

Anatomy and Physiology - Master's studies

1st year, summer semester 2026, compulsory course (2-0-3) 6 credits

Educational period: 16.2.2026– 22.5.2026
Skúškové obdobie: 25.05.2026 - 07.07.2026
Lecture: Monday at 10.15-11.55 at Odbojárov O151
Practice: Wednesday at 12.05-14.25 at Odbojárov OSM1

- Form of teaching of the course is attendance study (event. distance) and will take place within the timetable for the course.
- Moodle and Microsoft Teams are used as an e-learning tool for teaching.
- Teachers responsible for the preparation of individual topics are listed in the syllabus.
- Technical assistance: p. Haššová, p. Vilémová, p. Kolembusová
- Slovak state holidays: 3.4.2026 (Friday), 6.4.2026 (Monday), 1.5.2026 (Friday)
- The materials for lectures and exercises will be in the online system Moodle.
- Pre-tests will be written in paper form from the topics covered by the test date.
- Passing grades will be entered in AIS in the last week of semester (18.5.2026 – 22.5.2026) by the assistant listed in syllabi after the prerequisites have been met. Information about retake tests and exams will be posted on Moodle and AIS.
- The final exam is held in the attendance form on a PC via the Moodle system
- Attendance at lectures is compulsory and may be controlled by the lecturing teacher. If no students are present within the first 15 minutes of the scheduled lecture time, the lecturer has the right to leave, and the session will be considered cancelled due to non-attendance. Repeated absences may result in academic consequences as outlined in the study program regulations.

Recommended study literature

- Ganong's Review of Medical Physiology 25th ed, McGraw-Hill, NY, by KE Barrett, SM Barman, S Boitano, HL Brooks, 2016, ISBN 9780071848978, 750pp
- Essentials of Medical Physiology 6th ed, Jaypee Brothers Medical Publishers Ltd, 2012, ISBN 9789350259368
- Anatomy and Physiology, OpenStax, Texas, by JG Betts and al., 2013 9781938168307, 1410 pp.
- Vander's Human Physiology 12th ed, McGraw/Hill, Ed., NY, by EP Widmaier, H Raff, KT Strang, 2011, ISBN 978007122215/0
- Introduction to Human Anatomy and Physiology, 2nd ed, Saunders Elsevier, St. Louis, by EP Solomon, 2009, ISBN 072160045X/9780721600451
- Human Anatomy and Physiology, Pearson Benjamin Cummings, San Francisco, by EN Marieb, K Hoehn, 2007, ISBN 032137294-8
- Human Anatomy and Physiology, McGraw-Hill, NY, by R Carola, JP Harley, CR Noback, 1990, ISBN 0075579375
- Human Anatomy, Physiology, and Pathophysiology. by Thewes G., Mutschler E., Vaupel P., Ed. Elsevier, Amsterdam, 1985. 812pp.
- Selected questions for the Anatomy and Physiology exam for Pharmacy students. Kosírová S. a kol. 2023; https://stella.uniba.sk/texty/FAF_selected_questions_anatomy_physiology.pdf

WEEK	LECTURE O151 MON 10.15-11.55	PRACTICE OSM1 WED 12.05-14.25
1. WEEK 16.2.-20.2. 2026	1. LECTURE Doc. Kosírová Introduction to Anatomy and Physiology. Human organism - organizational structure, anatomical terminology. Basics of tissue histology. Epithelial tissue - structural and functional characteristics, localization, glandular tissue, special sensory tissue. Connective and supporting tissues, blood, lymph, characteristic function, cartilage - hyaline, elastic, fibrous structure, and description, function, localization, growth, formation, renewal, bone tissue (bone) - compact, cancellous bone, osteon	1. PRACTICE Dr. Sprušanský Theoretical introduction: Nerve physiology. Nervous Tissue - neuron, functional morphology, basic principles of electrical phenomena, action potential (AP), impulse propagation. Synapse, transmission, mechanism of release of neurotransmitters, neuromodulators. Intercellular communication, synaptic connections. <i>Practical task:</i> <i>Histological preparative - overview of tissues</i> <i>Musculoskeletal system - bones (skeleton), joints and muscular system, mechanics, topography of muscle groups. Topography of systems of anatomic areas</i> <i>Histology of nervous tissue (neuron, glial cells).</i> <i>Membrane potential on the nerve cell.</i>
2. WEEK 23.2.-27.2. 2026	2. LECTURE Doc. Rajtík Anatomy and physiology of the central nervous system. Organization and structure of the nervous system - nervous tissue, division of NS. Molecular cell anatomy of NS. Structure of the spine, spinal cord, cerebral and spinal cord cavities. Vascular supply, blood-brain barrier, cerebrospinal fluid. General structure and function of the brain, brainstem, cranial nerves of the cerebellum. Limbic system, reticular formation, cranial nerves, centrifugal nerves.	2. PRACTICE Doc. Kosírová Theoretical introduction: Physiology of skeletal muscle. Structure and function of the skeletal muscle. Excitation-contraction coupling, muscle contraction, organization of innervation, energy metabolism of striated muscle. Isotonic contraction, isometric; muscle work, electrophysiology of muscle activity. <i>Practical tasks:</i> <i>Contractions m. biceps and m. triceps brachii.</i> <i>Fatigue of skeletal muscle. Tetanus</i>

