please underline)

The course description was prepared by:

Dr. Gergő Tóth

Pharmaceutical Technology (theory) III., Pharmaceutical Technology (practice) III.

Full name of the subject: GYÓGYSZER-TECHNOLÓGIA III., GYÓGYSZER-TECHNOLÓGIA (gyakorlat) III.

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: Pharm. Tech.

English name of the subject: Pharmaceutical Technology (theory) III., Pharmaceutical Technology (practice) III.

German name of the subject: Pharmazeutische Technologie III.

Neptun code of the subject: GYKGYI249E3A (lecture); GYKGY-I249G3A (practice)

Type of registration: obligatory

Responsible Department: Semmelweis University, Department of Pharmaceutics

Responsible tutor: Dr. István Antal Professor, Ph.D., Habil. Contact information: phone: +36-1-217-0914 email: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Nikolett Kállai-Szabó Associate professor, Ph.D.

Dr. Krisztina Ludányi Associate professor, Ph.D.

Dr. Emese Bertalan-Balogh Senior lecturer, Ph.D.

Dr. Livia Budai Senior lecturer, Ph.D. Dr. Mária Hajdú Senior lecturer, Pharm.D.

Dr. Miléna Lengyel Senior lecturer, Ph.D.

Dr. Borbála Dalmadi-Kiss Research scientist, Ph.D.

Dr. Dóra Farkas Assistant lecturer, Ph.D. Dr. Andrea Kovács Assistant lecturer, Ph.D.

Dr. Nóra Mike-Kaszás Assistant lecturer, Ph.D.

Dr. Noémi Anna Niczinger Assistant lecturer, Ph.D.

Dr. Márton Király Assistant lecturer, Pharm.D.

Dr. Petra Szalkai Assistant lecturer, Pharm.D.

Classes per week: 2 lectures, 8 practices,

Credit point: 2 credits lecture, 5 credits practice

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the Pharmaceutical Technology course is to provide the student with the theoretical knowledge and practical skills necessary for the basic professional activity of a pharmacist, the preparation of pharmaceuticals.

Short description of the subject:

The subject covers the theoretical and practical knowledge required for the preparation of medicinal products. An overview of the history of pharmaceutical preparation. Pharmaceutical technology aspects of ensuring efficacy, quality requirements for the pharmaceutical formulation. Tasks and conditions of pharmaceutical preparation, basic operations. Individual (magistral) and factory production of pharmaceuticals. Aspects, excipients, quality requirements for formulation of medicinal products. Identification and resolution of possible incompatibilities of ingredients, compatibility, stability.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
7 th semester	28	112	-	-	140	Autumn semester	-

Program of semester

Topics of theoretical classes (pro week):

1. Introduction. The task, history, and evolution of pharmaceutical manufacturing.
2. Engineering principles of pharmaceutical manufacturing, scale-up, in-process control, critical quality attributes and process parameters.
3. Pharmaceutical development. Preformulation, formulation.
4. Packaging materials and operations, shelf life and stability aspects.
5. Drug stability and stabilization, stability testing.
6. Pharmaceutical technology operations and procedures: Particle size reduction, milling, grinding. Mixing, dispersing.
7. Pharmaceutical technology operations and procedures: Heat transfer, evaporation, distillation. Filtration, sedimentation, centrifugation, extraction.
8. Pharmaceutical technology operations: Crystallization, polymorphism. Amorphization.
9. Pharmaceutical technology operations: Drying. Fluidization.
10. Pharmaceutical technology operations: Spray drying. Freeze drying (lyophilization).
11. Conditions for pharmaceutical production, GMP. Safety aspects.
12. Parenteral medicinal products. Sterile pharmaceutical production.
13. Small-volume parenteral preparations, solution and suspension type injections. Additives.
14. Large-volume parenteral preparations. Development of sterile preparations.

Topics of practical classes (pro week):

Pilot practices

- Study on the drying process
- Study on the filtration process
- Study on the mixing process*
- Study on the fluidization
- Study on particle size reduction*
- Preparation of suspensions. Suppository replacement factor
- Preparation and stability examination of emulsions*
- Study on compression*
- IPC for solid dosage forms

Parenteral practices

- Preparation and examinations, IPC control of infusions (carbohydrate containing, electrolyte containing, infusions against acidosis)*
- Study of infusion bottles
- Study of the Laminar air flow technology
- Autoclaving, autoclaving indicators*
- Isotonization*

Chemical practices

- Study of the stability of penicillin containing solutions in the presence of other medicinal substances
- Study of the catalytic oxidation of ascorbic acid solutions*
- In vitro investigation of the acid binding capacity of thermolabile aluminium hydroxide gels
- Testing the activity of antacid formulations with Rossett-Rice method

- Investigation of ASA content decreasing due to moisture in solid drug preparation*
- Preparation of a KCl-containing capsule composition*
- Preparation and encapsulation efficiency of theophylline-containing microcapsules
- Encapsulation of tocopheryl acetate into liposomes
- Study of the interaction of ASA and caffeine
- Project work: development of a biorelevant dissolution study

Physical practices

- Water purification*
- Studies on ion exchange resins*
- Effect of pH on the solubility of drugs
- Evaluation of macromolecular colloids by viscometry*
- Effect of permittivity on the solubility of salicylic acid
- Hydrotropic auxiliary materials. Solubilization of volatile oils by Tweens*
- Effect of excipients on droplet number and surface tension of pharmaceutical preparations*
- Analysis of the rheological behavior of hydrogels: effect of the pH
- Analysis of the rheological behavior of hydrogels: effect of electrolytes
- Determination of critical micelle concentration (CMC) of pharmaceuticals
- Measuring the sun protection effect of oily products by spectrophotometry, Study on the particle
- size distribution of suspensions by Andreasen's device, Determination of sedimenting velocity by
- Wiegner tube

Formulation lecture: -technical background, -composition, -production elaboration

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

	Expected date	Expected date for retake 1	Expected date for retake 2
1st midterm	October 10. (week 6) 14.30-16.00	October 17. (week 7) 14.30-16.00	December 11.
2nd midterm	November 28. (week 13) 14.30-16.00	December 5. (week 14) 15.30-17.00	December 11.

The written tests include the material of the practices, including the calculations. In the case of a rewrite, the result of the rewrite will override the result of the previous assessment.

The practical grade is determined based on the average of the % result of the midterms as follows:

90.00-100%	excellent (5)
80.00-89.99%	good (4)
65.00-79.99%	fair (3)
50.00-64.99%	pass (2)
0-49.99%	fail (1)

Requirements of signature:

- To obtain a signature the student must attend at least 75% of the practical sessions.
- Complete the practices marked with an asterisk* in the practical topics.
- From the 6 pop tests at least 5 must be written and min. 50.00% must be reached in each laboratory.
- The student must achieve a minimum of 50.00% individually in each of the two midterms.
- The 4 moodle calculation tests must be successfully completed by the end of the semester (December 18, 2023, 12.00).
- Completion of project works.

Type of the semester-end examination:

Lecture: semi-final

Practice: practical grade

Examination requirements:

Theoretical topics:

- The task, development, and evolution of pharmaceutical manufacturing

Completion of the practices marked with an asterisk* is a condition of signature. In the case of absence from other practices, an oral report must be made by arrangement.

Schedule of consultations: as demanded

Prerequisites: Pharmaceutical technology II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Meet at least 75% attendance and participation requirement per lab for practical sessions

- In the event of late arrival (10 minutes) the practice can only be started with the permission of the teacher. Further guidelines are provided by the Study and Examination Regulations.
- Completion of the exercises marked with an asterisk* in the practical topics is a prerequisite for signature.
- In case of absence, complete the exercise in the make-up exercises. Make-ups are recommended, as the material is part of both the written reports, the semi-final and the final examination. In case of non-completion of the exercises not marked with an asterisk, an oral report of the practical material must be given by arrangement.
- It is not mandatory to make up the absences, but opportunity is provided to complete the exercise in the make-up exercises. Supplementation is recommended, as the course material is part of both midterms, the semi-final, and the final examination.
- Due to failure to meet the attendance requirements, the responsible tutor determines the conditions of the signature and the order of the possibility of making up.

- Condition system of manufacturing. Good Manufacturing Practice (GMP)
- Pharmaceutical development, formulation, and manufacturing process
- Engineering principles of pharmaceutical manufacturing, basic operations
- Basics of drug stability, types of changes
- Stabilization of pharmaceutical products, stability testing
- Packaging technology and packaging materials, patient centricity
- Critical quality attributes and parameters, scaling up, optimisation
- Heat transfer, evaporation, and distillation
- Particle size reduction, grinding, sieving, micronisation, particle design
- Mixing, homogeneity testing, dosing aspects
- Drying, spray drying
- Freeze drying (lyophilisation)
- Separation operations, filtration, centrifugation, extraction
- Importance and characteristics of polymorphic and amorphous materials
- Crystallisation, amorphisation
- Principles of the formulation of parenteral preparations
- Formulation of injections, parenteral additives
- Formulation of infusions, large volume parenteral preparations
- Manufacturing of sterile preparations

Modern dosage forms:

- Inhalation powder, pre-dispensed
- Gene therapy medicine (infusion solution)
- Inhalation powder, hard capsules
- Concentrate for solution for infusion
- Solution for infusion
- Solution for injection

7. Nasal drops
8. Nasal spray solution
9. Eye drops, solution
10. Powder and solvent for solution for injection
11. Powder and solvent for prolonged-release suspension for injection
12. Powder for dispersion for infusion (albumin bound nanoparticles)
13. Sublingual spray
14. Nebuliser Suspension
15. Suspension for injection
16. Suspension for injection in vial
17. Pressurised Inhalation Suspension

Calculations, practical knowledge, excipients and definitions: as published by the department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: combined examination

Written part:

- Calculation (assessment on a two-point scale: pass/fail)
- Practical knowledge (assessment on a five-point scale)
- Excipients (assessment on a five-point scale)

Oral part:

- Theoretical topic (assessment on a five-point scale)
- Definition (assessment on a two-point scale: pass/fail)
- Modern dosage form (assessment on a five-point scale)

The possibility and conditions for offering grades:

Exemption from subsections or partial grade may be offered for certain parts of the examination based on the mid-semester performance in the following ways:

Definitions: At the lectures, there will be a non-obligatory short assessment ("slip") of the knowledge presented that day, which results in exemption from the definition subsection of the oral part if the student completes at least 75%.

Practical knowledge:

Based on the performance on the pop tests – if the average is

- min. 80.00%, a good grade (4),
- min. 90.00%, an excellent grade (5) is offered for the practical topic.

Excipients: 2 prearranged times during the semester, in the form of a test, based on the overall result:

- min. 80.00%, a good grade (4),
- min. 90.00%, an excellent grade (5) is offered for the excipient topic.

Scientific, course related research, publications, essays:

The lecture materials, the supplementary material for the excipients and the practical work are available in electronic form on Moodle.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on an individual assessment basis

The course description was prepared by:

Dr. István Antal

Biological Drugs (theory)

Full name of the subject: Biológiai gyógyszerek (elmélet)
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject:
English name of the subject: Biological Drugs (theory)
German name of the subject: Biopharmazeutika (Vorlesung)

Neptun code of the subject: GYKGYI088E1A
Type of registration: obligatory
Responsible Department: Semmelweis University, Department of Pharmaceutics

Responsible tutor: Dr. Krisztina Ludányi associate professor, PhD
Contact information:
phone: 36 1 476-3600/53017
email: ludanyi.krisztina@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Dr. István Antal professor, PhD
Dr. Romána Zelkó/Dr. Szilvia Sebők professor, DSc
Dr. Borbála Dalmadi-Kiss research fellow, PhD
Dr. Katalin Baranya-Ganzler (Richter G. Plc.) scientific advisor, PhD
Dr. László Drahos (ELKH TTK Research Centre for Natural Sciences, MS Proteomics Research Group)
senior research fellow, research group leader, PhD
Dr. Ádám Fizil/Dr. Zoltán Szakács (Richter G. Plc.) PhD
Dr. Erik Bogsch/Dr. László Tóth (Richter G. Plc.) director, PhD/ HoD, PhD

Dr. Veronika Harmat/Dr. Zsolt Dürvanger (ELTE Institute of Chemistry) senior lecturer, PhD/ research fellow, PhD
Tímea Erdősi (National Public Health Centre)
Dr. Hilda Kőszegi-Szalai, OGYÉI honorary associate professor, PhD

Classes per week: 2 lectures
Credit point: 2 credits lecture

Professional content, intent of acquirement and its function in order to implement the goals of the program:
The aim of the course “Biological drugs” is to give the student an overview of macromolecules important in biological therapy, their production, official regulation of marketing and the most commonly used analytical techniques for qualitative and quantitative determination, especially the methods used in the development and manufacture (quality control) of biological preparations.

Short description of the subject:
The course summarizes the possibilities of the production and introduction of biologics, biosimilar preparations, its regulation for official licensing, as well as the sample preparation (digestion, enrichment, etc.), separation techniques (chromatography, electrophoresis), spectroscopy (MS,NMR, CD, fluorescence, X-ray diffraction, etc.), molecular biological methods (PCR, Elisa, etc.) reviews the research results in the fields of quantification, and the challenges of the clinical application of the biological drugs.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
7 th semester	2	-	-	-	28	Autumn semester	-

Program of semester

- Topics of theoretical classes (pro week):**
1. Definitions, structure, properties (biologics, biosimilar drugs)
 2. Grouping of biological drugs, industrial aspects
 3. Possibilities of the administration of biological drugs, aspects of formulation and technological aspects of quality
 4. Pharmacokinetic properties of biological drugs
 5. Regulation and authorization of biological medicinal products
 6. Proteins produced by recombinant technology Monoclonal antibodies
 7. Advanced therapy medicinal products: gene therapy, cell therapy, tissue engineered products
 8. Qualitative characterization of biological drugs: Molecular biological techniques (Elisa, Westernblot, immunoprecipitation, PCR, microarray)
 9. Qualitative characterization of biological drugs: Sample preparation (extraction, cell extraction, solubilisation, digestion, purification/ enrichment, filtration) Separation techniques (chromatography: IEX, RP-HPLC, HILIC, nanoLC, 2D; gel and capillary electrophoresis) Spectroscopic methods: fluorescence, UV-VIS, infrared, CD
 10. Qualitative characterization of biological drugs: Mass spectrometry: LC-MS/MS, MALDI_MS, imaging, lab-on-a-chip Protein sequencing: bottom up / top down, peptide sequencing, post-translational modifications (glycosylation)
 11. Qualitative characterization of biological drugs: Nuclear magnetic resonance analysis
 12. Structure determination by protein crystallography technique, cryo-electron microscope
 13. Quantitative characterization of proteins
 14. Aspects of the clinical application of biological drugs

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:
Biochemistry, Biotechnology, Pharmacology, Pharmaceutical chemistry, Instrumental drug analysis
There is no overlap

Schedule of consultations: According to individual student demand, at an agreed time.
Prerequisites:
Pharmaceutical Chemistry II.
Pharmacology and toxicology I.
Biotechnology

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:
according to the Examination and Studies Regulation

Type of the semester-end examination:
Lecture: semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

- Topic list:**
1. Definitions, structure, properties (biological drugs, biosimilar medicines)
 2. Grouping of biological drugs, industrial aspects
 3. Possibilities of introducing biological drugs into the body, aspects of formulation
 4. Technological aspects of quality
 5. Pharmacokinetic properties of biological drugs
 6. Regulation and authorization of biological medicinal products
 7. Proteins produced by recombinant technology (grouping, expression strategies, production)
 8. Monoclonal antibodies, structure-effect relationship, design, production and quality assurance
 9. Advanced therapy medicinal products: gene therapy, cell therapy, tissue engineered products
 10. Application of Elisa, Westernblot, immunoprecipitation, microarray in the analysis of biological substances
 11. PCR and its application in the analysis of biologicals
 12. Sample preparation: extraction, cell extraction, solubilization, digestion, purification / enrichment, filtration

13. Separation techniques: chromatography, electrophoretic methods in the production and characterization of biologicals
14. Mass spectrometry: LC-MS/MS, MALDI-MS, imaging, protein sequencing (bottom up/top down, determination of peptide sequence), post-translational modifications (glycosylation)
15. Nuclear magnetic resonance analysis (de novo structure determination, verification of higher order structural similarity based on spectral fingerprinting, 2D spectra, ligand-detected NMR protein binding studies)
16. Application of protein crystallography and cryo-electron microscope in the analysis of biological substances
17. Quantitative characterization of proteins
18. Aspects of the clinical use of biological drugs

Form of the semester-end examination: practical examination/the assessment of completing project work

The possibility and conditions for offering grades:

Conditions for offering an exam mark:

- correctly answering five questions at the end of the lectures (the questions are related to the
- material of the lecture that day)
- the student have to be present at 75 % of lectures
- at the end of the semester, the offer of a mark is determined

based on the overall result in accordance with the the Examination and Studies Regulation: "(a) students who achieve the top 10% can terminate the subject with excellent grade,(b) students who achieve the top 10.1-20% can receive an offer of a mark with a good grade"

Scientific, course related research, publications, essays:

Slides presented at lectures

Recommended literatures:

K. Vékey, A. Telekes, A. Vertes: Medical Applications of Mass Spectrometry, Elsevier, 2006
 L. Endrényi, P. J. Declerck, S. C. Chow: Biosimilar drug product development, CRC Press, 2017
 K. M. Nagel: Introduction to Biologic and Biosimilar Product Development and Analysis, Springer, 2018
 R. Sheets: Fundamentals of Biologicals Regulation: Vaccines and Biotechnology Medicines, Elsevier, 2017

The course description was prepared by:

Dr. Krisztina Ludányi, Prof. István Antal

Pharmacology and Toxicology (theory) II., Pharmacology and Toxicology (practice) II.

For further information contact directly with the Department.

Physical Education VII.

Full name of the subject: Testnevelés VII.

Program: undivided program (pharmaceutical)

Schedule: full-time

English name of the subject: Physical Education VII.

German name of the subject: Sport VII

Neptun code of the subject: GYKTSI116G7A

Type of registration: obligatory

Responsible department: Semmelweis University, Physical Education and Sports Center

Responsible tutor: Várszegi, Kornélia director

E-Mail: varszegi.kornelia@semmelweis.hu

Phone: +36-1/264-1408

Name of the persons responsible for the teaching of the subject:

Kalmus, Dániel circuit training trainer
 Katona, László hiking, badminton, boulder trainer
 Lehel, Zsolt tennis, golf, icehockey trainer
 Rimay, István football trainer
 Weisz, Miklós basketball trainer
 Doharné Buczkó Anikó P.E. teachers
 Farkas Dominika P.E. teachers
 Kovács Imre tennis trainer
 Nagy-Kismarci Bence cheerleading trainer
 Balogh Orsolya aerobic and zumba trainer
 Dr. Herbert – Minkó Krisztina yoga trainer
 Tóth Balázs dance, zumba, salsa trainer
 Kiss Valéria Bless You Gym trainer
 Szeredás Bálint ultimate frisbee trainer
 Soós Gábor tennis trainer
 Kunos Gábor hiking trainer

Classes per week: 1 practice

Credit point: 0

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

Short description of the subject:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behaviour.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
7 th semester	0	14	-	-	14	Autumn semester	-

Program of semester

Topics of practical classes (pro week):

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge: 60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations. 1107 Bp, Zágrábi utca 14.

1×60 min./week sessions:

Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, advanced Yoga, male football, salsa, step aerobics, badminton, beginner ultimate frisbee, advanced ultimate frisbee, zumba
 1×90 mins./week sessions: women's football, ice hockey, beginner tennis, beginner tennis 2,
 4×3 hrs. and 1×2 hrs. session packages: Hiking 1, Hiking 2.
 2×90 mins./week sport training (competitive sport, for qualified only): cheerdance, cheerleader, men's football, handball, basketball, volleyball

Fee-based: at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

COURSE REQUIREMENTS

Prerequisites:

Prerequisites Physical Education I, III. and V.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The number of active participations for physical education classes is 10, regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days, after registration in the Neptun system. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Except for the Sport Hiking courses, where you have to attend 4 times due to blocking. 3 of these are on your own course and 1 can be made up by arrangement with the instructor!

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Requirements of signature:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate to the TSK or
 2. does sports regularly and submits a certificate of association and federation to the Foreign Students Secretariat
- until the last study day in the 4th week of the semester. On the basis of the submitted application and its annexes, the TVB decides on the exemption of both the Hungarian and foreign students.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes

If you have not completed the course you may be readmitted in the 2. semester of the following academic year.

The course description was prepared by: Kornélia Várszegi

Pharmacy Administration (theory) I.

Full (Hun) name of the subject: Gyógyszerügyi ismeretek (elmélet) I.

Program: Undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject:

English name of the subject: Pharmacy Administration (theory) I.

German name of the subject: Pharmazeutische Administration (Vorlesung) I

Type of registration: obligatory/obligatory elective/elective/criteria requirement

Neptun code of the subject: GYKEGY090E1A

Responsible Department: University Pharmacy, Department of Pharmacy Administration

Responsible tutor Dr. Romána Zsófia professor, Ph.D., DSc

Contact information:

phone: 06-1-2170919

email: zelko.romana@semmelweis.hu

Title, academic degree:

Name of the persons responsible for the teaching of the subject:

Dr. Ágnes Mészáros associate professor, Ph.D., Dr. Habil

Dr. Adrien Kzsoki-Nochta lecturer, Ph.D.

Class per week: 2

Credit point(s): 2

Professional content, intent of acquirement and its function in order to implement the goals of the program:

It aims to provide an introduction to the different branches of pharmacy and the responsibilities of the pharmacist, by teaching professional skills required in the field of community and hospital pharmacy, as well as in the industry and the authority.

Short description of the subject:

In the course, the primary areas of pharmacy and the competencies of a pharmacist are examined. Topics include the necessary competencies and professional skills for drug dispensing, as well as administrative, legal, and management/quality management activities.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
7 th semester	28	–	–	–	28	Autumn semester	-

Program of semester

Topics of theoretical classes (pro week):

1. Essentials of Pharmacy Administration
2. Pharmacy education (Good Pharmacy Education Practice)
3. Financial pressures; Drug Reimbursement
4. Health care systems, Managing health care
5. Change management in health care
6. Human resource management
7. Importance, objectives of health promotion
8. Quality management within the lifecycle of drugs
9. European Pharmacopoeia I.
10. European Pharmacopoeia II.
11. Managing quality in health care, information needs
12. Competition in Pharmacy Administration I.
13. Drug Utilization Studies
14. Publication Strategies

Topics of practical classes (pro week): none

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects: Pharmaceutical management

Schedule of consultations: -

Course requirements

Prerequisites: History of Pharmaceutics and Propedeutics, Pharmaceutical Technology II

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: According to the University's Study and Examination Regulations

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Successful semifinal exam.

