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|  | **FACULTY OF MEDICINE****UNIVERSITY OF BANJA LUKA**Department of Physiology  | C:\Users\Korisnik\Desktop\Logo MF\logo mF novi.jpg |

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| **Academic year** | **Subject** | **Subject code** | **Study program** | **Cycle study**  | **Year of study** | **Semester** | **Number of students** | **Number of groups** |
| 2024/2025. | MEDICAL PHYSIOLOGY | ISM22MPH | Medicine in EnglishInternational programme  | The first | The second | III |  | 3 |

**LECTURES (TIMETABLE)**

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| **Week** | **Lecture** | **Topic** | **Day** | **Date** | **Time** | **Place** | **Class** | **Professor** |
| I | L1 | **Functional Organization of the Human Body*** **Cells as the Living Units of the Body**
* **Functional Organization of the Human Body and Control of the “Internal Environment - Homeostasis”**
* **“Homeostatic” Mechanisms of the Major Functional Systems**
 | Thursday | 10.10.2024 | 10:00-13:00 | Amphitheatre of TheFaculty of Political Sciences (FPS),The Campus | 4 | Ponorac N |
|  | L2 | * **Body fluid compartments**
 | Friday | 11.10.2024 | 12:00-13:30 | Amphitheatre of FPS | 2 | Ponorac N |
| II | L3 | **Membrane Physiology*** **Transport of Substances Through the Cell Membrane**
* **Membrane Potentials**
 | Thursday | 17.10.2024 | 10:00-13:00 | Amphitheatre of FPS | 4 | Ponorac N |
|  | L4 | **Action Potential*** **Excitation—The Process of Eliciting the Action Potential**
 | Friday | 18.10.2024 | 12:00-13:30 | Amphitheatre of FPS | 2 | Ponorac N |
| III | L5 | **Physiology of Muscles*** **Contraction of Skeletal Muscle**
* **Excitation of Skeletal Muscle:**
* **Neuromuscular Transmission and**
* **Excitation-Contraction Coupling**
 | Thursday | 24.10.2024 | 10:00-13:00 | Amphitheatre of FPS | 4 | Ponorac N |
|  | L6 | * **Contraction and Excitation of Smooth Muscle**
 | Friday | 25.10.2024 | 12:00-13:30 | Amphitheatre of FPS | 2 | Ponorac N |
| IV | L7 | **Physiology of Nervous System*** **Organization of the Nervous System,**
* **Basic Functions of Synapses and “Transmitter Substances”**
 | Thursday | 31.10.2024 | 10:00-12:00 | Amphitheatre of FPS | 2 | Ponorac N |
|  | L8 | * **Sensory Receptors and Neuronal Circuits for Processing Information**
 | Friday | 01.11.2024 | 12:00-13:30 | Amphitheatre of FPS | 2 | Ponorac N |
| V | L9 | **Somatic Sensations*** **General Organization, the Tactile and Position Senses**
* **Position Senses, Pain and Thermal Sensations**
 | Thursday | 07.11.2028 | 10:00-12:00 | Amphitheatre of FPS | 2 | Ponorac N |
|  | L10 | **The Special Senses*** **The Eye Sense of Vision**
* **Optics of Vision**
 | Friday | 08.11.2024 | 12:00-13:30 | Amphitheatre of FPS | 2 | Ponorac N |