3. WEEK 2.3.-6.3. 2026	3. LECTURE Doc. Rajtík Anatomy and Physiology of peripheral nervous system. PNS - cerebrospinal nerves (cranial, spinal), autonomic. Autonomic nervous system – basic structural and functional characteristics. Spinal cord function. Vigilance, sleep, consciousness, memory.	3. PRACTICE Dr. Sprušanský Theoretical introduction: Physiology of smooth muscle. Smooth muscle structure and function. Excitation-contraction coupling, muscle contraction, organization of innervation, energy metabolism of smooth muscle. Examples of activation and inhibition of the autonomic nervous system. <i>Practical tasks:</i> <i>Reflexes, somatic and visceral reflex arc</i>
4. WEEK 9.3.-13.3. 2026	4. LECTURE Dr. Horváth Physiology of the endocrine system. anatomy of the endocrine system. Hormones, control of production and release of hormones and their feedback control system, hypothalamic-pituitary axis, basic characteristics of hormones of individual glands, blood transport, metabolism, excretion. Characteristics of endo and exocrine glands, paracrine diffusion system. HPA-portal circulation	4. PRACTICE Dr. Horváth Theoretical introduction: Physiology of the pancreas. Regulation of glucose metabolism, Hormonal regulation of glucose metabolism. The importance of insulin, glucose. Lipoproteins - function, origin, types. <i>Practical tasks:</i> <i>Histological structure of the pancreas. Determination of random glycemia and oral glucose tolerance test (OGT test).</i>
5. WEEK 16.3.-20.3. 2026	5. LECTURE Dr. Hadová Physiology of the respiratory system. Functional anatomy of the upper respiratory tract, respiratory parenchyma. Pulmonary ventilation, diffusion, perfusion, respiratory mechanics, regulation of respiratory tract. Circulation and exchange gas exchange, the role of carbonic anhydrase. Dissociation curves of CO₂ and O₂	5. PRACTICE Dr. Horváth Theoretical introduction: Functional lung tests. Vital volumes and capacities, the role of lung tissue in the regulation of acid-base balance. <i>Practical tasks:</i> <i>Histology of the airway wall, pulmonary parenchyma. Measurement of vital capacity of the lungs spirometrically.</i>

6. WEEK 23.3.-27.3. 2026	6. LECTURE Dr. Kráľová Physiology of the cardiovascular system. Functional anatomy of the cardio-vascular system – structure of heart, cytoskelet – valves, coronary arteries - the blood supply of the myocardium. Energetics. Electrical and functional changes in the heart. Frank-Starling law. Heart cycle. Control and regulation of cardiac activity. Preload, afterload	6. PRACTICE Dr. Jarabíková Theoretical introduction: Physiology of the heart. Excitation-contraction coupling, action potentials in heart. The electrocardiogram, the description of waves and intervals. Factors affecting ECG. <i>Practical tasks: ECG monitoring at rest and after a physical workout.</i> PRE-TEST 1
7. WEEK 30.3.-3.4. 2026	7. LECTURE Doc. Košírová Physiology of circulation. Blood circulation. Physical principles in the circulation – blood pressure, blood flow, the resistance of the riverbed. The specifics of the microcirculation, internal (metabolic (endotel, NO) and myogennic control), and extrinsic (neural and hormonal) control mechanisms of arteriolar smooth muscle.	7. PRACTICE Doc. Košírová Theoretical introduction: Vessels and physiology of the circulatory system. Structure and comparison of the blood vessels – arteries, arterioles, capillaries, veins, and lymphatic vessels. Blood pressure and its changes, pulsation. Renin-angiotensin-aldosterone <i>Practical tasks: Monitoring of blood pressure changes due to external conditions.</i>
8. WEEK 6.4.-10.4. 2026	8. LECTURE - Easter Monday Public Holiday	8. PRACTICE Home study - Body composition - the composition of body fluids, chemical compounds (water, glucose), inorganic (acids, bases, salts), organic (carbohydrates, proteins, lipids, nucleic acids) and their role in the human body.