Number and type of projects students have to perform independently during the semester and their deadlines: -

Type of the semester-end examination: end-term examination

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment):

Completely accessible on the Moodle platform.

Form of the semester-end examination: written examination

The possibility and conditions for offering grades: -

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**

no

The course description was prepared by: Dr. Mészáros Ágnes

Pharmacoeconomics (practice)

Full name of the subject: PHARMACOECONOMICS
Program: undivided program (pharmaceutical)
Schedule: full-time

Short name of the subject:
English name of the subject: Pharmacoeconomics (practice)
German name of the subject: Pharmakoökonomie

Neptun code of the subject: GYKETE131G1A

Type of registration: obligatory

Responsible Department: Semmelweis University, Center for Health Technology Assessment

Responsible tutor: Prof. András Inotai Assoc Prof.; Ph.D., DrHabil

Contact information:

phone: 06/70 430-46-45

email: inotai.andras@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Prof. Zoltán Kaló PhD, DrHabil

Assoc. Prof. Balázs Nagy PhD, DrHabil

Dr. Balázs Babarczy PhD (research fellow)

Kristóf Gyöngyösi PhD candidate

Class per week: 1x45 min (2x45 mins biweekly, 1x45 lecture followed by 1x45 practice) Credit point: 1 credit

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Health technology assessment (HTA) is the evaluation of health technologies (including pharmaceuticals) from different perspectives (incl. clinical, economic, organizational, ethical etc.) to support health policy decision making at institutional-, and macro (i.e national) level. Practice-oriented teaching of basic health- and pharmacoeconomic knowledge for students enables them interpreting and determining the cost-effectiveness of health technologies (including pharmaceuticals), and understanding the principles of pharmaceutical pricing and reimbursement. Competencies acquired through the completion of the course: Command of key health economic terms, including: health technology assessment (HTA), steps of economic evaluations, measurement of health outcomes incl. health related quality of life, measurement of costs, pricing and reimbursement of pharmaceuticals, pharmaceutical policy

Short description of the subject:

Practice-oriented teaching of basic health- and pharmacoeconomic knowledge for students to enable them interpreting and determining the cost-effectiveness of pharmaceuticals, and understanding the principles of pharmaceutical pricing and reimbursement.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
7th semester	7	7	-	-	14	Autumn semester	7 (bi-weekly 1x45 min lecture followed by 1x45 min practice: total 90 mins)

Program of semester

Topics of theoretical classes (pro week):

Class	Topic	Lecturer
Week 1 45 min	Introduction, requirements; Health care market and market failures Elements of health care system Financing health care	András Inotai, Balázs Babarczy
Week 3 45 min	Pharmacoeconomics, Health Technology Assessment, Classification of economic evaluations	Zoltán Kaló
Week 5 45 min	Steps of health economic evaluation I - Evidence synthesis – methods&tools for review-based thesis; health outcome measurement (quality of life, utility, quality adjusted life years)	Kristóf Gyöngyösi, András Inotai
Week 7 45 min	Steps of health economic evaluation II – Measuring costs, decision rule (threshold, multicriteria decision analysis)	Balázs Nagy
Week 9 45 min	Health economic modelling (classification, applicability)	Balázs Nagy
Week 11 45 min	Pricing of original and generic medicines	András Inotai
Week 13 45 min	Pharmaceutical reimbursement system, cost control techniques	András Inotai, Kristóf Gyöngyösi
Evaluation Week 14	Test type exam	

Topics of practical classes (pro biweek):

Class	Topic	Lecturer
Week 1 45 min	Introduction, requirements; Health care market and market failures Elements of health care system Financing health care	András Inotai, Balázs Babarczy
Week 3 45 min	Pharmacoeconomics, Health Technology Assessment, Classification of economic evaluations	Zoltán Kaló
Week 5 45 min	Steps of health economic evaluation I - Evidence synthesis - methods&tools for review-based thesis;; health outcome measurement (quality of life, utility, quality adjusted life years)	Kristóf Gyöngyösi, András Inotai
Week 7 45 min	Steps of health economic evaluation II – Measuring costs, decision rule (threshold, multicriteria decision analysis)	Balázs Nagy
Week 9 45 min	Health economic modelling (classification, applicability)	Balázs Nagy
Week 11 45 min	Pricing of original and generic medicines	András Inotai
Week 13 45 min	Pharmaceutical reimbursement system, cost control techniques	András Inotai, Kristóf Gyöngyösi
Evaluation Week 14	Test type exam	

Schedule of consultations: 90 mins bi-weekly (contact hours, 1x45 min lecture followed by 1x45 min practice)

Prerequisites:

Pharmacology and Toxicology I.
Statistics for Pharmacists
Basics of Economics

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Regular attendance is strongly recommended; however, it is not mandatory for semester acceptance. No attendance sheet will be used. Audio recordings of the classes will be available throughout the semester and will be shared on Moodle for students to make up for absences. No need to justify absence. However, students are incentivised for face-to-face participation at classes. At the end of each class, students are challenged with 2-3 quiz questions, to be answered based on the knowledge of that class. Filling these questions is facultative, however students with a 70% or better good response rate receive automatically +30% points in addition to their classroom exam performance at the end of the semester. Incentive is only applicable for face-to-face participants.

Requirements of signature: No further requirement is applicable for the signature

Type of the semester-end examination:

practical grade

Examination requirements:

as published by the education-research department on the MOODLE interface by the start of the academic term. Test-type written (Moodle based) classroom exam of the entire semester curricula at week 14 (according to semester schedule), opportunity for correction: week 1 of exam period. Exam schedule to be disclosed during the first contact class. Duration 45 mins/40 test type questions incl. true/false, simple choice, multiple correct answer quiz question. Min. 50% is required to pass (test results+incentive for attendance). Detailed technical information and test tutorial will be shared on Moodle.

Assoc. Prof. András Inotai

Form of the semester-end examination: practical examination/the assessment of completing project work

Test-type written (Moodle based) classroom exam of the entire semester curricula at week 14 (according to semester schedule), opportunity for correction: week 1 of exam period. Exam schedule to be disclosed during the first contact class. Duration 45 mins/40 test type questions incl. true/false, simple choice, multiple correct answer quiz question. Min. 50% is required to pass (test results+incentive for attendance). Detailed technical information and test tutorial will be shared on Moodle.

Test result (%)	Pharmacy students (obligatory)	Medical students (elective)
87.5-100	5 (excellent)	Distinction
75-87.49	4 (good)	Distinction
62.5-74.99	3 (average)	Merit
50-62.49	2 (satisfactory)	Merit
0-49.99	1 (unsatisfactory)	Fail

List of teaching materials: slide decks and audio recordings of the classes (available throughout the semester), obligatory and recommended reading materials, test tutorial for the entire semester curricula. All materials are uploaded to Moodle and assigned to be-weekly classes.

Scientific, course related research, publications, essays:

slide decks and audio recordings of the classes (available throughout the semester), obligatory and recommended reading materials, test tutorial for the entire semester curricula. All materials are uploaded to Moodle and assigned to be-weekly classes.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

The course description was prepared by:

8. SEMESTER 2022/2023/2

Subject	Lecture (hour/week)	Practice (hour/week)	Credit	Prerequisites	Exam type
Industrial pharmaceutical Technology (theory) II. GYVGYI185E2A	2	–	2		examination
Pharmacology and Toxicology (practice) II. GYKGYH086G3A	–	2	2	Pharm. and Tox. I. Pharm. Techn. III. Basic Med. Pathop. I.	practical mark
Pharmacology and Toxicology (theory) II. GYKGYH086E3A	3	–	4		final*
Pharmaceutical Technology (practice) IV. GYKGYI126G4A	–	8	4	Pharmaceutical Technology III.	practical mark
Pharmaceutical Technology (theory) IV. GYKGYI126E4A	2	–	5		final*
Pharmacy Administration (practice) I. GYKEGY254G1A	2	2	4	Basics of Pharmacoec. Hist. of Scienc.and Prop. Pharm. Techn. III.	practical mark
Phytotherapy (theory) GYKFMG092E1A	2	–	2	Pharmacognosy II.	examination
Pharmaceutical management (theory) GYKEGY255E1A	1	–	1	Introduction to Pharmacoeconomics	examination
Pharmaceutical management (practice) GYKEGY255G1A	–	1	1	Introduction to Pharmacoeconomics	practical mark
Public Health (practice) GYKNEI091G1A	–	2	2	Basic Medical Pathophysiology I.	practical mark
Public Health (theory) GYKNEI091E1A	2	–	2		examination
Physical Education VIII. GYKTSI116G8A	–	1	–	–	signature
Diploma Work I. GYKSZD094G1A	–	4	–	Passing all examinations and finals of the 7th semester	signature
Elective or obligatory elective subjects	–	–	–		examination or practical mark
Total:	14	20	29		

Pharmacology and Toxicology (theory) III., Pharmacology and Toxicology (practice) III.

For details on this subject please contact the department or visit their website.

Pharmacy Administration (practice) II., Pharmacy Administration (theory) II.

Pharmacy Administration (practice) II.

Full (Hun) name of the subject: Gyógyszerügyi ismeretek (gyakorlat) II
Program: Undivided program (pharmaceutical)
Schedule: full time

Short name of the subject:
English name of the subject: Pharmacy Administration (practice) II
German name of the subject: Pharmazeutische Administration (Praktikum) II

Type of registration: obligatory/obligatory elective/elective/
criteria requirement

Neptun code of the subject: GYKEGY090G2A, GYKEGY090E2A

Responsible Department: University Pharmacy, Department of Pharmacy Administration

Responsible tutor Dr. Romána Zelkó professor, Ph.D., [D.Sc.](#)

Contact:

telephone: 2170-927

e-mail: zelko.romana@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Ágnes Mészáros associate professor, Ph.D., Dr. Habil

Dr. Adrien Kazsoki-Nochta lecturer, PhD

Class per week: 0 lecture(s)

2 practice(s)

Credit point(s): 2

Professional content, intent of acquirement and its function in order to implement the goals of the program:

It aims to provide an introduction to the different branches of pharmacy and the responsibilities of a pharmacist, by teaching professional skills required in the field of community and hospital pharmacy, as well as in the industry and the authority.

Short description of the subject:

In the course, the primary areas of pharmacy and the competencies of a pharmacist are examined. Topics include the necessary competencies and professional skills for drug dispensing, as well as administrative, legal, and management/quality management activities.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
8 semester	–	28	–	–	28	spring semester	–

Program of semester

Topics of theoretical classes (pro week): -

Pharmacy Administration (theory) II.

Full (Hun) name of the subject: Gyógyszerügyi ismeretek (elmélet) II
Program: Undivided program (pharmaceutical)
Schedule: full time

Short name of the subject:
English name of the subject: Pharmacy Administration (theory) II
German name of the subject: Pharmazeutische Administration (Vorlesung) II
Type of registration: obligatory/obligatory elective/elective/criteria requirement

Neptun code of the subject:

Responsible Department: University Pharmacy, Department of Pharmacy Administration
Responsible tutor: Dr. Romána Zelkó professor, Ph.D., D.Sc.
Contact:
telephone: 2170-927
e-mail: zelko.romana@semmelweis.hu

Name of the persons responsible for the teaching of the subject:
Dr. Ágnes Mészáros associate professor, Ph.D., Dr. Habil
Dr. Adrien Kzsoki-Nochta lecturer, PhD

Class per week: 2 lecture(s)
0 practice(s)
Credit point(s): 2

Professional content, intent of acquirement and its function in order to implement the goals of the program:

It aims to provide an introduction to the different branches of pharmacy and the responsibilities of a pharmacist, by teaching professional skills required in the field of community and hospital pharmacy, as well as in the industry and the authority.

Short description of the subject:

In the course, the primary areas of pharmacy and the competencies of a pharmacist are examined. Topics include the necessary competencies and professional skills for drug dispensing, as well as administrative, legal, and management/quality management activities.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
8 semester	28	–	–	–	28	spring semester	

Program of semester

Topics of theoretical classes (pro week):

1. Pharmaceutical research
2. Good Laboratory Practice - GLP
3. European Marketing Authorization I
4. Marketing of pharmaceuticals
5. Quality Management and GMP (I)
6. Therapeutic decision making; Pharmacist Prescribing
7. Risk assessment, the concept
8. Good Documentation systems
9. Questionnaire Design
10. Reliable information for the patient, "Healthy" Website
11. Medline, UpToDate, Micromedex
12. Fight against counterfeit Medicine
13. Hospital Pharmacy Management
14. Personal career management

Topics of practical classes (pro week): -

Schedule of consultations:

Course requirements

Prerequisites:

Pharmaceutical Technology III.,
Pharmacy Administration I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

According to the University's Study and Examination Regulations

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results: -

Requirements of signature:

Successful final exam.

Number and type of projects students have to perform independently during the semester and their deadlines: -

Type of the semester-end examination: final

Examination requirements:

Completely accessible on the Moodle platform.

Form of the semester-end examination: written examination

The possibility and conditions for offering grades: -

Scientific, related research, publications, essays:

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**

no

The course description was prepared by:

Dr. Mészáros Ágnes

Topics of practical classes (pro week):

1. Evidence-Based Medicine; Systematic reviews
2. Pharmacovigilance
3. European Marketing Authorization II and CTD
4. Drug information: safe medicine use, SMPC
5. GMP in practice (II).
6. GCP and related activities of the hospital pharmacist
7. Good Distribution Practice (GDP)
8. Good Pharmacy Practice 1 (GPP) the concept
9. Good Pharmacy Practice 2 (GPP) special dispensing situations
10. Risk assessment concerning drug manufacturing
11. About the EU concerning health care
12. Competition in Pharmacy Administration II.
13. Professional life after graduation
14. Test to obtain the practical mark

Phytotherapy (theory)

Full (Hungarian) name of the subject: Fitoterápia
Program: undivided program (pharmaceutical)
Schedule: full-time
English name of the subject: Phytotherapy
German name of the subject: Phytotherapie

Neptun code of the subject: GYKFMG092E1A

Type of registration: obligatory

Responsible Department: Semmelweis University, Department of Pharmacognosy

Responsible tutor: Ágnes Alberti associate professor, Ph.D.

Phone: 06-1/459-1500 / 55307

e-Mail: alberti.agnes@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Ágnes Alberti associate professor, Ph.D.
Eszter Riethmüller assistant professor, Ph.D.
Orsolya Csernák assistant professor, Ph.D.
Ida Fejős assistant professor, Ph.D.
Nóra Gampe assistant lecturer, Ph.D.
Csenge Anna Felegyi-Tóth, assistant lecturer, Ph.D.

Classes per week: 2 lecture(s)

Credit point(s): 2 credits

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the course is to acquaint pharmacy students with herbal drugs and medicines, dietary supplements and other preparations that can be used in rational phytotherapy: focusing on their composition, effects, methods of administration, indications for therapy, relevant pharmacological and clinical data, major side effects and interactions. It provides a basis for the selection of herbal medicines with traditional and well-established use in stand-alone or complementary therapy. It contributes to the assessment of herbs according to their real values, to the recognition of their importance in prevention and therapy.

Short description of the subject:

In the context of the subject, lecturers describe the relevant areas of indication in rational phytotherapy and the medicinal plants and plant-based preparations that can be used in them, including their active ingredients. The subject describes industrial / galenic preparations, tea blends and recipes containing medicinal plants. It presents the mechanisms of action revealed so far, the most significant synergistic effects, the possible side effects and interactions. It deals with the data of clinical studies, recommendations for use and dosing, and presents examples for herbal medicines and phytotherapeutic preparations from Hungary and other countries.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
8th semester	28	0	–	–	28	Spring semester	–

Program of semester

Topics of theoretical classes (pro week):

1. week: The place of phytotherapy in drug therapy. Characteristics and development of phytotherapeutic products.
2. week: Interactions of medicinal plants and their active substances. Phytotherapeutics and adverse drug interactions
3. week: Evidence of efficacy of phytotherapeutics, herbal monographs (EMA/HMPC, ESCOP, WHO, etc.).
4. week: Side effects of medicinal plants and their active ingredients, the role of the quality of phytotherapeutics in the occurrence of side effects.
5. week: Herbs and their preparations acting on the central nervous system.
6. week: Herbs and their preparations for upper respiratory diseases.
7. week: Herbal products acting on the digestive
8. week: Herbal products acting on the digestive tract
9. week: Herbs and metabolic syndrome.
10. week: Herbs and their preparations that act on the cardiovascular system
11. week: Phytotherapeutics for diseases of the urogenital system
12. week: Herbal anti-inflammatories and analgesics.
13. week: Herbs for skin and oral mucosa diseases.
14. week: Immunomodulatory and adaptogenic medicinal plants

Schedule of consultations: on demand

COURSE REQUIREMENTS

Prerequisites: Pharmacognosy II.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Based on the current Study and Exam Regulations

Requirements of signature: According to the current in STUDY AND EXAMINATION REGULATIONS

Number and type of projects students have to perform independently during the semester and their deadlines: -

Type of the semester-end examination: semi-final

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: oral examination

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments:

Topic list and lectures to be used for learning, requirements

1. The place of phytotherapy in drug therapy, categorization and specificity of phytotherapeutic preparations – lecture 1
2. Proof of the effectiveness of phytotherapy, herbal monographs – lecture 2

3. Side effects of herbs, inadequate quality as a possible source of side effects – lecture 3
4. Demonstration of synergistic and antagonistic interactions of phytotherapeutics with examples – lecture 3
5. Drug interactions of phytotherapeutics – lecture 4
6. Herbs acting on the central nervous system – lecture 5
St. John's wort
Valerian
Hop strobile
Lime flower
Passionflower herb
Lavander
Melissa leaf
Lemon verbena leaf
Eschscholziae herba
7. Herbs used to relieve the symptoms of upper respiratory tract diseases – lecture 6
Herbs used to relieve runny nose, nasal congestion: peppermint oil, eucalyptus oil
Herbs used to relieve sore throat: medical sage leaf, matricaria flower, Iceland moss, Ribwort plantain
Medicinal plants with diaphoretic effect: lime flower, elder flowers
8. Herbs used to treat cough – lecture 6
Herbs with antitussive effect: Iceland moss, ribwort plantain, marshmallow root, honey, mallow leaf and flower
Plants with expectorant effect: ipecacuanha root, ivy leaf, primula root, senega root, liquorice root, thyme, thyme oil, anise oil, peppermint oil, eucalyptus oil
For the treatment of both dry and productive: Iceland moss, ivy leaf
9. Herbs used in diseases of the gastrointestinal tract: appetite enhancers, antiemetics, stomachics, digestives, carminatives – lecture 7
Herbs used in the treatment of loss of appetite: gentian root, white wormwood, white horehound, bogbean leaf, centaury, holy thistle, ginger peppermint leaf, peppermint oil, caraway, bitter fennel fruit / fruit oil, matricaria flower
Herbs with antiemetic effect: ginger
Herbs with carminative effect: caraway fruit/fruit oil, bitter fennel fruit / fruit oil, peppermint leaves, peppermint oil, matricaria flower
10. Herbs used in diseases of the gastrointestinal tract: laxatives, constipatives – lecture 8
Herbs containing dietary fiber: psyllium seed, ispaghula husk, linseed
Herbs with laxative action: castor oil, frangula bark, cascara bark, senna leaflets, senna pod, rhubarb root, psyllium seeds and ispaghula husks, linseed
Herbs that can be used in the treatment of diarrhea: agrimony, green tea, black tea, psyllium seeds and ispaghula husks,
11. Herbs that can be used in the treatment of diseases of the hepatobiliary system – lecture 7
Herbs with cholagogue effect: artichoke leaves, holy thistle, turmeric rhizome
- Herbs with hepatoprotective action: milk thistle fruit, liquorice root
12. Herbs acting on the cardiovascular system; Herbs and metabolic syndrome – lecture 9
Herbs that affect the cardiovascular system: hawthorn leaf and flower and fruit, horse chestnut, butcher's broom, flavonoids, centella, ginkgo leaf
Herbs and metabolic syndrome: phytosterols, garlic
13. Herbs used in diseases of the genitourinary system – lecture 11
Herbs used in the treatment of urinary tract infections: bearberry leaf, American cranberry,
Diuretic herbs: goldenrod, birch leaves, equisetum stem, java tea, restharrow root, nettle, dandelion root, burdock root, couchgrass rhizome, juniper cone berry
Herbs used to relieve the symptoms of benign prostatic hyperplasia: sabal palm fruit, pumpkin seeds, pumpkin seed oil, nettle root, willow herb, rye pollen
Herbs used to relieve the symptoms of menopause: black cohosh, phytoestrogens
Herbs that can be used to relieve complaints before menstruation: agnus castus fruit
Herbs to relieve the symptoms of menstruation: shepherd's purse, yarrow, bitter fennel fruit
14. Herbal anti-inflammatories, herbs for use in musculoskeletal disorders – lecture 12
Hyperemic herbal preparations: peppermint oil, eucalyptus oil, rosemary leaf and oil, red pepper /red pepper extract, methyl salicylate
Analgesic herbs applied externally: comfrey root, calendula, arnica
Analgesic herbs used internally: willow bark, meadowsweet, devil's claw root, ash tree leaf, incense, turmeric rhizome
Herbs for the treatment of headache: peppermint oil, capsaicin, feverfew
15. Herbs that can be used in diseases of the skin and oral mucosa – lecture 13
Antiviral herbs: melissa leaf, greater celandine
Herbs used in the treatment of skin infections: tea tree oil, sage leaf, clove oil
Herbs with a wound healing effect: calendula, centella, matricaria flower and oil, yarrow, rose, St. John's wort, hamamelis leaf and bark, pansy
Herbs for the treatment of atopic skin: evening primrose oil, soy oil
Herbs that can be used for the care of oral mucosa: tea tree oil, calendula, matricaria flower
16. Herbs with immunomodulatory and adaptogenic effects – lecture 14
Herbs with immunomodulatory action: purple coneflower herb, geranium root
Herbs with adaptogenic effect: ginseng, eleutherococcus, golden root

The course description was prepared by: Dr. Ágnes Alberti

Pharmaceutical Technology (practice) IV., Pharmaceutical Technology (theory) IV.

Full name of the subject: GYÓGYSZER-TECHNOLÓGIA IV., GYÓGYSZER-TECHNOLÓGIA (gyakorlat) IV.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Pharm. Tech.
English name of the subject: Pharmaceutical Technology (theory) IV., Pharmaceutical Technology (practice) IV.
German name of the subject: Pharmazeutische Technologie IV.

Neptun code of the subject: GYKGYI249E4A (lecture); GYKGY-I249G4A (practice)

Type of registration: obligatory

Responsible Department: Semmelweis University, Department of Pharmaceutics

Responsible tutor: Dr. István Antal Professor, Ph.D., Habil.

Contact information:

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email: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Nikolett Kállai-Szabó Associate professor, Ph.D.

