## FACULTY OF PHARMACY

### STUDY PROGRAMME

#### First Year

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Lectures</th>
<th>Practices</th>
<th>Credit Points</th>
<th>Prerequisites</th>
<th>Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>General and Inorganic Chemistry I. Practice GYASKASKG1A</td>
<td>–</td>
<td>5</td>
<td>5</td>
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<tr>
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<td>Medical Terminology** GYLEKOTRG1A</td>
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<td>Subjects</td>
<td>Lectures</td>
<td>Practices</td>
<td>Credit Points</td>
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<td>Biology I. Practical course grade</td>
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<td>Hungarian Medical Terminology II. * GYLEKMSZG2A</td>
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<td>Hungarian Language I.</td>
<td>practical course grade</td>
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**Total Credit** 30

#  The grade influences the qualification of the diploma  
*  Obligatory courses  
**  Obligatory elective courses: (2 credit points).  

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

2. Genetics and Genomics (e-book)  
7. Mihalik: Botany for Students of Pharmacy. (Szeged)  
Recommended textbooks:

5. Belák E. Medical Terminology for Beginners (earlier title: Medical Latin), Bp. Semmelweis Kiadó

MATHEMATICS

University Pharmacy, Department of Pharmacy Administration
Tutor: Dr. Andrea Meskó

In the first year of the curriculum two hours of lectures are given to pharmacist students under the title above. The lectures are accompanied by practicals to help a better understanding and to get experienced in solving problems and exercises.

The title covers two, more or less independent, subjects. The majority of the lectures (over 60 per cent) is devoted to (classical) mathematics, the smaller part, however, in which biostatistics are given, is not of less importance.

The aim of learning classical mathematics is to understand biological, chemical, and physical processes dealt with in the subjects mentioned. The most appropriate mathematical model for the processes in nature are functions of one or more variables. To obtain the proper function for a particular process a differential equation is to be solved. The notion and the way of solution of differential equations is the central point of the course. The others namely limits, differential and integral calculus, discussion of functions, series etc. are, however, necessary preparatory steps for getting
acquainted with differential equations. Biostatistics, the other subject under this title, is a more recent branch of sciences. Its importance is permanently increasing in each field where data are present, i.e. quite everywhere in scientific work. Pharmacological investigations, clinical trials, epidemiological studies (etc, etc.) cannot be carried on without the statistical analysis of the data obtained. The results of the above mentioned studies are always derived by statistical inference. Statistics is an indispensable part of any research from planning the experiment to interpretation of the results. Statistical methods are essential even for students in their laboratory work.

MATHEMATICS I.

University Pharmacy, Department of Pharmacy Administration
Tutor: Dr. Andrea Meskó

First Semester

Lectures: 2 hours per week
Practicals: 2 hours per week

Differential and differential coefficient. Rules for derivations of functions.
The derivative of the power function.
Application of differentiation for calculation of limits of fractions.
An iterative method to solve equations (Newton-method).
Expansion of differentiable functions to power series. The Taylor series of exp x, sin x, cos x, ln x and other functions.
Qualitative examination of functions. Roots, extremes and inflexion points.
The multiplicity of a root.
The complete discussion of elementary functions.
Integration as the inverse operation of derivation. The indefinite integral.
Integration of power functions. Integration of simple elementary functions.
Integration of products (the rule of “partial integration”). Integration of composite functions. Integration of rational fractions.
Area under a curve: the definite integral. Improprious integrals.
Separation of variables as the method of solution. General and particular solutions. Introduction of new variables.
Nonlinear differential equations of the first order.
Differential equations of the chemical reactions of 0th, 1st and 2nd order.
Functions of several variables. Partial derivatives of first and second order.
Different kinds of integration of functions of several variables. Integration along a line. Point functions and independence of the integral of the path.
Calculation of the integral along different curves.

MATHEMATICS II.

University Pharmacy, Department of Pharmacy Administration
Tutor: Dr. Andrea Meskő

Second Semester

Lectures: 2 hours per week
Practicals: 1 hour per week

Introduction and information. The most common calculations in laboratory. Some hints for numerical calculations.
Measures of central tendency (mode, median, mean etc.) Applications of the weighted mean. Measures of dispersion.
Standard deviation and variance. The coefficient of variation. Error bounds. The standard error of the mean.
The concept of “regression line”. The linear regression: coefficients, interpretation, application. 
Sampling distributions. Important distributions derived from the normal one: t F, and chi-squared distributions. The use of statistical tables.
Theoretical background of statistical inference. Qualitative and quantitative conclusions. Estimation; confidence interval for the expected value. 
Testing hypotheses. The concept of “significance”. Errors of the first and of the second kind. The t-tests.
Analysis of variance. The Ftest. Discrete and dichotomous distributions; variables on a nominal scale. The Poisson distribution.
Analysis of qualitative data. Counting tables. Measures of association and statistical tests in fourfold tables.
Sets (finite and infinite). Natural, integral, rational, real and complex numbers.
Definition of a function.
General attributes of the functions. Classification of elementary functions.
Rational and irrational functions.
Transcendent functions: exponential, logarithmic, trigonometric and cyclometric functions. 
Limits of functions. Continuous functions.
Radius of convergency.