| VI | L11 | * **Receptor and Neural Function of the Retina**
* **Central Neurophysiology of Vision**
 | Thursday | 14.11.2024 | 10:00-12:00 | Amphitheatre of FPS | 2 | Ponorac N |
|  | L12 | **The Special Senses*** **The Sense of Hearing**
 | Friday | 15.11.2024. | 12:00-15:15 | Amphitheatre of FPS | 2 | Ponorac N |
| VII | L13 | * **The Chemical Senses Taste and Smell**
 | Thursday | 21.11.2024National holyday | 10:00-12:00 | Amphitheatre of FPS | 2 | Ponorac N |
|  | L14 | **Motor and Integrative Neurophysiology*** **Motor Functions of the Spinal Cord; the Cord Reflexes**
 | Friday | 22.11.2024 | 12:00-13:30 | Amphitheatre of FPS | 2 | Ponorac N |
| VIII | L15 | * **Cortical and Brain Stem Control of Motor Function**
 | Thursday | 28.11.2024 | 10:00-12:00 | Amphitheatre of FPS | 2 | Ponorac N |
|  | L16 | **Motor and Integrative Neurophysiology*** **Contributions of the Cerebellum and Basal Ganglia to Overall Motor Control**
 | Friday | 29.11.2024 | 12:00-13:30 | Amphitheatre of FPS | 2 | Ponorac N |
| IX | L17 | * **The Autonomic Nervous System and the Adrenal Medulla**
 | Thursday | 05.12.2024 | 10:00-12:00 | Amphitheatre of FPS | 2 | Ponorac N |
|  | L 18 | * **Regulation of body temperature**
 | Friday | 06.12.2024. | 12:00-13:30 | Amphitheatre of FPS | 2 | Ristić S |
| X | L 19 | **Cerebral Cortex*** **Cerebral Cortex, Intellectual Functions of the Brain, Learning and Memory**
* **Behavioral and Motivational Mechanisms of the Brain**
 | Thursday | 12.12.2024. | 10:00-13:00 | Amphitheatre of FPS | 4 | Ristić S |
|  | L 20 | * **The Limbic System and the Hypothalamus**
* **States of Brain Activity—Sleep and Brain Waves**
 | Friday | 13.12.2024. | 13:00-15:15 | Amphitheatre of FPS | 2 | Ristić S |
| XI | L 21 | * **Cerebral Blood Flow, Cerebrospinal Fluid, and Brain Metabolism**
 | Thursday | 19.12.2024 | 10:00-12:00 | Amphitheatre of FPS | 2 | Ristić S |
| XI | L 22 | **The Heart*** **Heart Muscle; The Heart as a Pump and Function of the Heart Valves**
 | Friday | 20.12.2024 | 13:00-15:15 | Amphitheatre of FPS | 2 | Šobot T |
| XII | L 23 | **The Heart*** **The Cardiac Cycle**
 | Thursday | 26.12.2024. | 10:00-12:00 | Amphitheatre of FPS | 2 | Šobot T |
| XII | L 24 | * **Rhythmical Excitation of the Heart**
 | Friday | 10.01.2024. | 13:00-15:15 | Amphitheatre of FPS | 2 | Šobot T |
| XIII | L 25 | **The Heart*** **The Normal Electrocardiogram**
 | Thursday | 16.01.2024 | 10:00-12:00 | Amphitheatre of FPS | 2 | Šobot T |
| XIII | L 26 | * **Interpretation and Vectorial Analysis**
 | Friday | 17.01.2024 | 13:00-15:15 | Amphitheatre of FPS | 2 | Šobot T |
|  | L 27 | * **Compensation of Holydays**
 | Thursday |  | 12:00-13:30 | Amphitheatre of FPS |  | Ponorac N |
| 15 | 30 |  |  |  |  |  | 60 |  |