Dr. Krisztina Ludányi Associate professor, Ph.D.

Dr. Emese Bertalan-Balogh Senior lecturer, Ph.D.

Dr. Livia Budai Senior lecturer, Ph.D.

Dr. Mária Hajdú Senior lecturer, Pharm.D.

Dr. Miléna Lengyel Senior lecturer, Ph.D.

Dr. Borbála Dalmadi-Kiss Research scientist, Ph.D.

Dr. Dóra Farkas Assistant lecturer, Ph.D.

Dr. Andrea Kovács Assistant lecturer, Ph.D.

Dr. Nóra Mike-Kaszás Assistant lecturer, Ph.D.

Dr. Noémi Anna Niczinger Assistant lecturer, Ph.D.

Dr. Márton Király Assistant lecturer, Pharm.D.

Dr. Petra Szalkai Assistant lecturer, Pharm.D.

Classes per week: 2 lectures, 8 practices,

Credit point: 6 credits lecture, 4 credits practice

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the Pharmaceutical Technology course is to provide the student with the theoretical knowledge and practical skills necessary for the basic professional activity of a pharmacist, the preparation of pharmaceuticals.

Short description of the subject:

The subject covers the theoretical and practical knowledge required for the preparation of medicinal products. An overview of the history of pharmaceutical preparation. Pharmaceutical technology aspects of ensuring efficacy, quality requirements for the pharmaceutical formulation. Tasks and conditions of pharmaceutical preparation, basic operations. Individual (magistral) and factory production of pharmaceuticals. Aspects, excipients, quality requirements for formulation of medicinal products. Identification and resolution of possible incompatibilities of ingredients, compatibility, stability.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
8 th semester	28	112	-	-	140	Spring semester	-

Program of semester

Topics of theoretical classes (pro week):

- Development of solid pharmaceutical forms, solid state characterization I. Excipients.
- Particle systems, granules
- Capsules
- Tablets I.
- Tablets II.
- Coating
- Modern dosage form design: testing and evaluation of drug release profile; modified drug release; tablets
- Modern dosage form design: improvement of dissolution and solubility
- Modern dosage form design: transdermal and other therapeutic systems.
- Molecular pharm. tech. microfabrication, nanotechnology, delivery of biopharmaceuticals Liposomal preparations.
- Formulation of biological drugs.
- Modern dosage form design: the role of the quality of excipients; patient-centered drug release systems
- Pharmaceutical technology and quality assurance. Quality by Design, PAT, nondestructive analysis
- Radiopharmaceuticals. Other preparations. Medical aids.

Topics of practical classes (pro week):

Pilot practices

- Production of solutions on an industrial scale, testing
- Production of ointments on an industrial scale, testing*
- Production of suppositories on an industrial scale, testing*
- Aspects of evaluation of dissolution tests, methods of comparing profiles

- Production of granules, testing*
- Production of pellets, testing*
- Production of tablets, testing*
- Production of coated dosage forms, testing*
- Digital technology (3D printing)

Parenteral practices

- Preparation, IPC testing of injections*
- Study and testing of membrane filters*
- Isotonization*
- Study and tests of aerosols
- Study and tests of foams
- Ampule filling, closure
- Lyophilization

Chemical practices

- Study of the interaction of methyl p-hydroxybenzoate (methylparaben) and macromolecules
- Maillard reaction: interaction between primary and secondary amines (caffeine) and lactose
- HPLC study of Ciprofloxacin containing film-coated tablet in milk (SPE sample preparation)
- Hydrolytic resistance testing of pharmaceutical vials
- Quality testing of plastic containers
- Examination of extractable and leachable compounds: determination of ethyl 3-ethoxy propionate from the preparation/ packaging material
- Identification of potentially leachable and/or extractable substances
- Method validation: precision, determination of linearity range (for E&L testing)
- Measurement validation: accuracy, specificity, limit of detection (for E&L test)

Physical practices

- Determination of slip point and dropping point for suppository vehicles and ointment bases
- Examination of the compression strength and disintegration time of suppositories; Studies on vehicles of ointments and suppositories with penetrometry
- Softening point determination of ointments and suppository vehicles; Determination of the congealing point of vehicles
- Study of the temperature dependence of viscosity
- Homogeneity of active ingredient distribution in suppositories*
- Examination of drug release from suppositories
- Preparation of suppositories by the Münzel method and their pharmacopoeial control tests
- Statistical evaluation of uniformity of mass of single-dose uncoated capsules*
- Examination of polymorph crystals
- Examination of drug release from tablets in the presence of activated charcoal
- Determination of the real density of granules; Examinations of granules and powders*
- Factors affecting the drug release of pharmaceutical dosage forms in connection with the application*

Completion of the practices marked with an asterisk is a condition of signature. In the case of absence from other practices, an oral report must be made by arrangement.*

Schedule of consultations: Upon request, individually.

Prerequisites: Pharmaceutical technology III.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

- Meet at least 75% attendance and participation requirement per lab for practical sessions
- In the event of late arrival (10 minutes) the practice can only be started with the permission of the teacher. Further guidelines are provided by the Study and Examination Regulations.
- Completion of the exercises marked with an asterisk* in the practical topics is a prerequisite for signature.
- In case of absence, complete the exercise in the make-up exercises. Make-ups are recommended, as the material is part of both the written reports, the semi-final and the final examination. In case of non-completion of the exercises not marked with an asterisk, an oral report of the practical material must be given by arrangement.
- Due to failure to meet the attendance requirements, the responsible tutor determines the conditions of the signature and the order of the possibility of making up.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

	Expected date	Expected date for retake 1	Expected date for retake 2
1st midterm	week 6	week 7	1st week of exam period
2nd midterm	week 12	week 13	1st week of exam period

The written tests include the material of the practices, including the calculations. In the case of a rewrite, the result of the rewrite will override the result of the previous assessment.

The practical grade is determined based on the average of the % result of the midterms as follows:

90.00-100%	excellent (5)
80.00-89.99%	good (4)
65.00-79.99%	fair (3)
50.00-64.99%	pass (2)
0-49.99%	fail (1)

Requirements of signature:

- To obtain a signature the student must attend at least 75% of the practical sessions.
- Complete the practices marked with an asterisk* in the practical topics.
- From the 6 pop tests at least 5 must be written and min. 50.00% must be reached in each laboratory.
- The student must achieve a minimum of 50.00% individually in each of the two midterms.
- The 4 moodle calculation tests must be successfully completed by the end of the semester (December 18, 2023, 12.00).
- Completion of project works.

Type of the semester-end examination:

Lecture: final*

Practice: practical grade

EXAMINATION REQUIREMENTS:

Theoretical topics:

- Quality requirements, principles and control methods for medicinal products (e.g. Ph.Hg. VIII General Chapters 1. Principles and 2. Importance of analytical methods).
- Preformulation and formulation, aspects of formulation development. Salt selection, importance of polymorphic and amorphous materials, structure analysis, biopharmaceutical aspects.

- Importance of compatibility, testing. Physical and chemical incompatibilities in pharmaceutical technology.
- Production of stable pharmaceutical formulation, drug stability and testing. Unwanted physical, chemical, microbiological changes during shelf life of drugs. Options for stabilisation.
- Preparatory and basic operations in the manufacture of pharmaceuticals, significance.
- Particle size: significance, reduction, testing.
- Packaging, packaging materials. Testing.
- Technical fundamentals of pharmaceutical manufacturing, scale-up, in-process control, critical quality characteristics and process parameters.
- Technological aspects of pharmaceutical manufacturing and quality, conditions. GMP, authorised person. planned quality (QbD). process analytical technology (PAT).
- Preparation and testing of solution preparations.
- Emulsion preparation and quality control (HLB concept, surfactants).
- Preparation and quality control of suspensions.
- Extraction operation, preparation and testing of a preparation containing extracts.
- Preparation and quality control of ophthalmic, otological and nasal preparations.
- Preparation and testing of sterile preparations (aseptic drug preparation, clean room and isolation techniques, sterilisation, pyrogen-free, parametric release).
- Formulation of injections, parenteral additives.
- Formulation of infusions, large volume parenteral preparations.
- Preparation and quality control of rectal and vaginal preparations. Medicinal sticks.
- Manufacturing and quality control of dermal formulations.
- Preparation and quality control of inhalation formulations, aerosols.
- Preparation and quality control of powders, granules for ingestion.
- Preparation and quality control of pharmaceutical pellets. Medicinal chewing gum.
- Preparation and quality control of capsules.
- Preparation and quality control of tablets.
- Production and quality control of film-coated formulations.

- Modified release formulations. Pharmaceutical technology options and testing of drug delivery. Patient-centric drug delivery systems.
- Manufacturing and quality control of transdermal formulations.
- Production and quality control of enhanced bioavailability formulations (dissolution and absorption promotion, solubilisation, complexation).
- Preparation and quality control of colloidal nanoparticle delivery systems.
- Formulation aspects and quality control of biological drug formulation.
- Modern dosage forms:
 - Inhalation powder, pre-dispensed
 - Dragee
 - Gene-therapy medicine (infusion solution)
 - Gastroresistant hard capsule
 - Gastroresistant tablet
 - Inhalation powder, hard capsule
 - Injection
 - Concentrate for solution for infusion
 - Soft capsule
 - Modified-release film-coated tablets
 - Solution for infusion
 - Solution for injection
 - Nasal spray solution
 - Nasal drops
 - Osmotic, retard film-coated tablet
 - Prolonged release tablet with pellets
 - Powder and solvent for solution for injection
 - Powder and solvent for prolonged-release suspension for intramuscular injection
 - Powder for dispersion for infusion (albumin nanocarrier)
 - Prolonged-release film-coated tablet
 - Prolonged-release hard capsule
 - Retard tablets
 - Orodispersible granules
 - Orodispersible tablet
 - Sublingual spray
 - Eye drops, solution
 - Suspension for injection
 - Suspension for injection in cartridges
 - Transdermal patch
 - Pressurised suspension for inhalation

Calculations, practical knowledge, excipients and definitions:

as published by the department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: combined examination
Practical examination (assessment on a five-point scale)

Written part:

- Calculation (assessment on a two-point scale: pass/fail)
- Excipients (assessment on a five-point scale)

Oral part:

- Theoretical topic (assessment on a five-point scale)
- Definition (assessment on a two-point scale: pass/fail)
- Modern dosage form (assessment on a five-point scale)

The possibility and conditions for offering grades:

Exemption from subsections or partial grade may be offered for certain parts of the examination based on the mid-semester performance in the following ways:

Practical examination: Partial grade can be offered in two ways: either by achieving an outstanding result in the student competition, or by meeting the following conditions:

- Excellent (5) grade is offered if:
 - o the practical grade in the previous semester is 5 AND
 - o the result of the pop-tests in the 2nd semester is at least 90.00%.
- Good (4) grade is offered if:
 - o the practical grade in the previous semester is at least 4 AND
 - o the result of the pop-tests in the 2nd semester is at least 80.00%.

Definitions: At the lectures, there will be a non-obligatory short assessment ("slip") of the knowledge presented that day, which results in exemption from the definition subsection of the oral part if the student completes at least 75%.

Calculation: If the student completes 5 of the 6 slips correctly in the lectures of week 2-7, the calculation can be passed early, on week 8.

Excipients: Based on the performance in the related 45-minute consultations.

Scientific, course related research, publications, essays:

The lecture materials, the supplementary material for the excipients and the practical work are available in electronic form on Moodle.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: on an individual assessment basis

The course description was prepared by: Dr. István Antal

Public health

Full (Hun) name of the subject: Népegészségstan
Program: Undivided program (pharmaceutical)
Schedule: full-time

Short name of the subject:
English name of the subject: Public Health
German name of the subject: Gesundheitslehre

Type of registration: obligatory/obligatory elective/elective/criteria requirement

Neptun code of the subject: GYKNEI091E1A, GYKNEI091G1A

Responsible Department: Semmelweis University, Institute of Preventive Medicine and Public Health

Responsible tutor: Ferenc Horváth MD assistant lecturer
Contact information: 1089 Budapest, Nagyváradi tér 4. 13. em
phone: +36-20-825-0596
email: horvath.ferenc@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

András Terebessy senior lecturer, PhD
 Ferenc Horváth assistant lecturer
 Vince Pongor senior lecturer, PhD
 Dorottya Árva clinical physician, MD
 Norbert Dósa resident, MD
 Dávid Major clinical physician, MD
 Kata Pártos resident, MD
 Noémi Mózes senior lecturer, PhD
 Anna Péterfi resident, MD
 Eszter Suskó resident, MD
 Boglárka Csík resident, MD

Class per week: 2 hours lectures
 2 hours practices

Credit point(s): 4

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Acquire skills in qualitative assessment of different epidemiological studies, comprehensive and comprehensible reading of the scientific evidence-based literature. Acquire basic statistical skills. Design and conduct research, choosing the most appropriate epidemiological methods. Conducting individual health promotion based on key life-style factors and learning the basics of community health promotion. Apply practical knowledge of epidemiology and infection control.

Short description of the subject:

Public health deals with issues affecting human health at the population level. As an applied science, its basic aim is to preserve and improve health and prevent disease. To achieve these objectives, public health integrates several disciplines. Epidemiology introduces students to the prevention of communicable diseases, with a particular focus on infection control. Classical public health describes the role of environmental factors in the development of disease, the clinical aspects of which are nowadays dealt with in environmental medicine. The main aim of occupational medicine is to protect the health of employees by preventing occupational diseases. Our professional background is strengthened by the fact that our Institute merged with the Department of Occupational and Environmental Medicine of the University in 2010. In addition to disease prevention, the idea of health promotion was pioneered in the second half of the 20th century with the formulation of the "new public health". Our aim is to enable future pharmacists to carry out individual health promotion and to be familiar with the concept of community health promotion. For all these activities, the acquisition and use of epidemiology as a methodology of public health is essential. Our aim is to familiarize students with the application of health promotion and prevention at the population and individual level, preparing them for practice.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
8 th semester	28	28	-	-	56	Spring semester	-

Program of semester

Topics of theoretical classes (pro week):

Week 1: History of Hungarian medicine/public health. Definition of health, levels of prevention. Theoretical foundations of health promotion. The concept and functioning of public health

Week 2: Health determinants. Health status of the Hungarian population. Health determinants in Hungary. Principles of health policy

Week 3: Epidemiology and prevention of smoking and smoking-related diseases

Week 4: Epidemiology and prevention of cardiovascular diseases. Epidemiology and prevention of cancer

Week 5: Epidemiology and prevention of respiratory diseases. Thyroid diseases. Vulnerable groups

Week 6: Mental health. Ageing

Week 7: Obesitas//Diabetes. Physical activity

Week 8: Epidemiology of communicable diseases. Vaccinations

Week 9: Infection control. Nosocomial infections

Week 10: Nutritional status and dietary habits of the Hungarian population. Food safety

Week 11: Environmental health: climate change, environmental health effects of air. Environmental health: soil, water

Week 12: Chemical safety and toxicology. Ionising radiation, types, effects, limits

Week 13: Occupational health. Maternal, infant, child and adolescent health, health inspector network and school health

Week 14: Structure, financing and administration of health and public health in Hungary. Health policy. Quality assurance and quality improvement in health care

Topics of practical classes (pro week):

Week 1: Introduction. Demography

Week 2: Epidemiology. Morbidity measurement (incidence, prevalence). Risk and causality (risk indicators). Epidemiological study types (descriptive studies, analytical studies: cross-sectional, cohort, case-control)

Week 3: Screening tests (population) for public health purposes. Evaluation of screening tests (sensitivity, specificity, predictive values, ROC curve)

Week 4: Interventional studies (RCTs). Meta-analyses. Critical reading

Week 5: Design, organisation and evaluation of health promotion programmes.

Week 6: Smoking and minimal intervention

Week 7: Alcohol SBI (screening and brief intervention)

Week 8: Physical activity/movement recommendations.

- Week 9: Mental health, mental hygiene. Prevention of illicit drug use
- Week 10: Preparing an individual health plan
- Week 11: Epidemiological concepts. Epidemiology system. Epidemiological investigation
- Week 12: Practical knowledge of vaccination
- Week 13: Case studies in environmental and occupational health
- Week 14: Consultation

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

Schedule of consultations: if necessary, in agreement with the teacher

COURSE REQUIREMENTS

Prerequisites: Basic Medical Pathophysiology II., Dietetics

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:
TVSZ Section 29 (2)

A prerequisite for obtaining the signature is that the student:
a) meets the attendance requirement of at least 75% at practical sessions and seminars. In the case of 14 practical sessions, this means attending at least 11 sessions (the 3 'permitted' absences do not need to be justified). Missed sessions can be made up by attending another session held in the same week.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Section 29 [The Signature]

- (1) For courses ending with an exam, a prerequisite for being allowed to take the exam is obtaining the "signed" (aláírva) signature entry by the end of the academic term or, at the latest, by the end of the first week of the examination period.
- (2) The conditions for obtaining the signature are that the student:
 - a) meets the attendance requirement of at least 75% at practical classes and seminars, and
 - b) fully participates in the academic performance assessments during the semester, or in their make-up opportunities, according to the general rules for retakes, on no more than two occasions.

Type of the semester-end examination: comprehensive examination

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment): as published by the education-research department on the MOODLE interface by the start of the academic term

Demography. Epidemiology. Epidemiology of Non-Communicable Diseases. Social Medicine

1. The concept of demography, data sources. Characteristic demographic data of Hungary. Population pyramid, vital statistics (natality, mortality, fertility, reproduction), migration. Crude, specific and standardized rates. Standardization.
2. Mortality analyses in the field of premature mortality (avoidable mortality, excess mortality, years of potential life lost). Mortality in old age. Mortality analyses in maternal, infant and women's health (infant mortality, perinatal mortality, fetal losses, maternal mortality). International comparison of life expectancy indicators.

3. The concept and scope of epidemiology. Measurement of epidemiological phenomena (incidence and prevalence, case fatality, risk indicators). Descriptive epidemiological studies. Analytical epidemiological studies (case-control, cohort studies). Experimental epidemiology (clinical experimental studies).
4. Types of screening tests. Criteria for organized screening programs. Characteristics of screening methods (sensitivity, specificity, positive predictive value, negative predictive value).
5. Tools for monitoring morbidity (routine statistics, population surveys, general practitioner morbidity monitoring, reporting of infectious diseases). Data sources.
6. Epidemiology and prevention of cardiovascular diseases.
7. Epidemiology and prevention of cancers (excluding colorectal cancer).
8. Epidemiology and prevention of obesity and diabetes mellitus.
9. Epidemiology and prevention of musculoskeletal diseases (osteoporosis).
10. Epidemiology and prevention of respiratory diseases (asthma, allergic rhinitis, COPD).
11. Epidemiology and prevention of gastrointestinal diseases (peptic ulcer, liver cirrhosis, colorectal cancer).
12. Epidemiology and prevention of mental disorders (depression, anxiety disorders, schizophrenia, Alzheimer's disease). Suicide.
13. Definition and tasks of preventive medicine and public health. The public health cycle and its operation. Definition of health. Determinants of health. Levels of prevention. Prevention in primary health care. Basic principles of health policy.
14. Concept of health promotion, its key documents, basics of health promotion programs. Aspects of planning, implementing, and evaluating health promotion programs.
15. Epidemiology of smoking, types of tobacco products, effects of smoking on health and health care. Minimal intervention for smoking cessation.
16. Smoking prevention: prevention of initiation, promotion of cessation, protection of non-smokers. Methods of supporting smoking cessation.
17. Public health significance of alcohol consumption and alcoholism.
18. Public health aspects of illicit drug use.
19. Maternal and infant health protection. Prevention of congenital anomalies. Population policy.
20. Child and youth protection, school health.
21. Public health significance of physical activity.
22. Health status and health care of vulnerable (disadvantaged) populations. Geriatric hygiene.
23. Great figures in the history of Hungarian public health (Ignác Semmelweis, József Fodor, Béla Johan).

Epidemiology of Infectious Diseases. Environmental Health, Occupational Health, Toxicology, Food and Nutrition Hygiene

24. General epidemiology of infectious diseases, basic epidemiological concepts. Epidemiological situation in Hungary and worldwide. Epidemiological measures in case of infectious diseases.
25. Infection control. Healthcare-associated infections. Sterilization, disinfection.
26. Vaccinations and vaccines. Vaccination schedule. Mandatory and recommended vaccinations in case of disease risk. Preventive epidemiological measures related to international travel. Occupational vaccinations. Tasks of the vaccinating physician.
27. Epidemiology of respiratory infectious diseases I (TB, diphtheria, pertussis, Haemophilus influenzae meningitis, scarlet fever, invasive meningococcal disease, legionellosis).
28. Epidemiology of respiratory infectious diseases II (mumps, measles, rubella, influenza, chickenpox, infectious mononucleosis).
29. Epidemiology of enteric infectious diseases I (typhoid fever, paratyphoid fever, dysentery, E. coli gastroenteritis, yersiniosis, campylobacteriosis, cholera).
30. Epidemiology of enteric infectious diseases II (viral gastroenteritis, polio, protozoan infections, helminth infections).
31. Foodborne toxicoinfections (salmonellosis, staphylococcosis, Bacillus cereus toxicoinfection, Clostridium perfringens toxicoinfection, botulism).
32. Epidemiology and prevention of viral hepatitis.
33. Epidemiology of hematogenous and lymphogenous diseases (relapsing fever, epidemic typhus, Lyme disease, tick-borne encephalitis, malaria, yellow fever, plague).