BIOLOGY I.

Department of Genetics, Cell- and Immunobiology
Course director: Prof. Dr. Edit Buzás
Course coordinator: Dr. Orsolya Láng
Subject code: GYGENBILG 1A (practice)
GYGENBILE1A (lecture)
Credit: 4

1st Semester
<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture</th>
<th>Practice</th>
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<tbody>
<tr>
<td>1.</td>
<td>The cell membrane: structure and function</td>
<td>The light microscope in use</td>
</tr>
<tr>
<td>2.</td>
<td>Structure and function of the nucleus I</td>
<td>General view of the cell. Light and electron microscopic microtechnique.</td>
</tr>
<tr>
<td>3.</td>
<td>Structure and function of the nucleus II</td>
<td>Cell nucleus. Cyto(histo)chemistry</td>
</tr>
<tr>
<td>4.</td>
<td>Endoplasmic reticulum and the ribosomes</td>
<td>Endoplasmic reticulum</td>
</tr>
<tr>
<td>5.</td>
<td>Golgi complex, secretion and protein transport</td>
<td>Golgi complex</td>
</tr>
<tr>
<td>6.</td>
<td>Lysosomes, endocytosis, vesicular transport</td>
<td>Midterm (written)</td>
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<tr>
<td>7.</td>
<td>Structure and function of mitochondria and peroxisomes</td>
<td>Secretion. Immunohistochemistry</td>
</tr>
<tr>
<td>8.</td>
<td>The cytoskeleton,</td>
<td>Endocytosis. Cellular digestion. Enzyme-histochemistry</td>
</tr>
<tr>
<td>9.</td>
<td>Cellular movement</td>
<td>Cell and tissue culture</td>
</tr>
<tr>
<td>11.</td>
<td>Extracellular regulation of cells, signal transduction I</td>
<td>Cytoskeleton and cellular movement</td>
</tr>
<tr>
<td>12.</td>
<td>The cell cycle and its regulation I</td>
<td>Cell surface differentiation, ultrastructure of cellular junctions</td>
</tr>
<tr>
<td>13.</td>
<td>The cell cycle and its regulation II</td>
<td>Midterm (written)</td>
</tr>
</tbody>
</table>
14. Cellular aging and programmed cell death (apoptosis)  

**Important notes:**
Students must visit at least 75% of the lessons. 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.
There are two midterms during the semester. To get practice grade and signature the average of the midterms have to be 2.0. Missed or failed midterms might be repeated two times. No improvement of midterm grade.
Requirement of lecture signature is: practice grade and not more than three absences from the lectures.
Students having lecture and practice signature may give the exam. Exam is a written test (multiple choice, essay, drawing etc. similar to midterms) covering practice and lecture parts.

**BIOLOGY II.**

Department of Genetics, Cell- and Immunobiology
Course director: Prof. Dr. Edit Buzás
Course coordinator: Dr. Orsolya Láng
Subject code: GYGENBILG_2A (practice)
GYGENBILE_2A (lecture)
Prerequisite: Biology I.
Credit: 3
Lectures: 2 hours per week
Practices: 2 hours per week

**Second Semester**

<table>
<thead>
<tr>
<th>Week</th>
<th>Lectures</th>
<th>Practices</th>
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<tbody>
<tr>
<td>1.</td>
<td>Meiosis</td>
<td>Typical and atypical mitosis</td>
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<tr>
<td>2.</td>
<td>Introduction to human genetics; human</td>
<td>Meiosis and gametogenesis</td>
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<tr>
<td>No.</td>
<td>Topic 1</td>
<td>Topic 2</td>
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<tr>
<td>3.</td>
<td>Mutations and polymorphisms I.</td>
<td>Cytogenetics I.</td>
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<td>Mutations and polymorphisms II.</td>
<td>Cytogenetics II.</td>
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<td>5.</td>
<td>Epigenetics</td>
<td>Introduction to humangenetics; special methods of humangenetics</td>
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<td>6.</td>
<td>Cytogenetics I.</td>
<td>Molecular genetics I.</td>
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<td>7.</td>
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<td>Autosomal inheritance I.</td>
<td>Molecular genetics II.</td>
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<td>Molecular genetics III.</td>
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<td>10.</td>
<td>Role of sex in inheritance</td>
<td>Application of genetic methods in the study monogenic inheritance I.</td>
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<td>11.</td>
<td>Genetics of sex</td>
<td>Application of genetic methods in the study monogenic inheritance II.</td>
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<td>12.</td>
<td>Relationship of genom and environment.</td>
<td>Complex inheritance</td>
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<td>13.</td>
<td>Pharmacogenetics, -genomics</td>
<td>Midterm II.</td>
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<tr>
<td>14.</td>
<td>Gene and genom manipulation</td>
<td>Consultation</td>
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**Important notes:** see at Biology I.

