

2023/2024. ACADEMIC YEAR							
PROGRAM OF STUDY (FOR STUDENTS OF 2ND YEAR)							
Full (Hungarian) name of the subject: Élettan II.							
Program: Undivided program (pharmaceutical)							
Schedule: Full-time							
Short name of the subject: Physiology II							
English name of the subject: Physiology II.							
German name of the subject: Physiologie II							
Type of registration: obligatory/obligatory elective/elective/criteria requirement							
Neptun code of the subject: GYKTLM275E2A							
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
4th semester	70	28			98	Autumn semester* <u>Spring semester</u> Both semesters (* Please underline)	--

Program of semester**

Topics of theoretical classes (pro 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.

<p>Topics of practical classes (pro week):</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>1st practice: Studying the circulatory and respiratory adaptation responses during physical exercise</p> <p>2nd practice: Acid-base disorders in the clinical practice (test)</p> <p>3rd practice: Measurement of pulse wave velocity (test)</p> <p>4th practice: Clinical case studies (test)</p> <p>5th practice: Blood glucose measurement and oral glucose tolerance test (test)</p> <p>6th practice: Examination of motor reflexes and vestibular function, EOG (test)</p> <p>7th practice: Lab exam</p>
<p>Schedule of consultations: -</p>
<p>Course requirements</p>
<p>Prerequisites: Physiology I. Biochemistry I.</p>
<p>Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup:</p> <p>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 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 final exam only if they performed on all 5 performing practice and test and passed on the lab exam.</p>
<p>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):</p>
<p>Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results***:</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><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 final grade as the following:</p> <p>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.</p>
<p>Requirements of signature(as provided for in STUDY AND EXAMINATION REGULATIONS § 29):</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 practice and test and passed on the lab exam.</p>

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