34. Epidemiology of diseases transmitted through the skin (tetanus, gas gangrene, toxic shock syndrome, trachoma, trichomoniasis, strongyloidiasis, hookworm disease, pediculosis, scabies).
35. Sexually transmitted infections (syphilis, gonorrhea, Herpes simplex, HIV/AIDS).
36. Zoonoses (leptospirosis, brucellosis, tularemia, anthrax, listeriosis, Q fever, ornithosis, rabies, lymphocytic choriomeningitis, West Nile fever, viral hemorrhagic fevers, toxoplasmosis, taeniasis, echinococcosis, trichinellosis, prion diseases).
37. Human ecology, human activities and ecosystems, environmental protection. Water hygiene: water resources, drinking water, bathing water, surface waters.
38. Air hygiene: air pollutants and their significance (smog-forming agents, chlorinated and polychlorinated compounds, PAHs, lead, asbestos, pollen). Types of smog. Indoor air pollutants.
39. Soil hygiene, disposal of solid and liquid wastes, disposal of hazardous wastes.
40. Types and sources of ionizing radiation, main dose units, radiation and tissue weighting factors. Deterministic and stochastic effects of radiation. Methods of protection against ionizing radiation. Population and occupational dose limits. Public health aspects of ultraviolet radiation and non-ionizing electromagnetic radiation.
41. Concept of occupational disease and increased exposure, possibilities for prevention. Work-related illnesses. Structure of occupational health care.
42. Physical harmful factors. Noise-induced hearing loss. Vibration. Work under high atmospheric pressure. Effects of extreme temperatures in the workplace on health.
43. Dust hazards: silicosis, asbestosis, coal workers' pneumoconiosis, foreign body type pulmonary fibrosis, plant dusts.
44. Ergonomic harmful factors. Display screen workplaces. Psychosocial harmful factors.
45. Occupational cancers.
46. Basic concepts of chemical safety and toxicology (classification of substances by toxicity, dose, fate of poisons in the body, types of poisoning, toxic effects, interactions). Risk assessment.
47. Detailed toxicology. Toxicology of metals and their compounds (lead, mercury, cadmium, chromium, nickel, arsenic). Plastics and their solvents (acrylamide, acrylonitrile, phenol, formaldehyde, TCP, vinyl chloride).
48. Detailed toxicology. Pesticides (organophosphates, pyrethroids, dithiocarbamates, phenoxy-carboxylic acid derivatives, carbamates). Gases (ethylene oxide, fluorine and hydrogen fluoride, phosgene, freons, hydrogen cyanide, hydrogen sulfide, sulfur oxides, chlorine gas, nitrogen oxides, carbon dioxide, carbon monoxide).
49. Detailed toxicology. Persistent environmental chemicals. Organic solvents.
50. Basic concepts of nutrition. Nutritional requirements, dietary reference intakes. Assessment and evaluation of nutritional status. Principles of healthy eating.
51. Forms of malnutrition. Protein-energy malnutrition (PEM). Types and characteristics of eating disorders. Iron and iodine deficiency. Vitamin deficiencies.
52. Naturally occurring and inherent harmful compounds. Food contaminants (technological, pesticide residues, environmental contaminants). Food additives and their hygienic assessment. Food safety, HACCP. Hygiene in public catering.
53. Quality assurance and quality improvement in health care.
54. Basics of health insurance and health care financing. Organization and financing of the Hungarian health care system.

Form of the semester-end examination: oral examination

The possibility and conditions for offering grades:

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:

Public health e-learning material (<https://itc.semmelweis.hu/moodle/>)

The course description was prepared by:
Ferenc Horváth MD

Physical Education VIII.

Full name of the subject: Testnevelés VIII.
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: PE VIII.
English name of the subject: Physical Education VIII.
German name of the subject: Sport VIII

Neptun code of the subject: GYKTSI116G8A
 Type of registration: obligatory
 Responsible department: Semmelweis University, Physical Education and Sports Center

Responsible tutor: Várszegi, Kornélia director
Contact information:
Phone: +36-20/825-0611
E-Mail: varszegi.kornelia@semmelweis-univ.hu

Name of the persons responsible for the teaching of the subject:
 Kalmus, Dániel P.E. teachers
 Katona, László hiking, badminton, boulder trainer
 Lehel, Zsolt P.E. teachers
 Weisz, Miklós P.E. teachers
 Doharné Buczkó Anikó P.E. teachers
 Farkas Dominika P.E. teachers
 Kovács Imre tennis trainer
 Balogh Orsolya aerobic and zumba trainer

Dr. Herbert – Minkó Krisztina yoga trainer
 Tóth Balázs dance, zumba, salsa trainer
 Kiss Valéria Bless You Gym trainer
 Szeredás Bálint ultimate frisbee trainer

Kunos Gábor hiking trainer

Classes per week: 1 practice
 Credit point: 0

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

Short description of the subject:

Upon completion of the course the student will be able to carry out regular physical activity.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
8	0	14			14	Spring semester	

Topics of practical classes (pro week):

Within the framework of obligatory regular physical activity, the requirements of the subject can be fulfilled as free of charge and self-financed student as well. The former is available during classes and courses organized by the Semmelweis University's Centre for Physical Education and Sports (TSK), and the latter is available at SE-TSK accredited partner locations.

Free of charge:

60 minute classes held at the same time on a weekly basis, on the premises of the TSK facilities and other locations.
 1107 Bp, Zággrábi utca 14.

1x60 min./week sessions:

Aerobics, BlessYou Gym, boulder, functional circuit training, golf, beginner Yoga, male football, salsa, step aerobics, badminton, beginner ultimate Frisbee, advanced ultimate Frisbee, Zumba
 1 x 90 mins./week sessions: women's football, ice hockey, beginner tennis, beginner tennis 2,
 4 x 3 hrs. and 1x 2 hrs. session packages: Hiking 1, Hiking 2.
 2x90 mins./week sport training (competitive sport, for qualified only): cheer dance, cheerleader, men's football, handball, basketball, volleyball

Fee-based:

at the sports venues specified on www.semmelweis.hu/sportkozpont, which will also be advertised on the Neptun system. The list of these locations may vary per school year.

Prerequisites:

Prerequisites Physical Education II, IV. and VI.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The number of active participations for physical education classes is 10 (once a week), regardless of the number of school breaks, which is to be completed during the hours assigned to the group. Two hours can be recovered in the first week of the exam period, on two separate days. Lessons missed do not need to be certified; however, catching up is mandatory. The days of study breaks do not qualify as automatic attendance. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Except for the Sport Hiking courses, where you have to attend 4 times due to blocking. 3 of these are on your own course and 1 can be made up by arrangement with the instructor!

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Requirements of signature:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

Type of the semester-end examination: signature

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

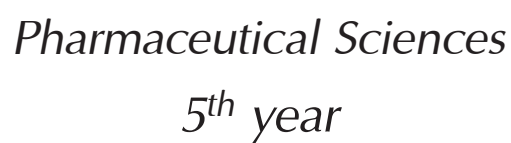
1. **whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate**
- or
2. **does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.**

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: yes

If you have not completed the course you may be readmitted in the 9. semester of this academic year.

The course description was prepared by: Kornélia Várszegi

Curriculum of the credit-based training for fifth year students in the 2024/2025 academic year



9th-10th semester

9. SEMESTER

Subject	Lecture (hour/ week)	Practice (hour/ week)	Credit	Prerequisites	Exam type
Obligatory Practice Before the Board Exam (2 months) I. GYKANG133G1A	–	40	8	Pharmacology and Toxicology III., Pharmaceutical Technology IV., Pharmacy Administration II.	practical mark
Drug Therapy (theory+practice) GYKGYH250E1A	2	3	4	Pharmacology and Toxicology III., Pharmaceutical Technology IV., Phytotherapy	semi-final
Pharmaceutical Care (theory+practice) GYKEGY096E1A	2	3	4	Pharmacology and Toxicology III., Pharmaceutical Technology IV.	semi-final
Clinical Pharmacokinetics and Biopharmacy (theory+practice) GYKGYI251G1A	2	3	3	Pharmacology and Toxicology III., Pharmaceutical Technology IV.	semi-final
Pharmaceutical Communication and Integrated Consulting (theory+practice) GYKMAG098G1A	1	2	2	Pharmacology and Toxicology III., Pharmacy Administration I.	practical mark
Pharmaceutical Informatics (theory+practice) GYKDEIO99G1A	1	1	1	Pharmacy Administration I. Pharmaceutical Technology IV.	practical mark
Pharmaceutical management (theory+practice) GYKEGY093E1A	1	1	2	Pharmacoeconomics	semi-final
Clinical Pharmaceutics (theory+practice) GYKEGY100E1A	1,2	1,2	1	Pharm. and Tox. III. Pharm. Techn. IV.	semi-final
Pharmaceutical Ethics and Sociology (theory+practice) GYKMAG101E1A	1	1	1	Pharmacology and Toxicology III., History of Pharmaceutics and Prop.	semi-final
Diploma Work II. GYKSZDI32G2A	–	5	–	Diploma Work I.	signature
Physical Education IX GYKTSII16G9A	–	1	–		signature
Drug Licensing (theory+practice) GYKGYII02G1A	12/sem.	12/sem.	1	Pharmaceutical Technology IV. Pharmacy Administration I.	practical mark
Pharmacovigilance and pharmacoepidemiology (theory+practice) GYKGYII03G1A	4/sem	4/sem	1	Pharmacology and Toxicology III.	practical mark
Quality Assurance (theory+practice) GYKGYII04G1A	4/sem	4/sem	1	Pharmaceutical Technology IV. Pharmacy Administration I.	practical mark
Drug innovation and clinical studies (theory+practice) GYKGYII05G1A	8/sem	8/sem	1	Pharmacology and Toxicology III. Pharmaceutical Technology IV.	practical mark
Total:	11,2	21,2	30		

Drug Therapy (theory+practice)

For further information contact directly with the Department.

Pharmaceutical Communication and Integrated Consulting (theory+practice)

Complete name of the course: Gyógyszerészi kommunikáció és integrált tanácsadás

Name of the Programme: Pharmacy Basic Education

Abbreviated name of the course: Pharmaceutical Communication

English name of the course: Pharmaceutical Communication and Integrated Consulting (theory+practice)

Neptun-Code: GYKMAG098G1A

Type of registration: obligatory

Institute: Institute of Behavioural Sciences of Semmelweis University

Name of the tutor/lecturer: Dr. Pilling János PhD, Associate professor

Phone: +36 (1) 2102930/56457

E-Mail: pilling.janos@med.semmelweis-univ.hu

Further tutors: **Zsófia Hídvégi** Psychologist, assigned lecturer

Karolina Szabó Psychologist, assigned lecturer

Number of classes /week: 1 (lecture)+ 2 (practice)

Credit points: 2

Professional content, the intent of acquirement, and its function in order to implement the goals of the program:

- to teach basic skills to improve pharmacists' communicational techniques of information gathering, active listening, and patient education

- improving skills, which can help to handle difficult communicational situations, such as coping with angry, aggressive patients, intimate questions, etc.
- to teach and practice communication techniques that can improve the success of pharmaceutical work, i.e. team, marketing, and assertive communication

Short description of the subject:

The education will be interactive and practical. In the first part of the semester students will get familiar with the basic concepts of pharmaceutical communication with a special focus on information delivery, patient education, active listening, and empathy. Risk communication and shared decision making will be also covered, such as improving compliance and promoting lifestyle changes. The second part of the semester will cover the possible coping strategies with communicational challenges in pharmaceutical practice such as handling tense, hostile patients, communication about intimate topics (menstruation, sexuality, stigmatizing disorders etc.), communication with patients from different age-groups. Students will learn communicational techniques to handle patients with mental health disorders such as anxiety, depression, suicidal ideation, alcohol/drug addiction, and psychosis. At the end of the semester marketing communication skills and team communication techniques will be the main focus of the seminars.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lecture	Total number of contact hours/ semester	Semester	Consultation
9	10	20	–	–	30	autumn	–

Semester program

I. Lecture topics/week

1. week: Role of communication in pharmaceutical practice. Active listening and empathy.
2. week: Communication difficulties and possible solutions of patient education. Possibilities of improving health literacy.
3. week: Communication about risk of the treatment. Shared decision-making. Communicational questions of patient safety.
4. week: Improving patient's adherence and promoting lifestyle changes in the pharmacy.
5. week: The specialties of age and gender in pharmaceutical communication. Communication about intimate questions.
6. week: Team communication. Assertive communication
7. week: Communication with tense, hostile patients, strategies to prevent violence. Handling complaints and patient's claims.
8. week: Communication with patients with mental health disorders I: anxiety, depression, crisis
9. week: Communication with patients with mental health disorder II: addiction, psychosis
10. week: Marketing communication in pharmaceutical practice.

II. Practice topics/week

1. week: Role of communication in pharmaceutical practice. Active listening and empathy. Verbal and non-verbal communication.
2. week: Communication difficulties and possible solutions of patient education. Possibilities of improving health literacy
3. week: Communication about risk of the treatment. Shared decision-making. Communicational questions of patient safety.
4. week: Improving patient's adherence and promoting lifestyle changes in the pharmacy.
5. week: The specialties of age and gender in pharmaceutical communication. Communication about intimate questions.
6. week: Team communication. Assertive communication
7. week: Communication with tense, hostile patients, strategies to prevent violence. Handling complaints and patient's claims.
8. week: Communication with patients with mental health disorders I: anxiety, depression, crisis
9. week: Communication with patients with mental health disorder II: addiction, psychosis
10. week: Written exam

COURSE REQUIREMENTS

Seminars will ensure the possibility of ongoing consultation with the seminar leader.

Prerequisites:

Pharmacology and Toxicology III.
Pharmacy Administration I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The participation at minimum 75% of the practice seminars is the prerequisite of the signature. Makeup is possible in another seminar group the same week based on a previous agreement with the seminar lecturers.

Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results:

The final grade will be created as follows. A maximum of 100 points is available:

1. Points earned in lectures:	10 points
2. Presentation in the seminar:	30 points
3. Written exam:	60 points

Evaluation:

Excellent (5): 80-100 points

Good (4): 70-79 points

Satisfactory (3): 60-69 points

Pass (2): 50-59 points

Fail (1): Below 50 points

1. Points earned at lectures: At the end of the lecture, the student answers the question related to the topic presented at the lecture on a paper basis. You can get 0 or 1 point for the answer.
2. Presentation: The student gives a 5-10 minute presentation about a specific topic related to the course. Students agree with the seminar teachers at the beginning of the practical classes on which topics they create professional content and perform a presentation. A maximum of 30 points is available.
3. Topics of the exam: the required literature of the course, as well as the materials of the lectures and seminars. A maximum of 60 points is available.

If the student does not reach 50% (30 points) in the exam, the points obtained in the lecture and the points obtained in the seminar presentation cannot be added to the score obtained in the exam paper, in this case, the exam paper must be repeated.

If the exam is unsuccessful or the student does not appear for it, it is possible to make it up once. The exam will take place in the last week of the seminars. A retake exam will be held during the exam period.

In the case that the student does not have a successful written exam by the end of the semester, but the number of absences does not exceed 25%, and the seminar presentation has been accepted, the course can be taken up later as a CV course (therefore, there is no need to attend the seminars, the exam should be repeated).

Requirements of the signature at the end of the semester:

- participation in at least 75% of the seminars
- accepted seminar presentation
- passing the written exam (at least 50%)

Number and type of projects students have to perform independently during the semester and their deadlines:

Students have to prepare and perform a 10 minutes presentation on an agreed topic. In the presentation they have to show the capacity to prepare individual work based on agreed literature, show that they are able to synthesize and use the knowledge gained during the course and demonstrate presentation skills. The presentation slides have to be uploaded to Moodle before the presentation deadline. Deadlines will be discussed in the seminars at the beginning of the semester.

Type of the semester-end examination: practical grade

Required material:

Pilling, János: Medical Communication in practice. Medicina, Budapest, 2020.

Beardsley, RS. – Skrabal, MZ. – Kimberlin, CL: Communication Skills in Pharmacy Practice. Wolters Kluwer. Seventh edition. 2020.

The course description was prepared by:

Dr. Mónika Ditta Tóth,
Kinga Babonits-Farkas, Dr.
Orsolya Szépe

Pharmaceutical informatics (theory+practice)

Full name of the subject: Gyógyszerész informatika (elmélet+gyakorlat)

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: Pharmaceutical Informatics

English name of the subject: Pharmaceutical informatics (theory+practice)

German name of the subject: Pharmazeutische Informatik (Vorlesung+Praktikum)

Neptun code of the subject: GYKDEI099G1A

Type of registration: obligatory

Responsible department: Institute of Digital Health Sciences of Semmelweis University

Responsible tutor: Dr. Szócska Miklós PhD, professor
titkarsag.dei@semmelweis-univ.hu

Name of the persons responsible for the teaching of the subject:

Dr. Zajzon Gergely assistant lecturer

Dr. Tamus Zoltán Ádám PhD, associate professor

Tóth Tamás assistant lecturer

Iváncsy Tamás guest lecturer, PhD

Classes per week: 2

Credit point: 1

Professional content, intent of acquirement and its function in order to implement the goals of the program:

To acquaint students with the IT systems and applications used in pharmacy. The subject reviews the life cycle of medicines and related legislation, and then presents in detail the IT tools that can be used during each step, from drug development and official licensing to drug distribution.

Short description of the subject:

Successful completion of the subject will result in the acquisition of the following competencies: Knowledge of the processes of drug development, authorization and distribution. Getting to know the IT methods, tools, code systems and databases used in these.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9 th semester	10	10	–	–	20	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week):

1. week: Lifecycle of pharmaceutical products, Introduction to the relevant legal hierarchy
2. week: Methods of computer molecular design
3. week: Drug development process, approval of clinical trials
4. week: Introduction to Drug authorization (Regulatory Affairs): CTD (Common Technical Document), eCTD standards
5. week: Pharmacovigilance, related IT systems, databases (Eudra-Vigilance, E2B, PSUR)
6. week: Drug Reimbursement system and relevant databases
7. week: Pharmacy IT systems, Serialisation
8. week: Mobile devices, portable devices, sensors, smart devices in healthcare
9. week: IT tools for evidence-based medicine and personalized medicine
10. week: Prescription software, electronic prescription

Topics of practical classes (pro week):

1. week: Clinical trial related IT systems – EudraCT, clinicaltrials.gov, clinicaltrialsregister.eu
2. week: National and international pharmaceutical databases (OGYÉI database, basics of pharmaceutical electronic register system, EudraPharm, EudraGMP, EudraNET)
3. week: CTD, eCTD
4. week: IT background of pharmaceutical reimbursement: Pupha, OWL, fix reimbursement
5. week: Pharmaceutical code systems and standards (ATC, DDD)
6. week: Pharmaceutical code systems and standards (Active ingredients register, INN, BNO, MedDRA)
7. week: QRD, Readability, structure of product information files (SmPC, PIL)
8. week: Pharmaceutical promotion and marketing
9. week: IT systems for pharmaceutical sales information – OSAP1913 – P@NKA, IMS
10. week: ORKA prescription software

Schedule of consultations: by agreement

Course requirements

Prerequisites:

Pharmacy Administration I.
Pharmaceutical Technology IV

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:
Attendance of at least 75% of the classes. Max. 3 absences are allowed

Requirements of signature:

Attendance of at least 75% of the classes

Type of the semester-end examination:

practical grade

Examination requirements:

as published by the education-research department on the MOODLE interface by the start of the academic term

Form of the semester-end examination:

written (computer test)

Scientific, course related researches, publications, essays:

The educational materials are available at <http://dei-cloud.semmelweis.hu>.

Username and password are announced at the first class.

The course description was prepared by:

Dr. Zajzon Gergely and Dr. Tóth Tamás

Clinical Pharmacokinetics and Biopharmacy (theory+practice)

Full name of the subject: Klinikai farmakokinetika és biofarmácia (elmélet+gyakorlat)

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject:

English name of the subject: Clinical Pharmacokinetics and Biopharmacy (theory+practice)

German name of the subject: Klinische Pharmakokinetik und Biopharmazie (Vorlesung+Praktikum)

Neptun code of the subject: GYKGY

Type of registration: obligatory

Responsible department: Department of Pharmaceutics of Semmelweis University

Responsible tutor: Prof. Antal István professor, Dr. habil

phone: 061-217-0914

email: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Prof. Antal István university professor, PhD, habilitated doctor

Prof. Balogh György university professor, PhD, habilitated doctor

Prof. Klebovich Imre Professor emeritus, Doctor of MTA

Dr. Ludányi Krisztina associate professor, PhD

Bertalané dr. Balogh Emese associate professor, PhD

Dr. Lengyel Miléna associate professor, PhD

Dalmadiné dr. Kiss Borbála research associate, PhD

Dr. Farkas Dóra assistant lecturer, PhD

Dr. Király Márton assistant lecturer, PhD

Dr. Kohod Zsófia teaching resident, PharmD

Classes per week: 2 hours lectures, 3 hours practices

Credit point: 3

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the subject to provide the students with theoretical knowledge and practical skills in the field of biopharmacy and pharmacokinetics.

Short description of the subject:

The course focuses on the therapeutical response and relationships between the fate of the drug in the body, the time course of drug action and intensity and the physico-chemical properties of the drug as well as the dosage form. The evaluation needs the pharmacokinetic interpretation of processes in the body (drug absorption, distribution, metabolism and excretion) as well as qualitative and quantitative description of the time course changes regarding also clinical considerations. During the practical training students perform tasks using in vitro and in vivo methods and bioanalytical procedures. Furthermore they learn the mathematical calculations of pharmacokinetic parameters and computer simulations.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9 th semester	10	10	–	–	20	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week):

1. The importance of clinical pharmacokinetics and biopharmaceutics. Fate and characterisation of the drug in the body.
2. Release of active ingredients and practical significance of the Biopharmaceutical Classification System
3. Absorption and transport processes.
4. Metabolism and its biopharmaceutical implications. Significance of bioanalytics.
5. Elimination, excretion processes and influencing factors.
6. Pharmacokinetic models and parameters, analysis I.
7. Pharmacokinetic models and parameters, analysis II.
8. Bioavailability, bioequivalence, biosimilarity.
9. Pharmacokinetic studies in drug discovery and development
10. Biopharmaceutical and pharmacokinetic studies, in vitro and in vivo correlation.

Topics of practical classes (pro week):

1. Study of the distribution of salicylic acid in a three-phase liquid bridge model. Effect of surfactant on transport processes.
2. Investigation of the drug release rate of diclofenac-containing tablets using a rotary basket method
3. Investigation of drug release of topical ointment under in vitro conditions. Study of drug penetration from a semi-solid dosage form using a device based on Franz cell theory.
4. Study of diclofenac release from drug patch.
5. Study of urinary excreted acetylsalicylic acid (ASA) in different suppositories.
6. Study of the drug content of plasma samples following iv administration of theophylline in beagle dogs. Mid-term I.
7. Study of the recoverability of diclofenac sodium in synovial fluid.

8. Plasma samples after per os administration of theophylline tablets in beagle dogs.
9. Pharmacokinetic calculations. Mid-term II.
10. Application of computational methods in biopharmacy and pharmacokinetics. Substitution, retake, consultation

Schedule of consultations: on request

COURSE REQUIREMENTS

Prerequisites:

Pharmacology and Toxicology III.

Pharmaceutical Technology IV.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Written mid-term report in weeks 7 (theory, background, counting of in vitro exercises) and 10 (theory, background, counting of in vivo exercises).

Retake and corrections are possible in week 10 and week 1 of the exam period. at an agreed time. The result of the corrected mid-term will overwrite the original grade. The practical retake (optional) is in week 10 and week 1 of the exam period.

Requirements of signature:

The course culminates in an oral colloquium and is taught through theoretical lectures (2 hours per week for 10 weeks) and 3 hours per week of practicals. Both written mid-terms must reach at least 50.00%. Min. 50.00% of the written reports have to be accepted. A maximum of 25% of the absences, as specified in the Study Regulation.