Students having lecture and practice signature may give the final exam. Final exam is a written test.
(multiple choice, essay, drawing etc. similar to midterms) covering practice and lecture parts of Biology I and II.

**BIOPHYSICS I.**

Tutor: *Dr. Károly Módos*

**First Semester**

**Lectures** (2 hours per week)

- Introduction; structure of matter; interactions
- Gases, crystals, liquids, Boltzmann distribution
- Properties of condensed matter
- Liquid crystals, membranes
- Structural organization of macromolecular systems
- Radiations, light, optics
- Wave and corpuscular nature of light
- Light absorption and emission, light scattering, vision
- Electromagnetic radiations, thermal radiation
- Luminescence
- Lasers
- X-radiation
- Ionizing radiations, radioactive decay
- Dosimetry
- Sound, ultrasound, hearing

**Laboratory** (3 hours per week)

- Laboratory safety rules
- Data processing
- Emission spectroscopy. Light sources
- Spectrophotometry
- Optical lenses; light microscope
- Detection of nuclear radiations
- Oscilloscope
- Radioactive power of an X-ray tube
- Special light microscopes
- Gamma energy determination
- Electronic blood particle counting
- Picoscale
- Determination of skin-impedance
- Concentration determination with refractometer
- Isotope diagnostics
- Repetition, consultation

**BIOPHYSICS II.**
## Second Semester

### Lecture (2 hours per week)

- Transport phenomena, flow of fluids and gases
- Diffusion, osmosis
- Thermodynamic aspects of transport processes
- Laws of thermodynamics
- Membrane potential
- Signals as information carriers, signal processing
- Detectors, transducers, displays
- Basic electronic units and circuits
- Physical methods for structural analysis I
- Physical methods for structural analysis II
- Regulatory system in technics and b
- Some diagnostic methods, endoscopy, thermography, ultrasound echo, Doppler, X-ray
- Isotope diagnostics
- Magnetic resonance imaging
- Some therapeutic methods, laser surgery, radiation therapy
- Research fields in the Department of
- Biophysics and Radiation Biology

### Laboratory (3 hours per week)

- U V-dosimetry
- Dosimetry
- Amplifier
- The attenuation of gamma-radiation
- Pulse generators
- Sine wave oscillators
- Audiometry
- Densitography (CT)
- Calculations
- Flow of fluids. Electric model of vascular system
- Electrocardiography
- Diffusion
- Sensory function
- Repetition
- Repetition

### GENERAL AND INORGANIC CHEMISTRY I.

**Lecturers:** Dr. Béla Noszál, Dr. István Szulai  
**Tutor:** Dr. Krisztina Kurin-Csörgei

## First Semester

Elementary particles: quarks, leptons, gauge particles, electron, proton, neutron.


Determination of MM by colligative properties.

# PRACTICAL GENERAL AND INORGANIC CHEMISTRY

## First Semester

**Lectures** (4+1 hours per week)

- Methods of purification of chemical substances. Recrystallization.
- Sublimation.
- Ion exchange. Distillation.
- Chemical purification.
- Preparation of inorganic compounds.
- Stoichiometry of chemical reactions.
- Theoretical yield, actual yield and percent yield. Types of chemical reactions.
- Acid-base reactions. Preparation of inorganic compounds by acid-base reactions.
- Acid-base properties of salt solutions, hydrolysis.
- Thermal decomposition of inorganic compounds (acids, bases, salts).
- Preparation of inorganic compounds by

**Practicals** (5 hours per week)

- Safety instructions. General instructions on the requirements. Recrystallization of KA1(SO$_4$)$_2$. 12 H$_2$O. Sublimation of iodine.
- Chemical purification of sodium chloride.
- Water purification using ion exchange resins.
- Distillation of hydrochloric acid.
- Preparation of CuSO$_4$. 5 H$_2$O
- Preparation of (NH$_4$)$_2$SO$_4$, H$_3$BO$_3$ from borax (Na$_2$B$_4$O$_7$)
- Preparation of CaHPO$_4$. Observation of hydrolysis of some salts.
- Observation of thermal decompositions.
- Determination of the mass of a
- Observation of some oxidation-reduction reactions.
- Preparation of metallic copper and
oxidation-reduction reactions.

Complex formation reactions. Naming of complex ions and coordination compounds.

Methods of preparation of double salts and coordination compounds.


Precipitation reactions. Equilibria in precipitation reaction.

Problem-solving in general chemistry. (Calculation of molar masses of nonelectrolytes from colligative properties).

Problem solving in general chemistry (Electrochemistry)

metallic manganese.
Reactions of metals.
Preparation of Cu$_2$O and FeSO$_4$

Preparation of precipitated sulfur.
Experimental observation of direction of redox reactions (standard potentials).
Preparation of a double salt (Mohr salt, (NH$_4$)$_2$ Fe(SO$_4$)$_2$. 6 H$_2$O
Preparation of a buffer solutions.
Preparation of Cu(NH$_3$)$_4$ SO$_4$ and Co Hg(SCN)$_4$ coordination compounds.
Qualitative comparison of solubility products.
Observation of osmosis.