**PRACTICAL AND THEORETICAL EXERCISES**

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| **Week** | **Exrcise** | **Type of exe.** | **Topics** |
| Isince 21.10.2024 | E1 | Practical | 1. Introduction to educational plan and program and evaluation of knowledge in medical physiology
2. Experiment as a method for scientific research in medicine (selection of animals, acute and chronic experiments)
3. Cell transport mechanisms and permeability (Physio Ex 9.0): simulating simple diffusion, facilitated diffusion, osmotic pressure, filtration, active transport
 |
| IIsince 28.10.2024. | E2 | Practical | 1. Physiological solutions (types and application-general principles and the ways of giving injections)
2. Maintaining a cell volume:
* erythrocytes in iso-, hypo- and hypertonic solution
* exploring the osmotic fragility of the red blood cells in the hypotonic solutions
 |
| Theoretical | Transport of substances through the cell membrane |
| IIIsince 04.11. 2024 | E3 | Practical | 1. Physiology of nerve impulses (Physio Ex 9.0): the resting membrane potential, receptor potential, the action potential-threshold, the action potential-importance of voltage-gated Na+ channels, the action potential-measuring its absolute and relative refractory period, the action potential-coding for stimulus intensity
2. Neurophysiology (Physio Ex 9.0): chemical synaptic transmission and neurotransmitter release
 |
| Theoretical | Human body fluids: intracellular and extracellular, interstitial; **Clinical consideration** |
| IVsince11.11.2024. | E4 | Practical | Skeletal muscle physiology (Physio Ex 9.0): the muscle twitch and latent period, the effects of stimulus voltage on skeletal muscle contraction, the effect of stimulus frequency on skeletal muscle contraction, tetanus in isolated skeletal muscle, fatigue in isolated skeletal muscle, the skeletal muscle length-tension relationship, isotonic contractions |
| Theoretical | Membrane potentials and action potentials **Clinical consideration** |
| Vsince18.11.2024 | E5 | Practical | 1. Examination of surface and deep sensibility
2. Construction of an image of an object in a simple and complex optical system
3. Visual acuity testing
4. Lenses
5. Demonstration of the blind spot - Mariotte's experiment
6. Testing of the color vision
7. Examination of the ocular fundi with an ophthalmoscope
 |
| Theoretical | Excitation and contraction of skeletal and smooth muscle **Clinical consideration**  |
| VIsince25.11.2024. | E6 | Practical | 1. Testing of air and bone conduction of the sound
2. Examination of balance (rotatory test, Romberg test)
3. Analyze the sense of taste and smell:
* a qualitative and quantitative analysis of smell
* a qualitative analysis of taste
* analyze the interdependence between the sense of taste and smell
 |
| Theoretical | Sensory receptors, neuronal circuits for processing information **Clinical consideration** |
| VIIsince02.12..2024. | E7 | Practical | 1. Analysis of reflex arc
2. Withdrawal reflex and experimental frog model (video simulation)
3. Performing of the clinically important reflexes: stretch reflexes, cutaneous reflexes, corneal and conjunctival reflexes; papillary light reflex; reflex of accommodation
 |
| Theoretical | Motor function of the spinal cord; The spinal reflexes **Clinical consideration** |
| VIIIsince09.12.2024. | E8 | Practical | 1. Assessment of functional capacity of the heart and circulation during physical activity in human
2. Astrand's test
3. Auscultation of heart sounds
 |
| Theoretical | Hypothalamus; The Autonomic nervous system and the adrenal medulla **Clinical consideration** |
| IXsince16.12.2024. | E9 | Practical | 1. Investigating the refractory period of cardiac muscle (PhysioEx 9.0)
2. Analysis of the heart function on the frog model (Stannius' ligature, Goltz's experiment, assessing the effect of temperature, hormones, and ions on the frog heart activity)
3. Recording of ECG
 |
| Theoretical | Cardiac cycle; Normal electrocardiogram (ECG); ECG Interpretation; Vectoral Analysis **Clinical consideration** |
| Xsince23.12.2024. | E10 | Practical | a) Oculocardiac reflexb) Analysis of ECGc) Performing the ergometric step-test and indirect determination of the maximal oxygen consumption |
| XIsince13.01.2024. | E11 | Practical | a) Biological materials for diagnostic procedures in clinical practiceb) Obtaining blood samples for laboratory analysis from the fingertipc) Separation of blood plasma and serumd) Identification of blood cells (blood smear)e) Hematocrit (Htc) |

**TIMETABLE**

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| **Group** | **Type of Exercise** | **Day** | **Time** | **Place** | **Number of Classes** | **Professor** |
| G1 | Practical | Tuesday | 8:00-11:00 | Laboratory of Physiology | 4 | Zorislava Bajić |
| G2 | Practical | Wednesday | 8:00-11:00 | Laboratory of Physiology | 4 | Zorislava Bajić |
| G3 | Practical | Friday | 8:00-11:00 | Laboratory of Physiology | 4 | Zorislava Bajić |
| G1 | Theoretical | Thursday | 11:30-13:00 | Amphitheatre of TheFaculty of Political Sciences (FPS),The Campus | 2 | Nenad Ponorac |
| G2 | Theoretical | Thursday | 16:00-17:30 | FPS | 2 | Nenad Ponorac |
| G3 | Theoretical | Friday | 13:30-15:00 | FPS | 2 | Nenad Ponorac |

G1 – group 1

G2 – group 2

G3 – group 3