Number and type of projects students have to perform independently during the semester and their deadlines:

Written reports of the practices have to be submitted by the end of week of practice (Sunday 23:59)

Type of the semester-end examination:

signature, end-term examination

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: combined examination

- The exam has written and oral parts.
- Written part: calculation* based on practical tasks and reports (accepted/ not accepted).
- Oral part: Theoretical topic, Practical topic*, Definition* (accepted/not accepted), Innovative dosage form (pharmacokinetics)

The possibility and conditions for offering grades: parts of exam marked with * can be offered as follows:

The calculation can be offered based on the result of the practical reports.

The practical topic is accepted

as a 5 when min 90.00%

as a 4 when min 80.00% of mid-terms are reached.

Scientific, course related researches, publications, essays:

The lecture slides are available for the students.

1. Michael E. Aulton, Kevin Taylor: Aulton's Pharmaceutics: The Design and Manufacture of Medicines, Elsevier Health Sciences, 2013
2. James Swarbrick, Marcel Dekker Encyclopedia of Pharmaceutical Technology, Second Edition - Volume 1 of 3, 2002
3. Remington Pharmaceutical Sciences, Ed. 20. (Easton, Pennsylvania, 1999) Rácz, I.: Drug formulation. (Wiley, New York, 2001.)

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: no

The course description was prepared by:

Dr. István Antal

Pharmaceutical Ethics and Sociology (theory+practice)

Full (Hun) name of the subject: Gyógyszerészeti etika-szociológia (elmélet+gyakorlat)

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: Pharma. Ethics and Soc. (theory+practice)

English name of the subject: Pharmaceutical Ethics and Sociology (theory+practice)

German name of the subject: Pharmazeutische Ethik und Soziologie (Vorlesung+Praktikum)

Neptun code of the subject: GYKMAG101E1A

Type of registration: obligatory

Responsible department: Institute of Behavioural Sciences of Semmelweis University

Responsible tutor: Dr. József Kovács MD, PhD, (Head of the Department of Bioethics)

Contact information: 210-2953

kovacs.jozsef@med.semmelweis-univ.hu

Name of the persons responsible for the teaching of the subject:

Dr. Zsuzsa Györfy PhD, associate professor

Dr. Edmond Girasek PhD Assistant Professor

Bence Döbrössy MSc assistant lecturer

Classes per week: 1 lecture, 1 practice

Credit point: 1

Professional content, intent of acquirement and its function in order to implement the goals of the program:

- To enable students to recognize ethical issues when encountered in everyday clinical practice and research
- To provide students with a conceptual-logical system, which helps them to address ethical questions and to resolve ethical dilemmas in an efficient way
- To introduce students to a body of knowledge, which helps them to understand, respect and protect the rights of patient research subjects and fellow health care professionals
- To help the would be health care professional to understand the responsibility of the individual, of the health care system and of the society as a whole in maintaining health
- To gain a solid foundation for future studies in any social subject related to pharmacy
- To enhance competence in designing, undertaking and evaluating research involving human subjects
- To enhance communication skills useful in dispensaries or in hospitals

Short description of the subject:

The course is designed to give a broad overview of the field of bioethics, including concepts, theory, and research.

Regarding sociology, the usage of medications became an integrated practice in modern societies which has several social connotations. Pharmacists will encounter the social problems connected with discovering, producing, distributing and consuming medicines on an everyday basis. The course aims to provide understanding of all these processes based on introducing some, selected sociological concepts

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	10	10	–	–	20	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week):

1. week: Principles of Medical Ethics (Jozsef Kovacs)
2. week: Competence and Capacity to Make Health Care Decisions. Informed Consent I.
3. week: Informed consent II. Confidentiality and Medical Records (Jozsef Kovacs)
4. week: End of Life Issues (Jozsef Kovacs)
5. week: Pharmacist-patient, pharmacist-pharmacist relationship. Pharmacist and society. Malpractice. Ethical Questions of Human Research. Ethical questions of organ transplantation. (Jozsef Kovacs)
6. week: Introduction to sociology. Basic Concepts The Pharmaceutical Aspects of Illness Behaviour (Edmond Girasek)
7. week: Inequalities in Health (Edmond Girasek)
8. week: The pharmaceutical Aspects of Intercultural (Bence Döbrössy)
9. week: Technology and Society (Zsuzsa Györfy)
10. week: Healthcare Systems (Edmond Girasek)

Topics of practical classes (pro week):

1. week: Principles of Medical Ethics (Jozsef Kovacs)
2. week: Competence and Capacity to Make Health Care Decisions. Informed Consent I. (Jozsef Kovacs)
3. week: Informed consent II. Confidentiality and Medical Records (Jozsef Kovacs)
4. week: End of Life Issues (Jozsef Kovacs)
5. week: Pharmacist-patient, pharmacist-pharmacist relationship. Pharmacist and society. Malpractice. Ethical Questions of Human Research. Ethical questions of organ transplantation. (Jozsef Kovacs)
6. week: Introduction to sociology. Basic Concepts The Pharmaceutical Aspects of Illness Behaviour (Edmond Girasek)
7. week: Inequalities in Health (Edmond Girasek)
8. week: The pharmaceutical Aspects of Intercultural (Bence Döbrössy)
9. week: Technology and Society (Zsuzsa Györfy)

10. week: Healthcare Systems (Edmond Girasek)

Schedule of consultations: None

COURSE REQUIREMENTS

Prerequisites:

Pharmacology and Toxicology (theory) III.
History of Sciences, Propedeutics

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

Students are expected to attend regularly the course and participation list will be recorded at the end of every lecture. Participating on at least 75% of the total number of lectures is a prerequisite for getting the signature needed to absolve the course. The maximum number of absences permitted: three absences from the classes

Requirements of signature:

Participation on at least 75% of the total number of classes is a prerequisite for getting the signature needed to absolve the course

Form of the semester-end examination: written

Scientific, course related researches, publications, essays:

List of teaching materials: (List of textbooks, hand-outs, scripts, etc.)

1. Conrad Fischer—Caterina Oneto (2016): Medical Ethics for the Boards. (Third edition) New York: McGraw-Hill Education. ISBN: 978-1-259-64121-3 MHID 1-25-964121-X
2. The textbook is available in the following bookshop: Medicina könyvesbolt, Budapest, IX. Üllői út 91/a (tel: 06-1-215-3786)
3. Graham Scrambler (ed) Sociology as Applied to Health and Medicine, Palgrave Macmillan 2018

Lectures: The power point slides of the lectures can be found at:

<http://semmelweis.hu/magtud/en/education/faculty-of-pharmacy>

The lecture slides are also available on Moodle

Physical Education IX.

Full name of the subject: Testnevelés IX

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: P.E.

English name of the subject: Physical Education IX.

German name of the subject: Sport IX.

Neptun code of the subject: GYKTSII16G9A

Type of registration: obligatory

Responsible Department: Semmelweis University, Physical Education and Sports Center

Responsible tutor: Várszegi, Kornélia director

Contact information: Phone: +36-20/825-0611

E-Mail: varszegi.kornelia@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Lehel, Zsolt icehockey trainer

Nagy-Kismarci, Bence cheerleading trainer

Rimay, István football trainer

Weisz, Miklós basketball trainer

Classes per week: 1 hour practice

Credit point: 0

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The short-term goal of the course is to maintain and improve the students' current state of health, to create the physical conditions for a better quality of life by learning and practicing (new) branches of sports that can be practiced after graduation as well. The long-term goal is to improve the quality of life and life prospects of future physicians, and to provide students with credible preventive attitudes and lifestyle advice - so that they can represent those in their later practice, through their own health-promoting behavior.

Brief course summary:

Upon completion of the course the student will be able to carry out regular physical activity.

After completing the „beginner swimming” course, one will acquire water-confident swimming skills.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	0	1	–	–	14	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week): -

Topics of practical classes (pro week):

You can register for the “independent sports activity” course as part of the Physical Education course in the Neptune system. Every week, a questionnaire is sent to the students through the Neptune system:

- The questionnaire can be filled in from Monday to Sunday in a semester (no entries can be made in advance or afterwards).
- Students must assure themselves that they have completed the questionnaire truthfully.
- It is a minimum requirement for the signature that a training of 1 x 60 minutes per week is completed (to be 10 times responses) and this is recorded in the questionnaire.

Other way, Free of charge:

2x90 mins./week sport training (competitive sport, for qualified only): cheerleader, female's football, men's football, handball, basketball, volleyball, waterpolo

Prerequisites: Prerequisites Physical Education I – VIII.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

The student who completes the independent sport activity course is also supposed to attend 10 classes and record their participation in the weekly sent UniPoll questionnaire.. Practice leaders follow an online presence registration at the beginning and end of the lessons, which can be individually tracked on semmelweis.hu/sportkozpont homepage.

Another way to complete the Physical Education course is to 15 times actively participate in the trainings of university teams. As teams take part in championships during the school year, we only accept applications from professional athletes!

Requirements of signature:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

Type of the semester-end examination: signature

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: -

The possibility and conditions for offering grades:

Active participation in practice classes 10 times (trainings 15 times) under the conditions described above.

May be exempted from attending classes the student who

- 1. whose diagnosis and the opinion of the sports doctor do not allow to exercise, and submits a certificate**
or
- 2.2. does sports regularly and submits a certificate of association and federation in the neptun system in the exemption period preceding the semester.**

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assesment basis

If the subject is not passed, it can be retaken with special permission.

The course description was prepared by: Kornélia Várszegi

Drug Licensing (theory+practice)

Full name of the subject: Gyszeripari és gyógyszerfelügyeleti, hatósági ismeretek_Gyógyszerengedélyezés (elmélet+gyakorlat)
Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: -

English name of the subject: Knowledge of the Pharmaceuticoindustrial and Pharmacovigilance Authorities - Drug Licensing (theory+practice)

German name of the subject: Behördenkenntnisse der pharmazeutischen Industrie und Arzneimittelüberwachung - Arzneimittelzulassung und Registrierung (Vorlesung+Praktikum)

Neptun code of the subject: GYKGYI102G1A

Type of registration: obligatory

Responsible Department: Semmelweis University, Department of Pharmaceutics

Responsible tutor: Prof. Antal István professor, Dr. habil

phone: 061-217-0914

email: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Miléna Lengyel Assistant professor, PhD

Phone: +36-1-459-1500 Extension: 53069

E-mail: lengyel.milena@semmelweis.hu

Dr. Romána Zelkó University Professor, Dr. habil

Dr. Nikolett Kállai-Szabó Associate Professor, PhD

Dr. Bálint Basa PhD Student, PharmD

Dr. Herta Pálfiné Goóts invited lecturer, PhD

Dr. Zsófia Kohod PharmD

Classes per week: 12/sem lectures, 12/sem practices

Credit point: 1

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The purpose of the subject is to review the authorization process of medicines and preparations that cannot be considered medicines, but are sold in pharmacies, as well as the aspects of the development and evaluation of the information and documentation that underpins this.

Short description of the subject: Students will learn the basics of marketing authorization, the regulatory environment and system of requirements that determine the content and form requirements of technical documentation, including drug quality, as well as the tasks related to the application for marketing authorizations, official evaluation and the maintenance of authorizations. The subject provides an overview of industrial and official processes prior to placing on the market. It presents, in general, the activities and knowledge materials required for maintaining and amending the license after obtaining it.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	12	12	–	–	24	Autumn semester	–

Program of semester

Topics of theoretical classes (2-week block in the 1-2. weeks of semester)

1. Introduction. Importance of licensing, legal environment, application
2. Drug authorization processes. Modification processes of already authorized pharmaceutical products.
3. Border area products and non-pharmaceutical products distributed in the pharmacy
4. The planning process for the development of original medicines
5. The planning process for the development of generic drugs
6. Planning process for the development of generic added value medicines
7. Biological medicines and biosimilar preparations
8. Planning of WEU and its traditional development
9. Official evaluation of medicines
10. Quality assurance related to drug licensing
11. Audits and inspections in pharmaceutical production
12. Pharmacovigilance of medicines
13. Instructions for use in everyday life, OTC preparations

Topics of practical classes:

During the exercises, students acquire additional knowledge about the content of the registration documentation in parallel with the theoretical lessons,

- on the structure of Common Technical Documentation
- about the QP declaration,
- on the practical implementation of the amendment of marketing authorizations.

Schedule of consultations: on demand

Prerequisites:

Pharmaceutical Technology IV.

Pharmacy Administration I.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their up-grading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Attendance of lectures and practicals expected according to study regulations. The written exam (Moodle test on Sept. 29.) or makeup exam (3. educational week) must be passed ("accepted"). The overview lecture slides will be published on Moodle.

Requirements of signature:

Attendance of lectures and practicals expected according to study regulations

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term. The written exam or makeup exam must be passed, min 50% ("accepted").

Form of the semester-end examination: written

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assesment basis

The course description was prepared by: Dr. Antal István

Pharmacovigilance and pharmacoepidemiology (theory+practice)

Full name of the subject: Gyógyszeripari és gyógyszerfelügyeleti, hatósági ismeretek - Farmakovigilancia és farmakoepidemiológia (elmélet+gyak)

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: -

English name of the subject: Knowledge of the Pharmaceuticoindustrial and Pharmacovigilance Authorities - Pharmacovigilance and pharmacoepidemiology (theory+practice)

German name of the subject: Behördenkenntnisse der pharmazeutischen Industrie und Arzneimittelüberwachung - Pharmakovigilanz und Pharmakoepidemiologie (Vorlesung+Praktikum)

Neptun code of the subject: GYKGYI103G1A

Type of registration: obligatory

Responsible Department: Semmelweis University, Department of Pharmaceutics

Responsible tutor: Prof. Antal István professor, Dr. habil

phone: 061-217-0914

email: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Miléna Lengyel Assistant professor, PhD

Phone: +36-1-459-1500 Extension: 53069

E-mail: lengyel.milena@semmelweis.hu

Dr. Tamás Tábi Associate Professor, Ph.D

Dr. Panka Kónya invited lecturer, Ph.D.

Dr. Attila Oláh invited lecturer, Ph.D.

Dr. Orsolya Szokolóczy invited lecturer, Ph.D.

Dr. Zoltán Barna invited lecturer, PharmD

Dr. Bálint Basa PhD Student, PharmD

Dr. Zsófia Kohod PharmD

Classes per week: 4/sem lectures, 4/sem practices

Credit point: 1

Professional content, intent of acquirement and its function in order to implement the goals of the program:

The aim of the course is to provide information on the national and European pharmacovigilance system established to promote the safe use of medicines and its importance to the pharmaceutical industry.

Short description of the subject: The lectures will cover the most common mechanisms of adverse drug reactions, the industry and regulatory system of adverse drug reaction reporting and evaluation, with special emphasis on the national and EU practice. The course will cover the detection and investigation of new risks

from drug safety data, the continuous monitoring and evaluation of the benefit/risk ratio of medicines, the proactive management of drug-related risks and their effective communication.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	4	4	–	–	8	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week)

1. Importance of pharmacovigilance, regulations (GVP) and regulatory hierarchy, definitions (AE, ADR), special situations
2. QPPV person's tasks, responsibilities, obligations
3. Duties of a pharmacovigilance specialist, "how a day goes by", in which areas they work (industry, authority, etc.)
4. The relationship of pharmacovigilance with other areas, e.g. registration, quality assurance, drug development (clinical and post-marketing studies), marketing, etc.

Topics of practical classes (pro week):

1. Sources of side effect reporting, literature review,
2. Side effect reporting sheet and its parts,
3. Actions related to notifications, e.g. follow-up, targeted follow-up
4. Process and manner of reporting to authorities.

Schedule of consultations: On request

Prerequisites:

Pharmacology and Toxicology III.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: On individual consultation.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their up-grading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Moodle test at the last day of course (Sept 29.) Successful written exam (min. 2.00, min 50%) is accepted.

Requirements of signature:

Attendance according to Study and Examination Regulations (max. 25% absence)

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assessment basis

The course description was prepared by: Dr. Antal István

Quality Assurance (theory+practice)

Full name of the subject: Gyógyszeripari és gyógyszerfelügyeleti, hatósági ismeretek - Minőségbiztosítás (elmélet+gyakorlat)
Program: undivided program (pharmaceutical)
Schedule: full-time
Short name of the subject: Quality Assurance
English name of the subject: Knowledge of the Pharmaceutical industrial and Pharmacovigilance Authorities - Quality Assurance (theory+practice)
German name of the subject: Behördenkenntnisse der pharmazeutischen Industrie und Arzneimittelüberwachung - Qualitätssicherung (Vorlesung+Praktikum)

Neptun code of the subject: GYKGYI104G1A

Type of registration: obligatory

Responsible Department: Semmelweis University, Department of Pharmaceutics

Responsible tutor: Prof. Antal István professor, Dr. habil
phone: 061-217-0914
email: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Miléna Lengyel Assistant professor, PhD
 Phone: +36-1-459-1500 Extension: 53069
 E-mail: lengyel.milena@semmelweis.hu
 Dr. Romána Zelkó University Professor, Dr. habil
 Dr. Nikolett Kállai-Szabó Associate Professor, Ph.D.
 Dr. Bálint Basa PhD Student, PharmD
 Dr. Livia Gál invited lecturer, PharmD
 Dr. Bulcsú Rác invited lecturer Ph.D.
 Dr. Dávid Szegvári invited lecturer Ph.D.

Classes per week: 4/sem lectures, 4/sem practices

Credit point: 1

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The aim of the course is to familiarise students with the specific aspects of quality assurance in the pharmaceutical industry and the responsibilities arising from the legal framework.

Short description of the subject: Students will be introduced to the most important activities, such as change management, risk management, variance investigation, OOS results management, qualification, validation, cross_contamination prevention, stability testing, microbiological issues, contaminants, etc. In the classroom exercises, students will be able to follow a risk management and investigation process.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	4	4	–	–	8	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week)

1. Basics of pharmaceutical quality assurance
2. Responsibilities of the authorised person (QP), release of batches
3. Risk management, risk-based GMP
4. Investigation of manufacturing deviations, OOS
5. Qualification and process validation
6. Audits, inspections
7. Release (parametric, "real-time")
8. Process analysis, PAT

Topics of practical classes (pro week):

1. Liberation
2. Risk analysis
3. Change management
4. Elements of PAT, typical methods, examples of PAT application

Schedule of consultations: On request

Prerequisites:

Pharmaceutical Technology IV.
 Pharmacy Administration I.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: max. 25% absence, according to the Study and Examination Rules, makeup on individual request

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their up-grading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Attendance of lectures and practicals expected according to study regulations. The written exam (Moodle test on Sept. 29.) or makeup

exam (3. educational week) must be passed ("accepted"). The overview lecture slides will be published on Moodle.

Requirements of signature:

Attendance according to Study and Examination Rules, max. 25% absence, attendance at visits at pharmaceutical plants

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments: Lecture slides will be published on Moodle. All necessary information for the successful exam can be found on the slides, however, the presenters provide deeper understanding of the schematic information slides.

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assessment basis

The course description was prepared by: Dr. Antal István

Drug innovation and clinical examinations (theory+practice)

Full name of the subject: Gyógyszeripari és gyógyszerfelügyeleti, hatósági ismeretek - Gyógyszerinnováció és klinikai vizsgálatok (elmélet+gyakorlat)

Program: undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject: Drug innovation and clinical examinations

English name of the subject: Knowledge of the Pharmaceutical industrial and Pharmacovigilance Authorities – Drug innovation and clinical examinations (theory+practice)

German name of the subject: Behördenkenntnisse der pharmazeutischen Industrie und Arzneimittelüberwachung - Arzneimittelinnovation und klinische Studien (Vorlesung+Praktikum)

Neptun code of the subject: GYKGY1105G1A

Type of registration: obligatory

Responsible Department: Semmelweis University, Department of Pharmaceutics

Responsible tutor: Prof. Antal István professor, Dr. habil
phone: 061-217-0914

e-mail: antal.istvan@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Miléna Lengyel Assistant professor, PhD

phone: +36-1-459-1500 Extension: 53069

e-mail: lengyel.milena@semmelweis.hu

Dr. Romána Zelkó University Professor, Dr. habil

Dr. Nikolett Kállai-Szabó Associate Professor, Ph.D.

Dr. Bálint Basa PhD Student, PharmD

Dr. Ágnes Mészáros Associate Professor, Ph.D.

Dr. Szabolcs Barótfi invited lecturer, Ph.D.

Dr. Éva Kollár invited lecturer

Dr. István Laszlovszky invited lecturer

Classes per week: 8/sem lectures, 8/sem practices

Credit point: 1

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The purpose of teaching the subject is for the student to master the most important theoretical and practical aspects necessary for the innovation activity of pharmaceutical products, with particular regard to the development of original and generic products, industrial property rights protection, and aspects of clinical trials.

Short description of the subject: The topic of the subject includes the pharmaceutical aspects of pharmaceutical innovation and research and development, the basics of strategic planning of products, the basics of industrial rights protection and the patentability of inventions, as well as the most important issues of drug development and licensing of original, generic and super-generic (innovative drug technology) preparations.

In addition, the subject aims to summarize the phases, significance, objectives and course of clinical trials based on the GCP directive, and also to provide insight into the related ethical aspects.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	8	8	–	–	16	Autumn semester	–

Program of semester

Topics of theoretical classes (pro week)

1. Pharmaceutical innovation from the perspective of industry
2. Pharmaceutical research and development today, opportunities, limitations, trends
3. Pharmaceutical industry aspects of industrial law protection
4. Regulatory environment for drug development and licensing
5. Development of original, generic, generic+ preparations: preclinical and clinical studies
6. Clinical trials in research and development
7. Phases of a clinical trial, authorisation, ethical aspects

Topics of practical classes (pro week):

1. Strategic planning, life cycle, product life curve theory, BCG matrix
2. Patent description structure and content aspects
3. Clinical trial protocol
4. Practical conduct of clinical tests,
5. Statistical evaluation

Schedule of consultations: On request

Prerequisites:

Pharmacology and Toxicology III.
Pharmaceutical Technology IV.

Conditions of attending the classes, amount of acceptable absents, way of presentation of

leave, opportunity for makeup: max. Attendance as in STUDY AND EXAMINATION REGULATIONS, makeup on individual request in the 3. week of the semester

Requirements of signature:

Attendance (max. 25% absence) attendance at visit at pharmaceutical plants

Type of the semester-end examination: practical grade

Examination requirements: as published by the education-research department on the MOODLE interface by the start of the academic term.

Form of the semester-end examination: written

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments: Lecture slides and practical documents can be found on Moodle

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission: individual assesment basis

The course description was prepared by: Dr. Antal István

Pharmaceutical Care (theory+practice)

Full (Hun) name of the subject: Gyógyszerészi gondozás (elmélet+gyakorlat)
Program: Undivided program (pharmaceutical)
Schedule: full-time

Short name of the subject:
English name of the subject: Pharmaceutical Care (theory+practice)
German name of the subject: Pharmazeutische Betreuung (Vorlesung+Praktikum)

Type of registration: obligatory/obligatory elective/elective/
criteria requirement

Neptun code of the subject: GYKEGY096E1A

Responsible Department: University Pharmacy, Department of Pharmacy Administration

Responsible tutor: Dr. Ágnes Mészáros associate professor, Ph.D., Dr. Habil.
Phone: 06-20663-2460
E-Mail: meszaros.agnes@semmelweis.hu

Dr. Romána Zelkó Professor, PhD, DSc
Dr. Dénes Kleiner PhD

Class per week: 2 lecture(s)
3 practice(s)
Credit point(s): 4

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The objective of the course is to provide an overview of the pharmacist's activities and services with a special focus on the community, on pharmaceutical care and medication therapy management, patient education.