Dependence of the reaction rate on concentration and temperature.
Observation of catalysis.
Decomposition of hydrogen peroxide.
Closing inventory. Problem-solving.

**GENERAL AND INORGANIC CHEMISTRY II.**

Lecturer: Dr. Zsuzsanna Nagy-Ungvárai

**Second Semester**

3 hours per week (lecture)

**Weeks  Introduction**

Chemistry of hydrogen, oxygen, nitrogen and carbon.


Chemistry of other nonmetallic elements
The noble gases. (He, Ne, Ar, Kr, Xe, Rn) and their compounds. The halogens (F, Cl, Br, I, At): occurrences, preparation, properties and uses. Oxyacids and oxyanions. The biological role of halogens.

The group 6A elements (S, Se, Te). General characteristics, occurrences, preparation, properties. Oxides, oxyacids and oxyanions of sulfur and selenium. Sulfur and selenium in biology.


Metals
Occurrence and distribution of metals. Metallurgy. The physical and chemical properties of metals and alloys. The alkali metals (Li, Na, K, Rb, Cs). General characteristics. Some important compounds of sodium and potassium.

The alkaline earth metals (Be, Mg, Ca, Sr, Ba). General characteristics. Some important compounds of magnesium and calcium. The zinc-group metals (Zn, Cd, Hg). Occurrences, chemical properties.

The transition metals. Physical properties, electron configurations and oxidation states. The chemistry of selected transition metals: chromium, manganese, iron, copper, molybdenum, platinum.
Chemistry of coordination compounds

10

11
The dynamics of coordination compounds: Complex equilibria, ligand exchange rates. The coordination chemistry of alkali metal ions. (Hostguest complexation.)

Metals in biology

12
Life essential metals and ligands in biosystems. Metals in enzymatic and trigger processes. Metals in oxygen and nitrogen biochemistry.

13
Metals in biomineralization. Metal-induced toxicity. The biomedical use of metal complexes and metal complexation.

The chemistry of the environment

14
A brief overview of the chemistry of the litosphere, hydrosphere and atmosphere.

ANALYTICAL CHEMISTRY I.

Qualitative Chemical Analysis
Lecturer:  
Dr. István Szalai, Dr. Norbert Szoboszlay
Practical:  
Dr. István Szalai, Dr. Norbert Szoboszlay
Tutor:  
Dr. Krisztina Kurin-Csörgei

Second Semester

Lectures (2 hours per week)
- Subject and aims of analytical chemistry.
- Analytical chemistry and other sciences.
- Qualitative and quantitative chemical analysis.
- Chemical and physical methods of analysis.
- The characterization of analytical reactions.
- Specificity, selectivity and sensitivity of analytical reactions. Requirements for qualitative chemical

Practicals (5 hours per week)
- General rules of work in the laboratory of analytical chemistry. Study of reactions of Group I cations.
- Part I: Bi^{3+}, Pb^{2+}, Cd^{2+}.
- Study of reactions of Group I cations.
- Part II: Hg^{2+}, Hg^{2+}, Ag^{+}, Cu^{2+}.
- Identification of cations in mixture


Summary of properties of elements and reactions of Group III cations. Solubility and complex ion equilibria and application in qualitative analysis of ions.


Study of ion reactions of Group I cations. Study of ion reactions of Group II cations: As/III/, /V/, Sb/III/, /V/, Sn/II/, /V/.

Analysis of Group I cation in unknown samples. Identification of the second group of cations in mixtures.

Study of ion reactions of Group III cations. Part I: Co^{2+}, Ni^{2+}, Fe^{2+}, Fe^{2+}, Cr^{3+}.

Study of ion reactions of Group III Part II: Al^{3+}, Mn^{2+}, Zn^{2+}. Analysis of unknown mixture of the third analytical group of cations.

Study of ion reactions of Groups IV–V cations. Analysis of Group III cations in unknown samples. Detection of cations in the mixture of the fourth and fifth analytical groups of cations.

Analysis of unknown samples containing cations of the Groups I–V. Study of reactions of the first analytical group anions. Study of reactions of the second and third analytical groups of anions.

Study of reactions of the fourth group of anions. Identification of anions in the mixture of Groups I–IV anions.
Summary of reactions of common anions.

**Lectures** (2 hours per week)

Analysis of cation-anion solution sample. Preliminary and specific tests.
Analysis of cation-anion unknown solid sample. General procedure for chemical analysis.
Physical methods of qualitative analysis.

Special tests for mixture of anions.

**Practicals** (5 hours per week)

Analysis of cation anion unknown solution sample (3–5 ions).
Analysis of cation anion unknown solid samples (3–5 ions).

Analysis of unknown simple substances.