9. WEEK 13.4.-17.4. 2026	9. LECTURE Dr. Král'ová Physiology of excretory system. Structure of the urinary system. Functional anatomy of kidneys (glomeruli, tubules) and urinary tract. Basic anatomical and functional unit - nephron, structure and relation of individual tubular parts with transport processes, concentration mechanism, endocrine and metabolic activities and regulation. Micturition.	9. PRACTICE Dr. Král'ová Theoretical introduction: Homeostasis and acid-base balance. Homeostasis - positive and negative feedback, local control. Thirst and its regulation. Acid-base balance, importance for the function of the organism - the role of the kidneys and lungs, pH regulation, urine composition. Evaluation of renal function. Practical tasks: <i>Nephron histology. Urine production, composition and abnormalities. Indicative test for the presence of unwanted substances in the urine. Functional kidney tests.</i>
10. WEEK 20.4.-24.4. 2026	10. LECTURE Dr. Král'ová Physiology of blood. Haematopoiesis, stem and progenitor cells and their potential significance in therapy. Composition and function of blood, blood elements and blood plasma. Transfusion. The construction and function of the lymphatic system, the main blood vessels, the lymph, organs, the reticular-endothelial system.	10. PRACTICE Dr. Král'ová Theoretical introduction: Blood groups. Transfusion. Haemocoagulation. Practical tasks: <i>Blood elements – blood counts. Determination of a blood group. Bleeding time and precipitation time. Pulse Oximetry.</i>
11.WEEK 27.4.-1.5. 2026	11. LECTURE Dr. Sprušanský Physiology of senses. Functional anatomy of the skin, subcutaneous tissue and cutaneous adnexes. Protective function, body temperature regulation, skin senses, blood reservoir, metabolic function, excretion.	11. PRACTICE Dr. Horváth Theoretical introduction: Sensory organs Sensory Organs: somatic sensitivity – touch, pressure, movement, posture, temperature, Vision. Hearing. Vestibular system-anatomy, transmission of information, nerve pathways. Chemical senses – taste, smell - anatomy, signal transmission, nerve pathways Practical tasks: <i>Examination of senses function - visual acuity and color blindness. Hearing, smell, taste, fingeriness.</i>

12.WEEK 4.5.-8.5. 2026	12. LECTURE Dr. Sprušanský Anatomy and physiology of the digestive system Digestive tract – basic structure, enteric nervous system, and autonomic regulation. GIT motility: peristalsis, segmentation, smooth muscle mechanism. Mouth, stomach, small intestine. Saliva, chewing. Large intestine – resorption of water and ions, microbiota, propulsive movements, defecation reflex. Liver, bile ducts, exocrine pancreas. Hormonal regulation of the GIT. Gastrin, secretin, CCK, motilin. Enterohepatic circulation of bile acids	12. PRACTICE Dr. Ferenczyová/Dr. Kaločayová Theoretical introduction: Physiology of digestion Gastric secretion: the role of parietal, chief, and endocrine cells; regulation. Digestion in the small intestine: pancreatic enzymes, breakdown of fats, sugars, proteins. Absorption of substances. <i>Practical task: Determination of salivary amylase activity. Effect of ptyalin exposure time on starch. Effect of pH on ptyalin activity. Thermolability of ptyalin</i> PRE-TEST 2
13.WEEK 11.5.-15.5. 2026	13. LECTURE Doc. Rajtík Anatomy and physiology of the male and female reproductive system. Hormonal regulation of changes in the structure of the uterine wall by hormones. Pregnancy, blood circulation, organization of the feto-placental unit.	13. PRACTICE Dr. Bartošová Theoretical introduction: Rational nutrition. Adipose tissue - metabolic and endocrine activity of adipose tissue - structure, subtypes, localization, distribution, storage function, metabolic activity, endocrine function - adipokines. <i>Practical tasks: Body weight and composition, measurement of waist circumference. Determination of blood cholesterol. Food composition, rational nutrition.</i>
14.WEEK 18.5.-22.5.2026	14. LECTURE Free topic.	14. PRACTICE Summary of learning outcomes, Resit + Correction pre-tests.

In Bratislava, 4.2.2026

Assoc. Prof. PharmD. S. Kosírová, PhD.
guarantor of the subject

Assoc. Prof. PharmD. P. Křenek, PhD.
head of the department