Its task is to provide knowledge on professional skills required in the pharmacy.

Short description of the subject:

The course wishes to discuss essential topics in relation to personalised, safe and effective medication therapy management (including drugs, herbal supplements as well as medical devices), lifestyle issues and travel medicine.

It enables the student to apply the knowledge acquired in everyday practice.

Name of the persons responsible for the teaching of the subject:

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	20	30	–	–	50	Autumn semester* Spring semester Both semesters (* Please underline)	–

Program of semester

Topics of theoretical classes (pro week):

1. Individual therapy with magistral preparation
2. Concept of Pharmaceutical care, Patient safety
3. Inhalation therapy management and Smoking cessation
4. Geriatrics and its relation to therapy management
5. Special drug forms in the elderly and in children
6. LMWH and NOAC therapy management
7. Special aspects of medication in Pregnancy
8. Management of side effects in Oncology patients
9. Enteral Nutrition Dr.
10. Hand Hygiene and Bandages

Topics of practical classes (pro week):

1. Compliance, Adherence, Persistence
2. Patient education about OTC drug, case study examples
3. Patient education about prescription (POM) drugs with an example of anti-hypertensive medication
4. Travel Medicine
5. Perioperative Medicine
6. Pharmaceutical care about Antibiotic therapy
7. Patients with disabilities (language, attitude ...) in the Pharmacy
8. New therapeutic challenges with cannabis
9. Management of diabetes and insulin therapy and use of insulin pens and blood sugar measurer
10. Patient education in relation to Case Studies

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

Schedule of consultations:

COURSE REQUIREMENTS

Prerequisites: Pharmacology and Toxicology III., Pharmaceutical Technology IV.

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

According to the university's Study and examination guide.

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Attending 75% of the practices and completion of the case study

Number and type of projects students have to perform independently during the semester and their deadlines:

A presentation, as it is scheduled.

Type of the semester-end examination: signature*/practical grade*/comprehensive examination*/final/end-term examination*

* Please underline

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment):

Completely accessible on the Moodle platform.

Form of the semester-end examination: written*/oral*/combined examination/**practical examination/the assessment of completing project work (according to STUDY AND EXAMINATION REGULATIONS 30.§)*** (* Please underline)

The possibility and conditions for offering grades:

At least 80% of correct answers on questions related to the lectures enables the omission of “question A” at the semi-final oral exam.

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, **-with exact description about which of them is required to acquire which part of**

the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:

Filipa Alves da Costa, J. W. Foppe van Mil, Aldo Alvarez-Risco:
The Pharmacist Guide to Implementing Pharmaceutical Care.
Springer, 2019.

<file:///C:/Users/zelko/Downloads/ibook.pub-the-pharmacist-guide-to-implementing-pharmaceutical-care.pdf>

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**

no

The course description was prepared by: Dr. Mészáros Ágnes

Pharmaceutical Management (theory+practice)

Full (Hun) name of the subject: Gyógyszerészi gazdálkodás és menedzsment (elmélet+gyakorlat)

Program: Undivided program (pharmaceutical)

Schedule: full-time

Short name of the subject:

English name of the subject: Pharmaceutical management (theory+practice)

German name of the subject: Pharmazeutische Management (Vorlesung+Praktikum)

Type of registration: obligatory/obligatory elective/elective/criteria requirement

Neptun code of the subject: GYKEGY093E1A

Responsible Department: University Pharmacy, Department of Pharmacy Administration

Responsible tutor Dr. Ágnes Mészáros associate professor, Ph.D.

Contact information:

Phone: 06-20663-2460

E-Mail: meszaros.agnes@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Romána Zelkó professor, Ph.D., DSc.

Class per week: 1

Credit point(s): 2

Professional content, intent of acquirement and it's function in order to implement the goals of the program:

The aim of this course is to introduce topics of management and administration of a Pharmacy (community and hospital) through practical examples and to prepare students for future pharmacy practice.

Short description of the subject:

In the framework of the course, the student will learn about the operation of community and hospital pharmacies with particular focus on the activities of pharmacists; it wishes to provide an insight into the management issues (inventory management, dispensing) and other professional competences.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	10	10	–	–	20	Autumn semester* Spring semester Both semesters (* Please underline)	–

Program of semester

Topics of theoretical classes (pro week):

1. Responsibilities, and duties of the Pharmacist
2. Logistics and stock control; inventory models in pharmacy practice
3. Handling of Drug shortages
4. Drug and Therapeutic Committee
5. Negotiation techniques

Topics of practical classes (pro week):

1. Dispensing robots in the community
2. Drug Shortage Case Report
3. Implementing Quality Assurance and Continuous Improvement in Pharmacies
4. The Unit Dose Dispensing System
5. Written practical exam (multiple choice test)

Other subjects (both obligatory and optional) relating to the transversal issues of the subject. Possible overlaps between subjects:

Schedule of consultations:

COURSE REQUIREMENTS

Prerequisites: Pharmacoeconomics

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

According to the university's Study and examination regulations

The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Attending 75 % of the practices.

Number and type of projects students have to perform independently during the semester and their deadlines:

-

Type of the semester-end examination: signature*/practical grade*/comprehensive examination*/final/end-term examination*

(* Please underline)

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment):

Completely accessible on the Moodle platform.

Form of the semester-end examination: written*/oral*/combined examination/practical examination/the assessment of completing project work (according to STUDY AND EXAMINATION REGULATIONS 30.5)*

(* Please underline)

The possibility and conditions for offering grades: -

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, **-with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:**

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**

yes*/no*/on and individual assessment basis*

(* Please underline)

The course description was prepared by: Dr. Mészáros Ágnes

Clinical Pharmaceutics (theory+practice)

Full (Hun) name of the subject: Klinikai gyógyszerészet (elmélet+gyakorlat)

Program: Undivided program (pharmaceutical)

Schedule: full-time

English name of the subject: Clinical Pharmaceutics (theory+practice)

German name of the subject: Klinische Pharmazie (Vorlesung+Praktikum)

Neptun code of the subject: GYKEGY100E1A

Responsible Department: University Pharmacy, Department of Pharmacy Administration

Responsible tutor: Dr. Ágnes Mészáros associate professor, Ph.D., Dr. Habil

phone: 206632460

e-Mail: meszaros.agnes@semmelweis.hu

Name of the persons responsible for the teaching of the subject:

Dr. Romána Zelkó professor, Ph.D., [D.Sc.](#)

Dr. Dénes Kleiner Ph.D.

Classes per week: 1,2 lecture(s)

1,2 practice(s)

Credit point(s): 1

Professional content, intent of acquirement and its function in order to implement the goals of the program:

Clinical Pharmaceutics aims to give an overview on the most important areas of hospital pharmacy and activities of a hospital (clinical) pharmacist.

Its task is to provide selected knowledge on professional skills required in the hospital pharmacy.

Short description of the subject:

The course covers the tasks of the hospital (clinical) pharmacists, while it focuses on essential services and activities. It also gives an overview of selected disease groups that affect a large population. The topics are discussed in the form of a theoretical lectures, that is followed by a seminar/ practice.

Course data							
Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/ semester	Normal course offer	Consultations
9th semester	10	10	–	–	20	Autumn semester*	–

Program of semester

Topics of theoretical classes (every second week):

1. Clinical Pharmacy and Medication Reconciliation
3. Anaesthesia and Surgery
5. Essentials in Paediatrics
7. Essentials in Cardiology
9. Renal Failure and Drug Therapy Management Project work

Topics of practical classes (every second week):

2. Therapeutic Decision Making and the Drug Formulary
4. Anaesthesia and Surgery

COURSE REQUIREMENTS

Prerequisites: Pharmacology and Toxicology III., Pharmaceutical Technology IV

Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:

According to the university's Study and examination regulations.

Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):

Attending 75% of the practices and completion of the case study/ project work.

Number and type of projects students have to perform independently during the semester and their deadlines:

Completion of the project work by end of the term.

Type of the semester-end examination: signature*/practical grade*/comprehensive examination*/final/end-term examination*

* Please underline

6. Essentials of Therapy in Paediatrics
 8. Essentials of Therapy in Cardiology
 10. Cytotoxic Infusion Production And A Case Study
- Project work

Other subjects (both obligatory and optional) relating to the transversal issues of the subject.

Possible overlaps between subjects:

Pharmacotherapy
Pharmaceutical care

Schedule of consultations: as requested

Examination requirements: (list of topics, test examination topics, mandatory parameters, diagrams, concepts, list of calculations, practical skills, and project tasks recognised as examinations, criteria for completion and assessment): Completely accessible on the Moodle platform.

Form of the semester-end examination: written examination

The possibility and conditions for offering grades:

At least 80% of correct answers on questions related to the lectures and practices, with the completion of the case study with good or excellent result.

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, **-with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:**

Marc Mitchell (Editor), Melanie Snelling (Editor), Nicola Stoner (Editor), Philip Wiffen (Editor): Oxford Handbook of Clinical Pharmacy; Oxford University Press; 3rd edition, 2017

The course description was prepared by: Dr. Mészáros Ágnes

10. SEMESTER 2022/2023/2

Subject	Lecture	Practice (hour/sem.)	Credit	Prerequisites	Exam type
Obligatory Practice e Before the Board Exam (4 months)II. GYKANG133G2A	–	40	16**	Obligatory Practice I.	practical mark
Diploma Defence GYKSZD134E1A	1/sem.	–	10**	Diploma Work II.	final*
Principles of Professional Ethics II. GYKANG071E2A	–	–	–		signature
Elective or obligatory elective subjects	–	–	–		examination or practical mark
Total:	1/sem.	40	26		

* Counts to the qualification of the diploma



FACULTY OF HEALTH SCIENCES

Brief History of the Faculty of Health Sciences

The University's second largest Faculty is the Faculty of Health Sciences. The Faculty started its first academic year in 1975 with the aim of training highly accomplished, skilled, committed and open-minded health care professionals. This was the first higher-level school in Hungary that trained dietitians, health visitors, physiotherapists, public health and epidemiology inspectors, vocational teachers and paramedics. During the past years both the structure of education and the curriculum have undergone changes in the spirit of modernization. The Faculty continuously expands the

range of its Hungarian and English language training programmes. To its prospective students, the Faculty offers study rooms, lecture halls, specialist laboratories, demonstration rooms and a public library that are all equipped with state-of-the-art technology, as well as a great variety of opportunities for an active student life, and a motivating environment. Following graduation, students of the Faculty can immediately be involved in various areas (ex.: health care, tourism, education, sociology) and they are able to have a positive impact on their close and broad environment.

Facts and Figures

The Faculty of Health Sciences celebrates its 50th anniversary in 2025. Since its foundation, cc. 35.000 students graduated from the Faculty and today more than 5000 students are studying at this institution. The Faculty is very proud of its library containing more than 50.000 volumes.

During the last four decades the Faculty has developed extensive international relations, and as a result, we have connections with about 50 higher educational institutions throughout Europe, Asia and America. Many students and staff members have the opportunity to take part in short- and long-term exchanges in our partner institutions. The Faculty's Asian relations have also been largely extended by establishing a fruitful relationship with Shanghai Jiao Tong University

School of Medicine (SJTU) and with Heilongjiang University of Chinese Medicine (HLJUCM), that launched its off-campus Traditional Chinese Medicine training at our Faculty.

We are also proud of having operated our Italian, French and English [B.Sc.](#)-level Physiotherapy training in Lugano, Switzerland since 2009. Currently, over 300 students participate in our programme there. The extent of our international relationships is still growing and we accept several groups of students from different countries on our 2-4 weeks advanced professional programmes mainly from the USA, China and Japan. In these programmes our students have the opportunity to participate in, and to build international professional connections.

Leadership, Dean's Office

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Home Page: <https://semmelweis.hu/etk>

Dean **College Professor Dr. Gabriella Dörnyei PhD**
Vice Deans **College Professor Dr. Klára Gadó PhD –Vice Dean for General Affairs**
College Professor Dr. István Vingender PhD – Vice Dean Responsible for Academic Affairs
College Professor Dr. Zoltán Balogh PhD – Vice Dean Responsible for Clinical Relations

Director of the English Language Programmes

Professor Dr. **Alán Alpár MD, PhD, Vice Rector Responsible for International Training Programmes**

Dean's Office

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Ms. Panna Herczeg	– Study Coordinator Phone: +(36-1)486-5909 e-mail: herczeg.panna@semmelweis.hu Fax: +(36-1)486-5913 room: 129
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Ms. Anita Gergye Phone: +(36-1)486-5905	– Study Coordinator (Off-campus program) e-mail: gergye.anita@semmelweis.hu Fax: +(36-1)486-5913 room: 129
Ms. Fruzsina Judit Székely	– Study Coordinator (Off-campus program) Phone: +(36-1)486-5905 e-mail: szekely.fruzsina@semmelweis.hu Fax: +(36-1)486-5913 room: 129

Information about the B.Sc. and M.Sc. programmes

Training system

Hungary, as a member of the European Union, belongs to the unified European Higher Education Area, which in principal follows the multi-cycle (bachelor, master and doctorate) training system. In this system it is much easier for students, lecturers and researchers to travel and build international relations, moreover, as citizens of the European Union they can continue their studies and plan their future as employees or entrepreneurs in any of the member states.

These opportunities open up a wider field for non-European citizens studying in Hungary as well, since the possibilities of internal mobility inside the unified Europe are based on the training channels and close relationships between countries in the labour market and among institutions.

Programmes of the Faculty

I. Bachelor of Science (B.Sc.) Programmes

1. Nursing and Patient Care B.Sc. Programme

Specialized programmes: Physiotherapy (Hungarian, English), Nursing (Hungarian, English), Midwifery (Hungarian, English), Dietetics (Hungarian, English), Paramedics (Hungarian), Voice, speech and swallowing therapy (Hungarian)

Physiotherapy

Physiotherapists act as autonomous practitioners who are able to perform functional examinations, identify impairments, functional limitations, abilities and disabilities by using clinical decision-making processes. Physiotherapists treat patients with therapeutic exercises, manual techniques and other therapeutic modalities as the professionals' chief task is to improve the functions of the musculoskeletal system. The therapists develop movement therapies and apply electrotherapeutic treatment, therapeutic ultrasound, and various manual and massage treatments for the sake of healing and rehabilitation or for the prevention of health damage. Graduates take part in healing locomotor (orthopaedic, rheumatologic, traumatologic), cardiovascular, obstetrical, gynaecological, neurological and psychiatric disorders. Prevention and health promotion belong to the specialists' profession, too. Physiotherapists plan, explain, carry out, and adapt an examination-based treatment, draw conclusions from the examination as a whole and rank the main problems according to priority.

Qualification

Physiotherapist

Nursing

The occupation of nurses is a vocation that is pursued for the sake of health preservation, promotion and patient healing. Nurses observe patients in the hospital and continuously monitor their needs, take part in disease prevention and act as active contributors to the process of the patient's recovery and rehabilitation. They help patients absorb and understand the information on their health status. Nurses holding a B.Sc. degree can organise, manage and supervise all their internal medical, surgical, obstetric-gynaecological, psychiatric, intensive nursing and primary care tasks in every area of health care. They are responsible for conducting the healing-nursing activities prescribed by the physician, and help the patient and the physician perform certain examinations. Graduates of the speciality are able to provide health care treatment for each age group from premature infants to elderly patients, explore the special needs of the patient and the person cared for, prepare nursing diagnoses and perform the tasks professionally on the basis of priorities, participate in planning, developing and implementing health care and social services.

Qualification

Nurse

Midwifery

Midwives fulfil caring and nursing tasks during pregnancies, in the postpartum period and on the occasion of gynaecological problems. Their responsibilities are to monitor pregnancies, labours and the postpartum progress while cooperating with other health care professionals in order to achieve the best possible outcome for each family. From the start of the parturition, midwives prepare and continuously support and encourage the woman during labour, monitor the process of delivery and the mother-infant connection, assess and register their observations. Midwives individually assist deliveries, take care of the protection of the perineum and of the treatment of the woman and the new-born baby during the post-delivery period. Graduate midwives look after, nurse and care for female patients and perform the required specialised treatment. State of the art skill laboratories help the preparation of the students for their future profession.

Qualification

Midwife

Dietetics

Dietitians deal with the questions of human nutrition and possess knowledge about healthy diet and diseases caused by unhealthy nutrition. Graduates are able to practise diet therapy independently, or perform dietetic and catering tasks as members of a therapist team. The specialist's tasks include individual and group counselling, preventing nutrition related chronic and non-contagious diseases, organising diet plans according to the client's sensitivity and disease type. They manage catering units: lead the catering service, organise catering work procedures, and establish appropriate and acceptable conditions for catering. Dietitians play an important role in teaching how to lead a preventive and healthy life as they can also develop and implement programmes for health promotion.

Qualification

Dietitian

Paramedics

Graduates are able to approach professionally and safely patients or victims in prehospital emergency care (oxyology), able to perform triage, on an individual basis and during a catastrophic event. On the scene, paramedics familiarise themselves with the nature of the emergency, examine the patient, and make a primary diagnosis. They stabilise and care for the patient, decide on the possibilities of leaving the patient on the scene. Paramedics observe and monitor the patient during transport, communicate appropriately with the patient and his/her relatives, complete the necessary interventions, and provide psychological support for the suffering patient. Paramedics holding a B.Sc. degree also complete standby on-call duties, organise teamwork in the system of emergency care within health institutions, teach First Aid, and participate in the further training of emergency nurses and ambulance car drivers. Paramedics work in close alliance with the control staff, ambulance assistants, physicians, and health care professionals of hospital emergency care.

Qualification

Ambulance Officer (Paramedic)

Voice, speech and swallowing therapy

Voice, speech and swallowing therapists perform diagnostic and therapeutic tasks in otolaryngology, phoniatics, neurology, paediatrics, geriatrics and rehabilitation units as well as in outpatient services and can treat certain functional disorders in private practice. Their responsibilities include the functional examination and therapy of phoniatics, articulation, speech-language abilities, nutrition intake (chewing, swallowing). Graduates are able to treat the disorders of two fundamental functions of human life: the disorders of communication and of food intake. They are able to contribute to the rehabilitation of persons suffering from these functional disorders, thus enabling them to manage their social responsibilities and to integrate into society. Graduates are able to participate in preventive, curative, nursing and rehabilitating professional work on any level of the health care and/or social care system.

Qualification

Voice, speech and swallowing therapist

2. Health Care and Disease Prevention B.Sc. Programme

Specialized programmes: Health Visitor (Hungarian), Public Health Care Inspector (Hungarian, English)

Health Visitor

The health visitor is present in the families' life during the most important steps of life: during pregnancy, reception of the new-born baby, formation of family life and at the time of enrolment to nursery and elementary school. Graduates are able to provide counselling concerning family planning and parenthood, help and provide nursing care to the pregnant woman, and perform screening tests. After childbirth, the health visitor teaches the mother the ways of breastfeeding and her tasks related to the child. They monitor the health condition and development of neonates, provide community health care for children (aged 3-18), aid in the prevention of behavioural disorders and bad habits, solve the problems of teenagers and direct them to the appropriate professional. Health visitors give mental hygiene support to families and organise vaccinations. Health visitors take part in planning, organising and conducting health development and promotion programmes for individuals and communities. They perform their duties either independently or in cooperation with doctors and other medical experts.

Qualification

Health Visitor

Public Health Supervisor

A public health supervisor deals with epidemiological tasks that consist of the organisation of public health investigations and the analysis of data retrieved during the investigations. Graduates of the speciality are able to perform public health related municipal activities, conduct appropriate municipal supervision based on current regulations, initiate, plan and manage epidemiological tasks, analyse, interpret, use and critically apply the results of epidemiological examinations, process and realize local and central health policies in order to improve the health status of the population. Public health supervisors plan and realize nosocomial surveillance, monitor the health status of the population, plan, organize, realize and evaluate preventive programmes.

Qualification

Public Health Supervisor

3. Medical Diagnostic Analysis B.Sc. Programme

Specialized programmes: Optometry (Hungarian, English), Radiography (Hungarian)

Optometry

Optometrists are able to utilise their optic, optometric, measuring and clinical knowledge gained during the training programme, conduct the examination and correction of the eye individually and prescribe optical aids (eyeglasses, contact lenses) with the aim of attaining the optimal visual acuity in patients. The professionals are able to estimate the refractive medium, refractive ability, errors of refraction, the way eye muscles function, and the ability of heterophoria and convergence. Professionals examine binocular vision, the chamber of the eye, crystalline lens, vitreous humour and the eye fundus with the help of a slit lamp, and they estimate ocular tension. Optometrists utilize their clinical and nursing knowledge during their daily activities, actively participate in improving the culture of vision of individuals, communities and the population. Through examinations, the optometrist recognises and evaluates the disorders of the eye and so contributes to the immediate receipt of specialised care.

Qualification

Medical Diagnostic Analyst (Optometrist)

Radiography

Medical diagnostic analysts individually operate modern diagnostic imaging appliances (e.g. X-ray, ultrasound, computer tomography / CT/) while keeping the related regulations and procedures. They process, evaluate and archive diagnostic imaging information, establish a daily contact with patients and prepare them for diagnostic imaging therapies. The specialists observe patients during examinations, perceive pathological situations, participate in therapeutic examinations, recognize health damaging effects as results of radiological interventions, and other technological errors, and they prevent them.

Qualification

Medical Diagnostic Analyst (Radiographer)

4. Health Care Management B.Sc. Programme

Specialized programme: Health Tourism Management (English)

Health Tourism Management

Graduates of the training take part in organising and managing health promotion activities, prepare projects that aim at developing health tourism and strengthening international cooperation, and they participate in the implementation of tourism development programmes of the European Union. The health care manager is a versatile professional who is proficient both in health care processes and in the field of tourism. Their acquired knowledge comprises information on health, tourism and business, therefore they are not only able to see through, organise and coordinate the operation of health care institutions but with appropriate business knowledge they are able to market and manage them, too. The speciality provides the necessary knowledge to create health tourism, health preservation, curative and rehabilitation programmes.