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**PHARMACEUTICAL BOTANY I.**

Department of Plant Anatomy
Tutor: Dr. Gábor Kovács

Second Semester

<table>
<thead>
<tr>
<th>Week</th>
<th>Lectures</th>
<th>Practicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction. The Plant Kingdom. The botanical sciences. Pharmaceutical Botany, the program of the lectures.</td>
<td>Fundamentals in Botany. The use of the light microscope. Knowledge of the medicinal plants</td>
</tr>
<tr>
<td>2</td>
<td>Compartmentalization and metabolic pathways in plant cells.</td>
<td>Plant cells (plasmolysis, cycloses).</td>
</tr>
<tr>
<td>3</td>
<td>Chloroplast and photosynthesis. Starch formation and degradation.</td>
<td>Plastids, reserve polysaccharides, protein bodies.</td>
</tr>
<tr>
<td>5</td>
<td>Mitochondrion and respiration.</td>
<td>Vacuole, crystals, lipid bodies.</td>
</tr>
</tbody>
</table>
A visit to Research Institute for Medicinal Plant (Budakalász) by coach, to study the chemotaxonomic plant collection. Field practice in the mountains near to Budapest to study the springtime blossoming medicinal plants.

ANATOMY

Tutor: Dr. Ágnes Csáky

Second Semester

The aim of the subject is to introduce to the fundamentals of the structure of the human body and by this teach the essential terms used in the communication between pharmacists and physicians. The topic anatomy also serves as a preliminary study for later clinical subjects and deals with the basic methods of morphological research. The programme refers to anatomical books and periodicals helping the pharmacists to complete their
knowledge in necessary.

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Introduction, general Embryology</td>
<td>Microscopy: stratified epithelium, connective tissue, cartilage, bone</td>
</tr>
<tr>
<td>2 Basic tissue</td>
<td>connective tissue, cartilage, bone</td>
</tr>
<tr>
<td>3 Bone, joint and muscle types</td>
<td>Macroscopy: bones and joints of the shoulder girdle and upper limb</td>
</tr>
<tr>
<td>4 Ossification, development of the vertebral column</td>
<td></td>
</tr>
<tr>
<td>5 Heart and its development</td>
<td>Microscopy: artery and vein, blood, lymph node spleen, palatine, tonsil</td>
</tr>
<tr>
<td>6 Blood vessels</td>
<td>Macroscopy: bones and joints of the pelvis girdle and lower limb</td>
</tr>
<tr>
<td>7 Blood, development of the blood cells</td>
<td></td>
</tr>
<tr>
<td>8 Lymphatic organs</td>
<td>Microscopy: lung, submandibular gland, liver, pancreas</td>
</tr>
<tr>
<td>9 Respiratory system</td>
<td></td>
</tr>
<tr>
<td>10 Development of lung and intestines</td>
<td>Macroscopy: vertebral column and skull</td>
</tr>
<tr>
<td>11 Intestinal tract.</td>
<td></td>
</tr>
<tr>
<td>12 Digestive glands</td>
<td></td>
</tr>
<tr>
<td>13 Kidney</td>
<td>Microscopy: stomach ileum, kidney, ureter</td>
</tr>
<tr>
<td>14 Ureter, urinary bladder, urethra</td>
<td></td>
</tr>
<tr>
<td>15 Inner and outer genitals</td>
<td></td>
</tr>
<tr>
<td>16 Development of the urogenital organs</td>
<td>Macroscopy: muscles, vessels and nerves of the upper limb.</td>
</tr>
<tr>
<td>17 Endocrine gland</td>
<td>Microscopy: ovary, uterus, placenta, testis, penis</td>
</tr>
<tr>
<td>18 Development of the nervous system</td>
<td></td>
</tr>
<tr>
<td>19 Spinal cord.</td>
<td>Macroscopy: muscles, vessels and nerves of the lower limb.</td>
</tr>
<tr>
<td>20 Oblongate medulla, pons, mesencephalon</td>
<td></td>
</tr>
<tr>
<td>21 Diencephalon, neurosecretion</td>
<td>Microscopy: hypophysis, thyroid, adrenal gland, cerebellum, spinal cord.</td>
</tr>
<tr>
<td>22 Cerebral cortex</td>
<td></td>
</tr>
<tr>
<td>23 Cerebellum, extrapyramidal system</td>
<td>Microscopy: intestinal complex</td>
</tr>
<tr>
<td>24 Olfactory and limbic systems</td>
<td></td>
</tr>
<tr>
<td>25 Eye, optic tracts and centers</td>
<td>Microscopy: eye, organ of Corti</td>
</tr>
<tr>
<td>26 Auditory and static system</td>
<td></td>
</tr>
<tr>
<td>27 Gustatory buds, skin and accessory organs</td>
<td>Microscopy: brain and spinal cord.</td>
</tr>
</tbody>
</table>
Development of the sensory organs
Repetition, complementary day for holidays

HISTORY OF SCIENCES, PROPEDEUTICS

University Pharmacy, Department of Pharmacy Administration
Lecturer: Prof. Dr. Ágnes Kéry
Tutor: Dr. Anna Sólyomváry

First Semester

Week Lectures (2 hours per week)

1 The place and importance of the subject in the curriculum. Profession’s history as bridge, methods, main fields. Symbols of medicine and pharmacy.
2 Knowledge of medicine and pharmacy in Babylonia-Assyria. Knowledge of medicine and pharmacy in Egypt.
4 The Arabs and the European Middle Ages. Transit ways of knowledge. Monastic medicine and pharmacy. The School of Salerno. Universities emerge, the birth of European professional pharmacy.
5 The idea of renaissance. Paracelsus and chemical drugs. Homeopathy as an example of medical sectarianism.
6 Development of pharmacy in Italy and France. Development of pharmacy in Germany and Britain.
Development of Pharmacy in Hungary.


