

2023/2024. ACADEMIC YEAR							
PROGRAM OF STUDY (FOR STUDENTS OF 2ND YEAR)							
Full (Hungarian) name of the subject: Élettan I.							
Program: Undivided program (pharmaceutical)							
Schedule: Full-time							
Short name of the subject: Physiology							
English name of the subject: Physiology I.							
German name of the subject: Physiologie I.							
Type of registration: obligatory/obligatory elective/elective/criteria requirement							
Neptun code of the subject: GYKTLM275E1A							
Responsible Department: Institute of Translational Medicine							
Responsible tutor Dr. Zoltán Benyó Contact information: - phone: 210-0306 - email: benyo.zoltan@med.semmelweis-univ.hu					Title, academic degree: Director, Professor, PhD, Dsc		
Name of the persons responsible for the teaching of the subject: Dr. Zoltán Benyó Dr. Lea Danics Dr. Tamás Ivanics Dr. Ákos Lukáts Dr. Éva Margittai Dr. Éva Ruisanchez Dr. Anna Monori-Kiss Dr. Éva Pál Dr. László Hricisák Dr. Ákos Zsembery Dr. Mátyás Szentiványi					Title, academic degree:  Professor, PhD, DSc Research fellow, PhD Associate professor, PhD Associate professor, PhD Associate professor, PhD Associate professor, PhD Associate professor, PhD Associate professor, PhD Assistant lecturer Associate professor, PhD director (OGYÉI)		
Class per week: 5 hours lecture + 2 hours practice					Credit point(s): 5		
Professional content, intent of acquirement and it's 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 practices. Students are required to take 5 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							
Recommend ed term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individu al lectures	Total number of contact hours/sem ester	Normal course offer	Consult ations
3rd semester	70	28			98	Autumn semester* Spring semester Both semesters ( Please underline)	--

***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. Micturition. Physiological aspects of different forms of circulatory shock.

<p><b>Topics of practical classes (pro week):</b></p> <p>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:</p> <p><b>1st practice:</b> introduction</p> <p><b>2nd practice:</b> 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)</p> <p><b>3rd practice:</b> Electromyography (test)</p> <p><b>4th practice:</b> Blood pressure measurement (test)</p> <p><b>5th practice:</b> ECG (test)</p> <p><b>6th practice:</b> Spirometry (test)</p> <p><b>7th practice:</b> Lab exam</p>
<p><b>Schedule of consultations: -</b></p>
<p><b>Course requirements</b></p>
<p><b>Prerequisites:</b> Anatomy Biology II.</p>
<p><b>Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:</b></p> <p>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 makeup a missed practice with the corresponding test or improve the grade of a single test. Absent 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.</p>
<p><b>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):</b></p>
<p><b>Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results***:</b></p> <p>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.</p> <p>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:</p> <p>&lt;50% fail (1) 50-69.9% pass (2) 70-79% fair (3) 80-89% good (4) 90-100% honor (5)</p> <p>Students can make up a single test and/or the corresponding practice at the end of the semester.</p> <p>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.</p>
<p><b>Requirements of signature(as provided for in STUDY AND EXAMINATION REGULATIONS § 29):</b></p> <p>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.</p>

<p><b>Number and type of projects students have to perform independently during the semester and their deadlines:</b></p> <p>None.</p>
<p><b>Type of the semester-end examination:</b> <u>signature</u>*/practical grade*/<u>semi-final</u>*/final* (<i>Please underline</i>)</p> <p><b>Examination requirements:</b> as published by the education-research department on the MOODLE interface by the start of the academic term.</p>
<p><b>Form of the semester-end examination:</b> <u>written</u>*/oral*/combined examination/<b>practical examination/the assessment of completing project work (according to STUDY AND EXAMINATION REGULATIONS 30.§)</b>* (<i>Please underline</i>)</p>
<p><b>The possibility and conditions for offering grades:</b></p> <p>None.</p>
<p><b>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, <u>****</u>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:</b></p> <p>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 &amp; Lange, 2019)  A. Fonyó: Principles of Medical Physiology (Medicina Publishing House, 2002)</p>
<p><b>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****:</b></p> <p>yes*/<u>no</u>*/on and individual assesment basis* (<i>Please underline</i>)</p>
<p><b>The course description was prepared by:</b></p> <p>Dr. Anna Monori-Kiss course coordinator</p>