Qualification

Health Care Manager (Health Tourism Management)

II. Master of Science (M.Sc.) Programmes

Physiotherapy M.Sc. Programme

Master's level physiotherapists develop therapeutic procedures and protocols based on their extensive national and international knowledge and skills, recognise and analyse physical, anatomical, physiological and pathological factors affecting physical ability and capacity. They participate in solving scientific problems in physiotherapy, and finding new skills and knowledge in their expertise. The specialists perform scientific evaluation of the effectiveness of physiotherapeutic methods, organise and realise clinical research in physiotherapy, publish new scientific results and act as leaders in hospital units of physiotherapy, apply fundamental regulations and quality control principles in the management of health institutions and private enterprises. The promotion of health education on local, community, national and international levels also belongs to the tasks of a physiotherapist.

Qualification

Physiotherapist

Languages

Hungarian, English

Nursing M.Sc. Programme (Advanced Practice Nurse)

Master's level nurses characterise the health status of the population, formulate problems, priorities and aims in public health. They conduct research and analyse technical literature, interpret the results of modern statistical methods, perform tasks of organisation and management related to the nursing process. They are able to perform human resource management tasks related to nursing. Planning budget and writing tenders, planning, realising and evaluating programmes, and establishing cooperation between institutions and individuals belong to the tasks of nurses, too. The health care professionals are acquainted with the role and the possibilities of the improvement of health sciences in the life of society, and they are able to characterise the health status of the population. Master's level nurses formulate problems, priorities and aims in public health, they take part in solving the scientific problems of nursing, in finding new and constructing ideas about the profession and in the promotion of their practical usage.

Specialisations within the Nursing M.Sc. programme

Emergency Nursing (Hungarian)
Geriatric Nursing (Hungarian)
Community Nursing (Hungarian, English)
Intensive Nursing (Hungarian)
Perioperative Nursing (Hungarian)

Qualification

Nurse

Languages

Hungarian, English

Nutritional Sciences M.Sc. Programme (Joint training of Semmelweis University and the Hungarian University of Agriculture and Life Sciences)

Nutritionists develop quality food, functional food, food supplements, special nutrients, eco products and organic food. They develop food industrial innovations, determine food qualities considering hygienic aspects, take part in professional and counselling tasks in the field of nutrition sciences and catering. Master-level dietitians determine the composition of food and diets for healthy people and those with different diseases, perform innovative research and development work preferred by the support system of the European Union. Master's level dietitians are able to understand and solve professional problems assertively, come up with reform ideas, and carry out innovative activities. The nutrition specialist plans and compiles healthy diets in the field of health industry, wellness, medical tourism and hotel industry. Nutritionists promote the achievements of nutrition science in order to improve public health figures, work as highly qualified nutritionists, researchers, advisors and health educators.

Qualification

Nutritionist

Language

Hungarian

Teacher of Health Sciences and Health Care M.Sc. Programme

Master's level health care teachers are capable of educating people about healthy lifestyle using their knowledge gained in the fields of health sciences and pedagogy. For the sake of improving the quality of life of people, professionals plan, develop and adopt prevention programmes in the specialist training, suggest problem solving and up-to-date life models in accordance with the altered health statuses. They give advice on career orientation, career choices and career planning. While applying health education methods, the teachers are able to recognize those negative effects that arise from harmful environment or poor social situation and lifestyle. In specialised health related interpersonal relationships, their activity is characterised by high communication standards and didactic preparedness. Master's level health care teachers possess the ability to educate, and to demonstrate good example while teaching, moreover, they are able to recognize the relationship and development opportunities between the training institutions, the economy, the labour market and the social environment.

Qualification

Teacher of Health Sciences and Health Care

Language

Hungarian

Public Health M.Sc. Programme

Master's level public health professionals, with their knowledge of the scientific basis of public health and the related methodological and practical skills, contribute to the improvement of the health status of the population and to the prevention of diseases through professional, social and intersectoral cooperation. They can also put their skills into practice in the country or institution where the legislation, guidelines and protocols in force allow them to do so.

This program is designed for graduates in health professions who want to contribute to a high level of health protection and prevention of diseases and risks. We welcome students who have a strong understanding of the importance of prevention in relation to both communicable and non-communicable diseases and who wish to develop their knowledge in this field to the highest level.

Specialisations within the Public Health M.Sc. Programme

Epidemiology
Environmental and Occupational Health

Qualification
Expert in Public Health

Language
Hungarian

III. Doctoral School

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The main objective of the Doctoral School of Health Sciences is to combine theoretical and preclinical knowledge, clinical and comparative health science research, and public and public health sciences, and to improve the social sciences related to health sciences. It also aims to complement the doctoral programs at the University to ensure that health sciences are also incorporated, thus giving extra emphasis to preventive – domestic and international – health preservation programmes that satisfy public health needs and affect society as a whole.

PhD studies can be conducted in the following professional fields:

1. Clinical and comparative health sciences
2. Theoretical and preclinical health sciences
3. Society and health
4. Public health sciences

IV. Postgraduate specialist training courses

Addictology Counselling (Hungarian)
Podiatrist (Hungarian)

DEPARTMENTS

Department of Nursing

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Background

The Department was founded in 1975 as a part of the College of Health Care of the Postgraduate Medical School (now Semmelweis University Faculty of Health Sciences). It was the first college in Hungary to award degree to health care teachers in 1977. Academic level training of nurses began with part-time courses in 1989/90; since 1990/91 a full-time course has been offered as well. The College of Health Care was also the first to introduce a four-year baccalaureate certificate programme in nursing. The Masters-level programme in nursing was introduced in Academic Year 2002/2003.

Education

B.Sc. in Nursing is an eight-semester programme, either a full-time or part-time, which provides students a general knowledge of science related to nursing, health and social sciences. The Nursing B.Sc. programme is based on the Directive 2005/36/EC of the European Parliament and the one of the European Council of 7 September 2005 on recognition of professional qualifications. Our programme has been running in English since the 2011/2012 academic year. M.Sc. in Nursing is a three-semester part-time programme based on a former bachelor degree in nursing. During their studies, students learn the planning of nursing in all areas of health care, the organisation of the nursing work, the teaching of the basics of nursing and health care, the organisation of research projects in nursing, and the supervision of quality assurance in nursing care.

Research

The previous members of the Department's staff supported projects such as the development of a nursing curriculum with the introduction of distance education methodology into nursing training programmes (in collaboration with Columbia University, School of Nursing (USA) in 1995-98 and a Hungarian-Canadian nursing programme for a methodology and model of prior learning assessment and recognition (PLAR) of nurse-candidates (Douglas College, Canada) in 1999-2000. In co-operation with the Chamber of Hungarian Health Care Professionals, the present members of the Department performed investigative research into the Hungarian situation with regard to needle-stick injuries in 2006, 2008, 2013, 2018 among health care professionals. The objectives of the study were twofold: to reveal the trend in the extent to which health workers are affected, and to draw the attention of economic and education decision-makers to the importance and prevalence of the issue. The other research programme aims to explore from an international perspective the meaning of care from the point of view of nurses and patients and to find common and shared definitions between these partners of caring. In addition, it aims to identify the relationship between nurse caring and patient satisfaction and to clarify the

opinion of nurses and patients on individualized nurse caring. In this study (2008-2014), participants from 6 EU countries: Cyprus, Czech Republic, Finland, Greece, Hungary and Italy united their efforts in order to achieve the aims of the study. Europe faces severe population ageing in the near future. A new positive vision of ageing and promotion of possibilities in older age is needed. The challenge is how to transfer this vision into practice. Higher Education Institutes and associations agreed to launch a project. Funding was received from Lifelong Learning Program-Erasmus Academic Networks for a project for the years 2013-2016.

Department of Clinical Studies in Obstetrics and Gynaecology

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Background

The Department of Clinical Studies in Obstetrics and Gynaecology was founded in 2014. Earlier, the training of midwives was performed by the Division of Midwifery of the Department of Nursing. Academic level training of nurses began through part-time courses in 1989/90; since 1990/91 a full-time training programme is offered as well. Additional programmes have been introduced in recent years, including the training of midwives (2002) and a masters-level programme in nursing (2003). The English language midwifery training programme was introduced in the 2011/12 academic year.

Education

The B.Sc. midwifery training programme can be completed on either a full-time or part time track. Those who receive a midwifery degree upon successful completion of this programme are able to carry out communicational/informational/documentation activities, provide a safe and hygienic environment, complete general midwifery tasks, and provide first aid, complete tasks related to antenatal care, conduct deliveries, care for female patients, and care for the newborn and the postpartum mother. The Midwifery B.Sc. programme is based on the Directive 2005/36/EC of the European Parliament and of the European Council of 7 September 2005 on the recognition of professional qualifications. Duration of the training: 8 semesters, number of credits: 240 ECTS.

Research

Members of the Department's staff support projects and conduct research in different fields of health care and health care education, e.g.: health behaviour of practising midwives, simulation education and curriculum development, and the impact of maternal depression on pregnancies and early attachment.

Department of Physiotherapy

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Background

Underwater therapy equipment was used in the Császár baths as early as 1891. The first physiotherapy training in Hungary, which was more like an artistic movement therapy, was started by Alice Madzsar in 1912. The need for physiotherapy arose during the time of the Poliomyelitis epidemic, resulting in the foundation of a proper physiotherapy school in Budapest in 1955. At this time, the training was two years long, the duration of studies increased to four years only in 2000.

Education

The Department's aim is to train physiotherapists who can be valuable members of a health care team of prevention, care and rehabilitation. The Physiotherapy undergraduate programme consists of 240 credits, which corresponds to the requirements of a Bachelor's degree. The Department also offers the Master's Programme for another 90 credits in 3 semesters. Each term consists of courses corresponding to 30 credits. Courses are divided into theoretical and practical units, each unit covering a particular field of physiotherapy. At the B.Sc. programme the supervised clinical practice takes place from the 1st to the 7th semester (two to three weeks), and in the 8th semester (12 weeks) at a variety of medical centres. The physiotherapy programme comprises an independent graduate project corresponding to 1152 clinical practice hours, which is equal with 48 credits. The Master's programme's last semester can be divided into two halves. At the beginning the students have theoretical and practical courses and in the last 8 weeks they attend specialised clinical practice and scientific research.

Successful completion of the programme requires that students:

- acquired sufficient knowledge and skills to be able to work independently as physiotherapists;
- acquired knowledge and skills of physiotherapeutic methods of assessment and treatment, as well as knowledge of the connection between science and long-established experience;
- developed their self-recognition and capacity for empathy, thereby paying attention to ethical considerations;
- and familiarised themselves with conditions in society which affect people's health, and gained an ability to initiate and take part in the health-promoting and preventive efforts.

Biomechanical Lab

The biomechanical lab is equipped with the latest technology. With these modern pieces of equipment we can perform dynamic and kinematic measurements to demonstrate the discrepancies of musculoskeletal, neurological and other problems, moreover, we can compare the physiological and pathological movement patterns. The use of these devices helps us to test the validity of traditional physiotherapy examination methods, as well as measuring the effectiveness of the therapies by objective data. In addition, our laboratory with the new visual stimulation biofeedback equipment can be used not only to analyse the walking but to correct and develop it. So now it is suitable for therapeutic interventions. Both the B.Sc. and M.Sc. programmes' curriculum include subjects that instruct the students how to use these devices for their thesis, dissertation research and for projects in the Students' Scientific Association.

Research

Some areas of research interests at the Department:

- the biomechanical characteristics of standing stability and balance maintenance, testing by biomechanical equipment and therapeutic possibilities with physiotherapy;
- examination of posture with ultrasound-based 3D movement analyser equipment, correction of posture by physiotherapy;
- treatment of incontinence with complex physiotherapy methods;
- effects of positive end-expiratory pressure in cystic fibrosis;
- conservative therapeutic options of the knee-instabilities;
- chest physiotherapy in cystic fibrosis with the specific features of childhood;
- clinical features of paraneoplastic syndrome in the musculoskeletal system;
- the effect of exercise in cardiac rehabilitation;
- the effect of exercise in musculoskeletal rehabilitation;
- gait analysis according to the ultrasound- based 3D method.

Division of Physical Education

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The Division of Physical Education teaches the 4-semesters long criteria subject, the Physical Education (PE) for each full-time B.Sc. student. PE classes enable students to several opportunities for sport (swimming, volleyball, handball, basketball, football, floorball, conditioning, aerobic) in different locations (gym, swimming pool). Apart from the PE course, therapeutic swimming that is highly demanded by our students is also launched as a selective subject in each semester.

Colleagues of the Division participate in the operation of the Student Sport Association (DSE). Primarily, the Association provides student participation in the university's system of sport competitions.

Department of Dietetics and Nutritional Sciences

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Background

Education of dietetics in Hungary dates back to the 1920s and was initiated by Aladár Soós. The Department of Dietetics was founded in 1975 as part of the newly established College of Health Care (now Semmelweis University Faculty of Health Sciences). The main task of the Department is the undergraduate and graduate training of dietitians while providing courses on nutritional sciences and dietotherapy for other health professionals educated at the Faculty. The Department of Dietetics and Nutrition Sciences is responsible also for the training of Masters of nutrition and food sciences. The programme is carried out in collaboration with the Hungarian University of Agricultural and Life Sciences.

Education

Over the last 40 years, as many as 2000 dietitians completed their studies here. The undergraduate training course consists of eight semesters, with a total number of 240 ECTS, of which 40% is devoted to theoretical training and 60% to practice. During the education students are taught about each scope of dietetic practice such as clinical, administrative and public health/community dietitians. Graduate students can be employed in different areas of public health nutrition and nutritional research fields. Postgraduate training programmes are also available for dietitians.

In the 2009/2010 academic year a new training programme, the Master of Nutrition and Food Sciences was launched. Students are taught by experienced teachers who are recognized as experts in the field of nutrition and food technology as well as in research methodology. The duration of the training is 4 semesters with a total number of 120 ECTS. Graduate students can be employed in different areas of public health nutrition and nutritional research fields.

Postgraduate training programmes are also available for dietitians. Graduating as Masters of nutrition and food sciences allows students to continue their studies at PhD level at Semmelweis University Doctoral School in Health Sciences.

The Department of Dietetics and Nutrition Sciences has collaborative partnership with the European Federation of the Associations of Dietitians (EFAD).

Research

The Department has been involved in several projects sponsored by, for example, the EU: the "Ageing Nutrition" project (2004-06, organised by the Department), the "PORCROW" project (2004-06), furthermore, the Department participated as partner institution in the thematic network called DIETS1, "Dietitians Improving the Education and Training Standards (2006-09)" and DIETS2, 'Dietitians ensuring education, teaching and professional quality' (funded by the EACEA 2010-13). The Department is involved in the preparation of the Hungarian version of EPODE Project collaborating with the Association of Hungarian Dietitians (2014).

Members of the Department's staff are involved in the PhD education as tutor teachers.

Research area:

- Food production by fermentation for patients with food allergy and intolerance
- Nutrition Science Analysis and Dietherapeutic Interventions
- Innovation in public catering
- Disease Specific Nutrition Therapy and Communication Method
- Examination of the nutrition and nutritional status of the elderly

Fields of scientific interest are:

- Investigation of biologically active component of vegetable and fruit during cultivation, post harvesting, food technology and food preparation
- Determination of mycotoxin contamination in foodstuffs
- Monitoring of allergen contamination of equipment, tools and food preparation process
- Role of food labelling in order to improve informed and safe food choice of people with special dietetic needs
- Monitoring of different groups' nutritional status and nutrient intake for the purpose of health preservation and to identify risk factors of diet-related diseases
- Assessment and analysis of the fluid consumption habits, attitudes and product choice preferences and education of theme for the purpose of health preservation
- Teaching correct dietary habits in children's catering, development of eating behaviours
- Members of the Department's staff are actively involved in the boards of various professional organizations in the field of nutrition, such as Hungarian Society of Nutrition, Association of Hungarian Dietitians, Hungarian Food Allergy and Food Intolerance Databank, College of -Health Dietetics and Human Nutrition Council, National Association of Catering Managers.
- Moreover, they hold positions in the editorial boards of several professional periodicals.

Department of Oxyology and Emergency Care

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Background

Oxyology – the science of rapid intervention as described by the famous Hungarian physician Aurel Gabor - is a specialisation that has been recognized since 1975. The main task of the Department of Oxyology and Emergency Care is the training of paramedics at the highest possible level. It is our mission to qualify health care providers not only for the National Ambulance Services but also for the national emergency departments. The department is also responsible for the first aid teaching at the Faculty of Medicine in English and German language, and for first aid classes held at the Faculty of Dentistry.

Besides theoretical and practical B.Sc. trainings, we offer postgraduate specialist trainings for qualified nurses and paramedics, and regular accredited courses in various areas of acute care for physicians and nurses. We have been participating in the training of the Doctoral School of the Faculty with an independent research subject since

2009, while regularly offering advanced education for the students of Semmelweis University's School of PhD Studies. The Department manages its tasks with four full-time members and a number of highly qualified consulting teachers. Practical teaching is organized with the co-operation of the National Ambulance Service, hospital practices are completed in accredited teaching hospitals.

Education

- The Department regularly provides vocational and postgraduate trainings, and is closely connected with the new University Emergency Centre where practical teaching takes place.
- Staff of the Department has an established relationship with the University of Massachusetts, Department of Emergency Medicine in the area of research and development.
- Members of the Department participate in numerous professional and societal organizations of acute care and hold leading positions in the Society of Emergency Medicine and Oxyology.
- The leader of the Department is an active Examiner in Emergency Medicine for the European Board of Emergency Medicine.
- Students can join the PhD School offering participation and thesis work on "Point-of-care technologies in emergency medical care".
- An M.Sc. training programme targeting the intrahospital emergency care has been started resulting in the qualification of advanced practice nurses (APN), those capable health care professionals who work in the emergency departments under the supervision of the lead physician.
- We have launched a monthly meeting named OxyNox for trainee and graduate paramedics. This event is held in the Vas utca building where a well-known representative of prehospital care is invited as guest speaker followed by case discussions from everyday practice.
- The Paramedic Day is organised each May, where students demonstrate their practical skills during a competition.

Research

PhD research topic:

- Point of Care technologies in emergency medical care.

Students' Scientific Association research topics:

- Acute Coronary Syndrome;
- First aid training;
- Position and activities of paramedics in the Emergency Department;
- Care of the multiple injured patients;
- Shock management;
- Mental aspects of rescue/emergency work;
- Complex cardiopulmonary resuscitation;
- Communication in emergency situations;
- Role players and standardized patients in HiFi simulation.

Department of Family Care Methodology

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Background

Academic level training of health visitors (similar to district or family nurse) started in 1975 in Hungary.

Education

The aim of this eight-semester programme is to train health visitors who can give assistance to children and pregnant women in social care and in the prevention of illnesses. Practical training takes place under clinical and real-life circumstances (e.g. in hospitals and district consulting rooms).

The basic subjects (e.g. anatomy, physiology, pathology, biology) are followed by special studies in paediatrics, nursing, obstetrics, sanitation and nursing methodology. Pedagogy, psychology, health education, social sciences and information sciences are integrated into the curriculum. After submitting a thesis, students are tested in theoretical, practical and professional skills before attaining their diploma. Upon completion of the programme health visitors are entitled to work in municipal primary health care facilities, or in schools and in the area of primary preventive medical services. They can perform their duties either independently or in cooperation with doctors and other medical experts.

Research

- Preventive/visiting nurse system in Europe
- The characteristics of childhood onset depression according to depressive symptoms, co-morbidities and quality of life
- Influence of smoking during pregnancy on preterm-birth and low birth-weight
- Connection between childhood obesity, IDDM and physical activity

Department of Public Health Sciences

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Background

The overall duty of the Department of Public Health Sciences, the legal successor of the Department of Epidemiology, is to provide appropriate training for health practitioners in the field of public health and carry out different research projects. Our aim is to equip students with the knowledge and skills to make valuable contribution to public health.

The Department offers undergraduate degree programmes at B.Sc. level and a master programme will be introduced in the near future. Courses of disease prevention and health promotion are available in English for full time students of physiotherapy. The Department for Epidemiology offers a wide range of research topics with professional assistance for students, and they also contribute to the improvement of our doctoral degree programme.

A well-equipped laboratory belongs to the Department for laboratory practices of microbiology and infection control investigations.

Education

Within epidemiology, students are taught both general and specific aspects of pest control and disinfection techniques, including insect and rodent control. Following the fourth and sixth semesters, students take part in four-week practice sessions, and during the eighth semester they participate in a thirteen-week practicum.

Research

Infection Control Centre

- In order to prevent nosocomial and healthcare associated infections, the Department forms an infection control centre in collaboration with external public health partners.
- The key elements of active laboratory surveillance system:
- molecular biology methods for comparison/characterization of strains isolated from different sources;
- monitoring infections;
- computer data analysis of bacterial isolates including antimicrobial-resistance patterns.

Burial customs and funeral practices

- Treatment of dead persons according to the law and the process of mourning
- Dead people – from a public health and cultural historical view
- Characteristics and forms of burial from an intercultural perspective

Research Projects for the Students' Scientific Association

- Epidemiology and prevention of infectious diseases
- Epidemiology of diseases of civilization
- Profile of secondary prevention in Hungary and in the EU
- Appropriate food hygiene practice, infestation of food, food poisoning
- Probiotics and their effects on the human body
- The impact of climate change on food safety
- Research on natural antimicrobial proteins

Department of Clinical Studies

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Background

The tasks of the Department of Clinical Studies are: instruction of clinical knowledge in the frame of the bachelor and master degree programmes of the Faculty of Health Sciences, and participation in health sciences programmes of Semmelweis University's School of PhD Studies as consultant or reviewer.

Education

- The Department's educational activities include:
 - transmission of evidence-based, modern, medical-clinical knowledge, and familiarization with the etiology and patho-mechanism of different diseases;

- enabling students to recognize the signs of diseases, evaluate symptoms, and complete adequate patient care based on competences;
- providing basic pharmacological knowledge, therapeutic possibilities and effects, side effects, therapeutic responses;
- helping students to gain insights into the clinical significance of most important laboratory, radiological and endoscopic examinations, into the methods of clinical problem-solving, and into the pharmacological basis of medical therapy;
- preparation for the assistance in advanced diagnostic and therapeutic methods, the understanding of current medical science, and the acquirement of the competences required for health practitioners;
- the development of the solid approach of prevention-remedy-nursing-care-rehabilitation.
- The Department actively participates:
 - in the preparation of student-focused didactical strategies;
 - in the development of new subjects and training programmes;
 - in the preparation of textbooks and lecture books;
 - and in special didactical and applied clinical researches.

Research

- Hemostasis changes in pregnancies
- Diagnosis and therapy of thrombophilias
- The methodology of teaching clinical knowledge
- Fitting the level of higher education to the European Qualification Framework
- Development of validation processes in higher education
- Family planning, family care
- Social and cultural background of health care employees
- The support of parents expecting their first child; application of the APP model (PhD research)
- Family planning and maternity plans of Health Visitor students
- Anaesthesiology and Intensive therapy – patient security/safety, monitoring
- Clinical nutrition and its management with pharmaceutical aspects
- Risk screening, nutritional assessment, oral nutrition support, enteral and parenteral nutrition,
- Parenteral nutrition compatibility and incompatibility
- Methods of examination of TPN emulsions, physicochemical stability of TPN
- Role of nutrition team

Department of Clinical Studies

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Background

The tasks of the Department of Clinical Studies are: instruction of clinical knowledge in the frame of the bachelor and master degree programmes of the Faculty of Health Sciences, and participation in health sciences programmes of Semmelweis University's School of PhD Studies as consultant or reviewer.