Definition of drugs. Aspects of classification.
Classification of drugs according to their origin and on the basis of strength.

Classification of drugs by their pharmaceutical action, use and by the place of application.
Drug and doses. Specially named doses.

Drug utilization. How could be influenced the increased drug consumption?
Narcotic controls.

Pharmaceutical literature: treatises, pharmacopeias, formularies, journals, periodicals.

Ordering of drug preparation. Pharmacy, galanic laboratories, pharmaceutical factories.

Pharmacists, connections with physicians, etc.
Health for all – all for health.

FIRST AID

Department of Traumatology
Head of Department: Prof. Dr. László Hangody
Tutor: Dr. Tamás Gál

Type of subject: Mandatory

Second Semester
**Purpose of subject:**
First aid is the provision of initial care for an illness or injury. It is usually performed by a lay person, until definitive medical treatment can be accessed. It generally consists of a series of simple and, in some cases, potentially life-saving techniques that an individual can be trained to perform with minimal equipment. All students who graduate from Semmelweis University, including pharmacists should have a knowledge of how to provide basic first aid to an injured or ill person.

The duty of care is the legal duty owed by one person to another to act in a certain way. As a first aider, you have a duty of care towards your casualties to exercise reasonable care and skill in providing first aid treatment. The duty arises because you have knowledge and skills relevant to a medical emergency situation.

The goal of first aid is to preserve life, prevent further harm, and to promote recovery.

**Syllabus (weekly schedule):**

1. Cardio-pulmonary resuscitation (CPR)
2. Bandaging methods
3. Mechanical injuries (fractures)
4. Bleeding and its control
5. Sport injuries
6. Thermal injuries
7. Shock
8. First aid in internal medicine
9. Respiratory diseases
10. Multiple casualty accident: organization and transport
11. Unconscious patient
12. Internal bleeding

Following the Cardio-pulmonary resuscitation (CPR) lecture, simultaneously during the lectures, a group of students will perform CPR practices on CPR manikins. Students will have the opportunity to learn the following: physical examination of injured patients, bandaging, providing first aid in cases of sport, mechanical, thermal injuries, how to treat a bleeding wound, respiratory diseases, shock, unconscious patient and internal bleeding.

The student will have an understanding of the Hungarian Paramedic Services, organization and transportation. Students have the opportunity for the consultation of the typical and the more frequent first aid cases during the interactive lectures and practices.

**Attendance:** During the course of the semester, three absences are allowed.

**Verification of absences:**
We can only accept hospital discharge papers for verification of more than three absences from lectures, proving the student was continuously
hospitalized during that time period.

**Mid-semester test and quiz topics, dates, absences and retaking of these tests:**
There will be no tests or quizzes during the semester, nor at the end of the semester.

**Criteria for the signature at the end of the semester:** Attendance of lectures is required.

**INTRODUCTION TO HEALTH INFORMATICS I.**

**Name of the educational organizational unit:** SE EKK Institute of Digital Health Sciences

**Name of the subject:** Introduction to health informatics I.

**Type of the subject:** 1 theory, 1 practice / week

**Code:** GYINFBEIE1A (theory), GYINFBEIG1A (practice)

**Credit value:** 2 (theory), 0 (practice)

**Name of the lecturer of the subject:** Dr. Miklós Szócska

**Teachers:**
- Dr. Ádám Zoltán Tamus (PhD, assistant lecturer)
- Dr. Gergely Zajzon (assistant lecturer (a PhD student))
- Tamás Tóth (assistant lecturer (a PhD student))
- Péter Dombai (assistant lecturer (a PhD student))
- Zoltán Sándor (assistant lecturer (a PhD student))

**Term:** autumn

**The exercise of the subject 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 theoretical lectures (broken down into weekly figures):** 2×7 lectures = 14 lectures

1. Introduction: disruptive technologies in the healthcare
2. Medical data – definitions, their collection and use on the individual and population level
3. Medical information on the Internet
4. Informatics background of the ambulance care – mobilcommunication
5. The background of basic healthcare informatics – integrated healthcare systems
6. The active aging – lifestyle supported by informatics
7. The IT tasks of health care experts
   Topic of the practical practices (broken down into weekly figures): 2 × 7 practices = 14 practices
   Application of MS Excel in the pharmacist practice
     (functions, diagrams, advanced level) 4 × 2 lessons
   Application of MS Word in the pharmacist practice 2 × 2 lessons
   Execution of individual complex exercise 1 × 2 lessons

Requirements of participation of the lessons and the possibility of substitution of the absence:
According to rules of the Studies and Exam Code. The absence can be excused by the presentation of a medical certificate. Substitution is possible according to a discussion with the teacher.

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.

The number, the topic, the time, the possibility of the substitution and improvement of checking during the term:
Acceptable solution of individual exercises.

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):
Suitable percentage of participation.

The mode of acquisition of the mark:
Exam: solution of a computer test (five-grade valuation).
Practice: three-grade valuation.

Type of the exam:
Colloquium.

Exam requirements:
Exam: solution of a computer test (five-grade valuation).

Mode of the application for the exam:
Via Neptun system.
Order of the modification of exam application:
According to Studies and Exams Code.

Mode of the certification in case of absence from the exam:
By a medical certification within three days.

List of lecture notes, course books, study-aids and literature which can be used to acquisition of the syllabus:
The use of educational materials on the institute website is obligatory: www.semelweis.hu/dei

Recommended literature:
2  Dinya Elek (szerk.): Humán gyógygazdaságtudomány, Medicina Könyvkiadó Zrt, 2006 ISBN 9632429982

INTRODUCTION TO HEALTH INFORMATICS II.

Name of the educational organizational unit: SE EKK Institute of Digital Health Sciences
Name of the subject: Introduction to health informatics II.
Type of the subject: 1 theory, 1 practice / week
                      code: GYINFBEIE2A (theory), GYINFBEIG2A (practice)
                      credit value: 2 (theory), 0 (practice)
Name of the lecturer of the subject: Dr. Miklós Szócska
Teachers:       Dr. Ádám Zoltán Tamus (PhD, assistant lecturer)
                Dr. Gergely Zajzon (assistant lecturer (a PhD student))
                Tamás Tóth (assistant lecturer (a PhD student))
                Péter Dombai (assistant lecturer (a PhD student))
                Zoltán Sándor (assistant lecturer (a PhD student))

Term: spring

The exercise of the subject 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 com-
puter sciences and it also includes from the different engineering, management and informatics procedures.

**Topics of the subject:**

**Topic of the theoretical lectures (broken down into weekly figures):** 2×7 lectures = 14 lectures  
1. IT tools related to the lifecycle of medicines  
2. Informatics of medicine planning – molecular modelling  
3. Clinical evidences – Scientific proofs and their data sources  
4. Informatics of medicine-licencing  
5. Medicine-data and -databases on the Internet  
6. Functions of pharmacy software  
7. Telemedicine and pharmaceutics – mobile phone applications connected with medicine

**Topic of the practical practices (broken down into weekly figures):** 2×7 practices = 14 practices  
Database management (PuPha (MS Access)) 3×2 lessons  
Practice with data representation and data visualisation (MS Powerpoint, Prezi) 3×2 lessons  
Execution of individual complex exercise 1×2 lessons

Requirements of participation of the lessons and the possibility of substitution of the absence:  
According to rules of the Studies and Exam Code. The absence can be excused by the presentation of a medical certificate. Substitution is possible according to a discussion with the teacher.

**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.

**The number, the topic, the time, the possibility of the substitution and improvement of checking during the term:**  
Acceptable solution of individual exercises.

**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):**  
Suitable percentage of participation.  
The mode of acquisition of the mark:  
Exam: solution of a computer test (five-grade valuation).  
Practice: three-grade valuation.
Type of the exam:
Colloquium.

Exam requirements:
Exam: solution of a computer test (five-grade valuation).

Mode of the application for the exam:
Via Neptun system.

Order of the modification of exam application:
According to Studies and Exams Code.

Mode of the certification in case of absence from the exam:
By a medical certification within three days.

List of lecture notes, course books, study-aids and literature which can be used to acquisition of the syllabus:
The use of educational materials on the institute website is obligatory: www.semelweis.hu/dei

Recommended literature:
2  Dinya Elek (szerk.): Humán gyógyszerfejlesztés, Medicina Könyvkiadó Zrt, 2006 ISBN 9632429982

TERMINOLOGY (1st semester)

Responsible organisational unit:
Faculty of Health Sciences, Division of Foreign Languages and Communication
Programme director: Zöldi Kovács Katalin PhD, Head of the Division
2 lessons per week, 2 credits
Assessment: 3 written tests

Role of subject in fulfilling the aim of training:
Students get familiarized with the Latin and Greek terminology of medicine in order to facilitate the acquisition of other subjects. Special focus is dedicated to anatomy, physiology, pathology and pharmaceutics. Furthermore, the course provides an introduction into general scientific termino-
Brief description of subject:
The main aim of the subject is:
1. to acquire a knowledge of about 500-600 Latin words and phrases as a minimum vocabulary (basic vocabulary of medical and scientific language),
2. the correct application of
   a) anatomical names,
   b) names of diseases
   c) names of drugs,
3. to understand diagnoses and prescriptions;
4. to learn about abbreviations used in prescriptions.
5. to be able to make a clear distinction between medical terms of English and Latin/Greek.