Education

- The Department's educational activities include:
 - transmission of evidence-based, modern, medical-clinical knowledge, and familiarization with the etiology and patho-mechanism of different diseases;
 - enabling students to recognize the signs of diseases, evaluate symptoms, and complete adequate patient care based on competences;
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- The Department actively participates:
 - in the preparation of student-focused didactical strategies;
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Research

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- Risk screening, nutritional assessment, oral nutrition support, enteral and parenteral nutrition,
- Parenteral nutrition compatibility and incompatibility
- Methods of examination of TPN emulsions, physicochemical stability of TPN
- Role of nutrition team

Department of Clinical Ophthalmology

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Background

The education of optometry started in 1992 in Hungary at the College of Health Care (now Semmelweis University Faculty of Health Sciences). The Department of Clinical Ophthalmology was established in 2008. Prior to this, the education of optometry belonged to the tasks of the Department of Clinical Studies. The Department is responsible for training optometrists. This includes developing the curriculum of the optometry training, organising clinical and optical trainings for students, and keeping connection with educators and institutions who participate in the practical training.

Education

The training is the one and only optometry training in Hungary and runs as a part time training programme. The undergraduate training programme consists of eight semesters and 240 ECTS with a total number of 1062 of contact hours and 6138 individual hours, of which 40% is devoted to theoretical training and 60% to practice. Graduate training programmes are also available after completion of the basic training.

Research

The Department conducts scientific research activities in two ways:

- 1 In cooperation with the Department of Ophthalmology at the University in the following fields:**
 - Femtolasers in the surgery of cataracts;
 - Development of a new intraocular lens in surgery of cataracts.
- 2 The Department's individual scientific work is carried out in the following fields:**
 - Correction of presbyopia with contact lens;
 - Screening of the visual acuity and ametropia of children of age 7 to 14;
 - Contact lens related dry eye;
 - Contact lens wearing in childhood;
 - Computer Vision Syndrome and its connection with ametropies.

Department of Imaging and Medical Instrumentation

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Background

The Department of Imaging and Medical Instrumentation conducts teaching, scientific and supplemental activities. The Department is responsible for the education of imaging diagnostic analyst specialists corresponding to the task of training highly qualified radiographers who are experienced in every sub-field of radiology.

Education

In the four-year part-time B.Sc. education, the first three basic semesters are followed by specialist courses (Conventional radiology, US, MRI, Nuclear Medicine, Interventional therapy, Radiation therapy).

Students attaining the degree are able to use imaging tools to plan and perform examinations on their own, and to process and apply the obtained information.

Teaching is performed by leading radiologists and radiographers, mainly of Semmelweis University and of large teaching hospitals. Practical training takes place in these hospitals as well.

The Medical Engineering group teaches “Basics of Biophysics and Medical Technology” and “Info-Communication” to dietitian, nurse, health visitor, physiotherapist, paramedics and public health supervisor students.

The Department continuously produces innovative books, image collections and other teaching materials necessary for the education. For this purpose, the Department works in collaboration with the other 3 similar departments in the country to harmonize the teaching materials and the requirements.

An emphasized task of the Department is the graduate teaching of radiographers including the organisation of courses.

Research

The professors of the Department have leading positions in associations of radiology, radiography and medical technology inside and outside Hungary, and they are in the editorial boards of various scientific papers. The focus of the researchers is on clinical decision support, medical informatics, self-monitoring, on developing an immersive learning environment, or a virtual learning environment. Significant focus is put on emergency care systems, on the reduction of supply times and on successful cooperation with emergency departments.

Moreover, the Department joined the European Association of Radiographers.

Department of Applied Psychology

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Education

The main task of the Department is to offer basic psychological knowledge for all departments of the Faculty of Health Sciences in four modules which are as follows:

- *Basics of Psychology* – theoretical course including general psychology, developmental psychology, theories of personality.
- *Social Psychology* – theoretical course including group dynamics, social phenomena, attitudes, prejudices, attributes, stereotypes.
- *Communication and Personal-Development* – We use structured exercises to develop skills in the following fields: enhance group cohesion, basic communication skills, assertive communication, emphatic communication, stress managing methods, conflict management, and profession-specific communication strategies.
- *Health Psychology* – Health psychology is the field within psychology devoted to understanding psychological influences on how people stay healthy, why they become ill, and how they respond when they get ill. It focuses on health promotion and

maintenance; prevention and treatment of illness; the ethology and correlates of health, illness, and dysfunctions; and improvement of the health care system and the formulation of health policy. Health psychologists' fields of work: behavior risk factors/"pathogens" (possibilities of intervention for correction of risk behavior) behavior health preservation / „immunogenic". Conducting research into what are the views, opinions, attributes of health and illness among everyday people. Communication, cooperation, decision-making (health professional – patient interaction). The environment of treatment (how the work environment influences the health worker). Psychology of patients with chronic diseases (disabled, dying).

Division of Applied Pedagogy

Another task of the Department is promoting the basic knowledge of theoretical and practical health education and prevention for students in B.Sc. and M.Sc. trainings; emphasising the pedagogical aspects of patient-care; improving the indispensable skills in counselling and education in paramedical professions; teaching methods of health promotion, and the possibilities of development of health culture, lifestyle and health behaviour.

Research

Since the Department's scope is necessarily broad, staff members have been participating in research activities of various psychological fields:

- Nutritional and sport habits of students;
- Stress among the Professional helpers;
- The exploration of the learning attitude among 19-26 years old students;
- The relationship between burn out, emotion regulation and empathy among health professionals;
- Assessment of ethical and legal issues regarding professional tasks of doctors and nurses working in perinatal centres from the point of view of dilemmas related to the beginning and the end of life

Department of Addictology

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Background

The Department of Addictology coordinates the educational and research activities of the Faculty related to addictive disorders. Some of our fields are the symptomatology, therapy, and prevention of addictive problems. Addiction medicine is present at every specialization of our Faculty; secondary topics like intravenous drug-use, models of preventive medicine are especially practical and optional courses. Our students are involved in many of our research programmes in collaboration with other institutions in Hungary or abroad. The new fields of addiction medicine like gambling and Internet-addiction are also present in our teaching and research activities.

We have close contacts with therapeutic and rehabilitation institutions in Hungary, preventive and outpatient centers (Blue Point Center).

Education

Our Department coordinates the „Addiction Counsellor” specialization, which is the first and only opportunity to study addiction counselling in our country. The most important specialists of this field are our invited teachers. Our counsellors are also taught economics and management, which are necessary for their everyday work as coordinators of therapeutic and financial processes. They are also able to organize preventive courses on alcohol and illegal drug abuse fields.

Research

Our research interests include the application and adaptation of counselling methods in the health and social care of alcohol and drug abusers, the analytic epidemiological study of deviant behaviour, biological and ethic sides of human behaviour, the social background of medical organizations, and researches about the newest therapeutical approaches for intravenous drug users and dependent patients as well as the qualitative and quantitative approaches in the study of hidden substance users (epidemiological, qualitative and quantitative studies on the users of new psychoactive substances).

Department of Morphology and Physiology

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Background

The Department of Morphology and Physiology as a unit of the Institute of Basic Health Sciences has been operating at Semmelweis University Faculty of Health Sciences since its foundation in 1975. The Department participates in the education of the full time English language physiotherapy B.Sc. programme since 2005. The full time English language training of nurses and midwives was introduced in the 2011/2012 academic year.

Education

The Department's educational tasks include the teaching of core and optional subjects to students participating in the full- and part time trainings of the Faculty, as well as to students taking part in the Master's level programmes, in the doctorate courses and in vocational trainings. Members of the Department's staff contribute to different medical and health care research projects, too.

The Morphology Working Group teaches Anatomy and Applied Biology, whilst the Physiology Working Group teaches Physiology-Pathophysiology, Chemistry and Biochemistry in the first, second and third semesters. The following optional subjects are offered in English language:

- Biology of stem cells;
- From classical genetics to epigenetics;
- Chapters of venous circulation and hemodynamics;
- The genetic basis of muscle disorders;
- Functions of hormone receptors: scientific research and clinical practice, health and disease,
- Applied sport physiology and sport health sciences.

Research

The main research areas of the teaching staff are as follows:

- Maintaining of functional abilities and prevention of falls among older adults;
- The examination of decreased function due to low back pain with validated, self-reported questionnaires;
- The examination of posture balance and talent parameters of high school student age group;
- Signalling pathways and autophagy in cancer;
- Stem cells: prospects and challenges;
- Statistical analysis of Hungarian twin data;
- Signal transduction pathways in maternal-fetal interactions in normal and complicated pregnancies;
- A possible model of venous varicosity in rats;
- Effects of hormones on vascular remodelling;
- Roles of G protein-coupled receptor signalling in the vascular function;
- Roles of physical activity in prevention of chronic diseases;
- Signs of cardiovascular sport adaptation;
- Gerontokinesiology – translational animal models: organization of motor control and cognitive functions,
- Walking assessment and dementia prediction;
- Prevention of falling and fracture in elderlies;
- Movement/sport nutrition;
- Active and passive exercise (experimental and human studies);
- Bariatric and metabolic surgery in rats;
- Neurocardiological aspects of exercise-driven rehabilitation in rats,
- Survey of environmental factors influencing ADHD symptoms among elementary school children.

Department of Social Sciences

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Background

The Department of Social Sciences belongs to the Institute of Basic Health Sciences. The role of the Department is to support all students to recognize and to prepare for the social, cultural and economic embeddedness of their future health care professions. Our Department offers theoretical and practice-oriented knowledge – discussing general and special health care related problems – in the fields of Sociology, Social Anthropology, History of Health Sciences, Law, Ethics, Scientific Research Methods, as well as Medical Economy and Management. These modules – as essentials in health care labour market – are to improve conscious employee competencies and social responsibility. Our Department actively participates in an extended Europe-wide network, COHEHRE. The members of the Department of Social Sciences occupy leading positions in several professional and social organizations and take part in their work (Hungarian Association of Medical History, Public Body of Hungarian Academy of Sciences, Hungarian Sociological Association, American Anthropological Association, The European Association for the History of Medicine and Health (EAHMH), Hungarian Association of Sport Studies). Furthermore, our colleagues have a hand in the edition of different scientific journals, such as Development and Financing, Central European Studies, Kaleidoscope – Journal of History of Culture, Science and Medicine, and the newly initiated Developments of Health Sciences.

Education

The Department takes part in the educational development of all B.Sc. and M.Sc. programmes of the Faculty and in the elaboration of curricular directives. As a participant of full time and part time trainings in Nursing and Patient Care, Health Care and Disease Prevention, and Medical Laboratorial Diagnostic Imaging programmes, the Department is responsible for teaching the following subjects: Health and Society, Introduction to Health Care Economics, Health Care Management, Health Care Law, Bioethics and Professional Ethics, Philosophy of Health, Thesis Methodology. Additionally, the Department has been organising the Health Care Project Manager postgraduate course (in Hungarian) since 2008, which enables graduates of the course to successfully (project) manage tasks and situations in every area of the health system. As a result of an educational cooperation between Semmelweis University Faculty of Health and Public Services, Semmelweis University Faculty of Health Sciences and the Budapest Metropolitan University, the Health Care Management B.Sc. started in Hungarian language (with Health Tourism Management speciality) in a form of part time programme in September 2014. The programme is supervised by the Faculty of Health and Public Services (the programme supervisor is Dr. Miklós Szócska). Our Department is involved in the coordination and teaching work related to the programme.

The Health Care Management B.Sc. programme enables graduates of the course to successfully design and construct client-centred health tourism programs, to analyse statistical data related to tourism, and to coordinate touristic and health touristic projects with the implementation of knowledge about the system of health care and touristic institutions.

One of the main concerns of the Department is to provide adequate and flexible knowledge in the most suitable ways, therefore we devote special attention to the innovation of our methods of instruction. To keep a continuous interdisciplinary discussion about this topic, we have organized eight 'Professional Days on Teaching and Research Methodologies' so far. Most of our staff have experience in teaching abroad, which has broadened our perspectives and made us more conscious about the approaches we apply.

Research and professional forums

With the aim of building networks of knowledge relating to social sciences and health, the Department of Social Sciences highly engaged with the creation of forums for interdisciplinary and inter-professional discussion. As a result, the Department hosted various professional days and conferences in the past years.

As a result of this work, in 2016 the Department organized the 5th Professional Day and Conference on Patient Rights. The next edition of this bi-yearly event was in the fall of 2018. The aim of the conference was to examine the current ethical and legal issues arising in the everyday practice of health care with the involvement of a wide circle of scientific and professional audience. The highlighted topics of the conference are the ethical and legal questions of health care for children, the dilemmas related to informed consent and communicational gaps during health care delivery, the questions of legal liability in emergency care and the opportunities for implication patients' rights during health care delivery.

In 2018, the Department gave place for the Professional Day on Health Tourism. The programme of the event put emphasis on the facilitation of discussion about the opportunities, weak points, results and possible legal regulation of health tourism.

With the initiation of the Faculty of Health Sciences, Department of Social Sciences a conference has been organized since 2017 with the title of 'Harmful/Protective Society'. The conference is a fruit of cooperation between three organizational units of Semmelweis University: The Faculty of Medicine Institute of Behavioural Sciences, the Faculty of Health and Public Service, Institute of Mental Health and the Faculty of Health Sciences Department of Social Sciences. The primary aim of the conference is to build a scientific community for those researchers who work on better understanding of the interconnectedness of health and society. The programme of the conference represents the results of ongoing research projects in the fields of Medical Sociology and Sociology of Health, with the emphasis on the mental, physical, and social dimension of health. Furthermore, the participants may share their experiences about challenges of teaching social sciences in health care training programmes.

Main research areas of the Department include: labour migrants in the

health care sector; health and social care of migrants and minorities in Europe; comparative analysis of archive sources, legal sources on health care of the 18-19th centuries; epistemology of interpretive anthropology; developing intercultural competences; minority education and its effects on cultural connectedness; comparative analysis of dentistry business income producing capability; typology of ancient votive uterus-representations; analysis of the archival sources related to the birth-control and the midwife training; ethical and legal dilemmas in the practice of perinatal intensive care from the point of view of the beginning and the end of life; the socio-economic status of nurses and its sociocultural context; modern pedagogical approaches of Hungarian health promotion by peer education (TANTUdSZ Programme).

Our department provides external review and evaluation for the Healthy Diversity project, which is an international consortium of 7 different organisations aiming at developing training materials for health care professionals in VET sector.

Department of Health Promotion Methodology

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Background

The mission of the Department of Health Promotion Methodology is to represent in the higher education sector the healthy lifestyle and healthcare decision support solutions increasingly used on electronic devices; which is world-class in its form as an educational, research, knowledge and service center.

Education

The department's areas of expertise cover the basic knowledge of process-based and value-based healthcare as well as healthcare founded on evidence obtained in real life, with special emphasis on health promotion as function of health behavior, the processes of patient support, health planning, health care communication and health-cooperation, the user experience and health experience, the human-machine collaboration and service-planning responding to this, job competency development as well as device design.

In education, it is primarily adapted to the training programs of the Faculty, while it also plays a role in the training programs of other faculties. It makes its training materials available for medical and health sciences students of other domestic institutions.

Research and professional forums

Its research focuses on the areas of health promotion solutions and human-machine collaboration emerging with the development of technology, with its sub-themes being organization, analysis and evaluation, behavioral, social, planning and design.

Through its knowledge-sharing activities, it assumes an active role in disseminating knowledge about people-centered healthcare to both other disciplines and to the general public.

Through a wide range of collaborations, the University is developing health-promoting applications that can be used by the population.

Department of Voice, Speech and Swallowing Therapy

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Background

The task of the Department of Voice, Speech and Swallowing Therapy is primarily to train its students, to teach professional subjects related to the program, to elaborate and develop subject programs, and to perform organizational work related to theoretical and practical education.

In order to ensure the professional development of our students, our task is to maintain continuous contact, cooperation and coordination with all organizational units and professional practice venues involved in the training of voice, speech and swallowing therapist students.

We regularly hold further training and preparation consultations, workshops and professional trainings for the therapists and master instructors conducting internships.

Education

At the department, we carry out research aimed at the development of the profession of voice, speech and swallowing therapist, and publish the results of the research in domestic and foreign journals. We provide an opportunity for students to get involved in research work, we help their Students' Scientific Association (TDK) and the preparation of their dissertation as a supervisor.

We participate as a lecturer in professional national and international conferences and domestic trainings in the fields of ear, nose, laryngology, phoniatrics, neurology, rehabilitation, child rehabilitation, special education.

The instructors are members of the management and are professional supporters of various national professional and social organizations.



ANDRÁS PETŐ FACULTY

Brief of Professor András Pető, the founder and namesake of András Pető Faculty

The founder of conductive education was born on 11th September 1893, in Szombathely, Having studying medicine at the University in Vienna and working in various hospitals in Austria, Andras Peto became an experienced neurologist. He was a pioneer in working with children with cerebral palsy by using a holistic approach to overcome any difficulties connected to their neurological motor disorders.

In the beginning of 1950, Peto founded his first Conductive Education centre which has been a foundation of the current András Pető Institute of Conductive Education and College for Conductor Training in Budapest, Hungary. Pető began to work with children with cerebral palsy, whose condition had been thought incurable and after a year an inspection committee reported that the children's condition had considerably improved. He provided motor therapy, special gymnastics, breathing exercises and motor education. "He put 'health' and 'illness' on another basis. He approached the problem with a bio-psycho-social-holistic view. It appears in his terminology too – there is 'client' instead of 'patient', a dynamic process analysis instead of the causal approach, educative-reeducative learning together instead of therapy-curing, a conductor leads towards independence instead of a doctor-physiotherapist."*

He worked persistently until his death. He died in the institute in 1967.

Pető's mission and legacy have been carried through the years and the geographical borders; although the aim remained the same – to show individuals suffering from injuries to the central nervous system and their families the way to a full life and to make society aware of the opportunities to help.

Nowadays, the András Pető Faculty of Semmelweis University (also known as Pető Institute) apart from providing conductive care to individuals with motor disorders; also prepares future professionals for implementing and practicing Conductive Education.

Facts and Figures

- More than two thousand students graduated since conductor training has started. Among these students there are Hungarian as well as international students, since the 1980's.
- The faculty has participated in international Erasmus programmes via different European projects, and different Erasmus+ student programmes. The Practicing Institutions of the Faculty also accepts students for Erasmus+ traineeship programme and offers the opportunity to get familiar with the practice of conductive education.
- The Faculty has different higher education cooperations in Europe, such as the United Kingdom, Germany, Russia, Ukraine and Romania.
- Training of Japanese conductors gave the opportunity to establish conductive education institutions in Japan, as our first Asian partners.
- New education cooperation has been established in the Public Republic of China, Shandong, and Jinan.
- More than 30 years of experience in coeducation is gained with the Aquinas College, in Grand Rapids, Michigan, United States.
- The faculty members are continuously working on developing its education programmes both in Hungarian and English and the cooperations with other higher education institutions.

Leadership, Dean's Office

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Dean **Andrea Zsebe PhD**

Vice Deans **Ibolya Túri PhD –Vice Dean of Scientific Affairs**

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Information about the Conductive Pedagogy Bachelor programme

Training system

Hungary, as a member of the European Union, belongs to the unified European Higher Education Area, which in principle follows the multi-cycle (bachelor, master, and doctorate) training system. In this system it is much easier for students, lecturers, and researchers to travel and build international relations, moreover, as citizens of the European Union they can continue their studies and plan their future as employees or entrepreneurs in any of the member states.

These opportunities open a wider field for non-European citizens studying in Hungary as well, since the possibilities of internal mobility inside the unified Europe are based on the training channels and close relationships between countries in the labour market and among institutions.

Conductive Pedagogy Bachelor programme

The conductor is an educational rehabilitation professional who is trained to use the method of conductive education and support the habilitation of children with cerebral palsy or other impairments of the nervous system causing difficulties in motor development/performance or coordination. Conductor is able to participate in adult rehabilitation as well, specialised in motor development of those who has neurodegenerative diseases such as Parkinson disease or Multiple Sclerosis, or conditions after stroke, or cranial/brain injuries. Conductive education through its holistic approach supports its participants in developing as independent life as possible by coming over or learning to live with their difficulties.

Field Practices

Practical training is closely related to the theoretical education in conductor training and organised by the faculty. The given order of the different practice cannot be changed.

The conductor BA programme is an 8-semester-long training including more than 40 percent practice of the total education hours.

Major curricular components: History of Education, Theory of Education, Functional Anatomy, Special Education, Anatomy of the neuro-system and musculoskeletal systems, Introducing to Psychology, Neuro Psychology, Conductive Pedagogy, and methodologies of rehabilitation at different fields of study.

Career opportunities: working in conductors' team, working in multi-professional teams in education, rehabilitation, or health institutions.

Qualification

Conductor

DEPARTMENTS

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Dr. Gábor Csikós	College Senior Lecturer	Department of Human Sciences
Ágnes Elek	Master Teacher	Department of Human Sciences
dr. Éva Feketéné Szabó	College Professor	Department of Conductive Pedagogy
dr. András Fogarasi	Professor	Department of Conductive Pedagogy
dr. Renáta Földesi	College Associate Professor	Department of Conductive Pedagogy
dr. Tamás Frank	College Senior Lecturer	Department of Human Sciences
Franciska Gál	Master Teacher	Department of Conductive Pedagogy
Kata Hodász	Assistant Lecturer	Department of Conductive Pedagogy
Helga Hollosy	Language Teacher	Department of Human Sciences
dr. Zsófia Kállay	College Senior Lecturer	Department of Conductive Pedagogy
Anita Gabriella Kapcsándy	Master Teacher	Department of Conductive Pedagogy
dr. habil Anna Kelemen	College Professor	Department of Conductive Pedagogy
Dorottya Kenesei	Assistant Lecturer	Department of Conductive Pedagogy
dr. István Kollega Tarsoly	Senior Research Fellow	Department of Human Sciences
Erika Kolumbán	Master Teacher	Department of Conductive Pedagogy
dr. János Lengyel	Language Teacher	Department of Human Sciences
dr. Róbert Mascher	College Professor	Department of Human Sciences
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Eszter Pázmándi	College Assistant Lecturer	Department of Human Sciences
Katalin Perger	Master Teacher	Department of Human Sciences
dr. Henriett Pintér	College Associate Professor	Department of Human Sciences
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