Course content of practical lessons:
1. Grammar:
   Nouns: the 5 Declensions
   Adjectives - construction of the most important attributive structures with the vocabulary of anatomy, clinical subjects and of pharmaceutics.
   Prepositions (in anatomical, clinical and pharmaceutical phrases)
   Numerals: Usage on prescriptions.
2. Texts containing:
   a) anatomical names;
   b) clinical and patho-anatomical diagnoses;
   c) prescriptions
3. Vocabulary
   Latin and bilingual (Greek-Latin) nouns, adjectives, numerals and prepositions used in anatomy, the clinical subjects and pharmaceutics;

Course material, recommended text book(s), professional literature and supplementary reading(s)
Belák E. Medical Terminology for Beginners (earlier title: Medical Latin), Budapest: Semmelweis Kiadó.
Basics of Foreign Language (module 1.)

Magyar orvosi szaknyelv 1.

**Responsible organisational unit:**
Faculty of Health Sciences, Division of Foreign Languages and Communication

**Programme director:**
Zöldi Kovács Katalin PhD, Head of the Division

4 lessons per week, 4 credits

**Assessment:** end-term written and oral exam

**Role of subject in fulfilling the aim of training:**
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. Raising students’ awareness of cultural differences is one of our top priorities.

**Brief description of subject:**
The first three modules are dedicated to learning basic general vocabulary and grammar. In the first module students acquire basic structures and vocabulary for everyday topics / e.g. shopping, food, housing etc./, language for „survival.”. The course places special emphasis on phrases essential for everyday communications, e.g. introductions, greetings, getting/giving information etc. Grammar is of less importance in this phase of language studies.

**Course content of practical lessons:**

Lesson 1-2: The alphabet
Lesson 3-4: Greetings
Lesson 5-6: Where are you from?
Lesson 7-8: Introducing people
Lesson 9-10: Numbers-phone numbers
Lesson 11-12: What time is it?
Lesson 13-14: Practising telling the time
Lesson 15-16: Days
Lesson 17-18: When do you study?
Lesson 19-20: What is it? - food
Lesson 21-22: Consolidation
Lesson 23-24: Test 1 + situations
Lesson 25-26: What is the food like? - adjectives
Lesson 29-30: I would like a tea
Lesson 31-32: Shopping for food
Lesson 33-34: Ordering food - in a café
Lesson 35-36: Rooms in the flat
Lesson 37-38: Furniture in the rooms
Lesson 39-40: Where are the furniture?
Lesson 41-42: As a guest
Lesson 11-12: At a party
Lesson 43-44: Where can I find the library?
Lesson 45-46: When shall we meet?
Lesson 47-48: Asking for information, setting programs
Lesson 49-50: Places in the city
Lesson 51-52: Consolidation
Lesson 53-54: Test 2 + situations and communication practice
Lesson 55-56: Assessment

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

**Basics of Foreign Language (module 2.)**

Magyar orvosi szaknyelv 2.

**Responsible organisational unit:**
Faculty of Health Sciences, Division of Foreign Languages and Communication
**Programme director:** Zöldi Kovács Katalin PhD, Head of the Division

4 lessons per week, 2 credits,
**Assessment:** midterm (written) and endterm (written and oral) tests

**Role of subject in fulfilling the aim of training:**
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. Raising students’ awareness of cultural differences is one of our top priorities.

**Brief description of subject:**
The first three modules are dedicated to learning basic general vocabulary and grammar. In the second module students acquire basic structures and the vocabulary for everyday topics (e.g. family, relatives, at the doctor’s etc.) language for survival.”. The course places special emphasis on phrases essential for everyday communications, e.g. likes, dislikes, offering help, etc. Grammar is of less importance in this phase of language studies.

**Course content of practical lessons:**
Lesson 1-4: Forming questions
Lesson 5-6: Plural forms
Lesson 7-8: What do you like doing in your free time?
Lesson 9-10: I would like to…….
Lesson 11-12: Communication skills
Lesson 13-14: A date – what do you like?
Lesson 15-16: I like dancing, swimming etc.
Lesson 17-18: I can ride a bike, drive etc.
Lesson 19-20: Communication practice
Lesson 21-22: Can I help you? In a clothes shop
Lesson 23-24: Can I give you something else?
Lesson 25-26: Communication practice
Lesson 27-28: Consolidation
Lesson 29-30: Test 1 + situations
Lesson 31-32: I have a headache - at the doctor
Lesson 33-34: At the chemist’s
Lesson 35-36: Communication practice- at the doctor, at the chemist's
Lesson 37-38: My family, family members
Lesson 39-40: Family relations
Lesson 41-44: Communication practice- introducing your family
Lesson 45-48: My boss’ wife – social relations
Lesson 49-50: Consolidation
Lesson 51-54: Test 2 – situations, communication practice
Lesson 55-56: Assessment

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