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| Study programme | MEDICAL STUDIES IN ENGLISH | | | | |
| Cycle | INTEGRATED | Type | UNIVERSITY | | |
| Study track | - | Module | - | | |
| Year of study | 2 | Semester | III | | |
| Course title | BASIC NEUROSCIENCE | Course code | MFMSE304 | | |
| ECTS | 8 | Status | OBLIGATORY | | |
| Teaching hours | | Lectures | Exercises | Seminars | Practice |
| | | 20 | 24 | 56 | 0 |
| Teachers | Prof. Zoran Đogaš, MD, PhD | 7 | 2 | 6 | |
| | Prof. Renata Pecotić, MD, PhD | 4 | 2 | 5 | |
| | Prof. Maja Valić, MD, PhD | 4 | 2 | 5 | |
| | Assoc. prof. Ivana Pavlinac Dodig, MD, PhD | 3 | 5 | 13 | |
| | Assist. prof. Nikolina Pravdić, MD, PhD | 2 | 5 | 12 | |
| | Assist. prof. Josip Lesko, MD, PhD | | 2 | 2 | |
| | Assistant Sijana Demirović, MD | | 6 | 13 | |
| Course objectives | <p>Course objectives are:</p> <ul style="list-style-type: none"> - to provide the student with knowledge about the normal function of our nervous system by applying the acquired knowledge of physics, chemistry, biochemistry, biology, anatomy, histology and physiology - to provide the student with knowledge about morphology of the brain in general - external and internal structure of the brain, cellular and molecular neuroscience, synaptic transmission, sensory and motor systems, general and control function of the brain, higher brain functions. | | | | |
| Course learning outcomes | Learning outcome (LO) Student: | | | Course learning outcome code | LO code at the study program level |
| | - names, recognizes and describes the morphological features of the central nervous system, midbrain, end brain, peripheral nervous system as well as spinal cord and explains their function. | | | IU-MFMSE304-1 | IU-MSE1 IU-MSE2 |
| | - describes the fundamental electrophysiological features of neurons, explains the generation of resting transmembrane potential, action potentials and postsynaptic potentials. | | | IU-MFMSE304-2 | IU-MSE1 IU-MSE2 IU-M3 |
| | - describes and explains the way information is transmitted between neurons, classifies and explains the basic properties and mechanism of action of neurotransmitters, describes the structure of receptors and discusses their role in information transmission. | | | IU-MFMSE304-3 | IU-MSE1 IU-MSE2 IU-MSE3 |
| | - describes, explains and outlines the organization of sensory systems and applies knowledge in solving examples from clinical practice. | | | IU-MFMSE304-4 | IU-MSE1 IU-MSE2 IU-MSE3 IU-MSE4 IU-MSE5 IU-MSE6 |
| | - describes, explains and sketches the organization of motor systems and applies knowledge in solving examples from clinical practice. | | | IU-MFMSE304-5 | IU-MSE1 IU-MSE2 IU-MSE3 IU-MSE5 IU-MSE6 |
| | - describes and interprets the structure and neurophysiological | | | IU- | IU-MSE1 |

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| | features of higher brain functions: learning and memory, emotions, sexuality, wakefulness and sleep, and the neural control of breathing and heartbeat. | MF MSE304-6 | IU-MSE2 IU-MSE3 |
| | - applies knowledge from theoretical classes and demonstrates skills in solving electrophysiological problems on the computer. | IU-MF MSE304-7 | IU-MSE1 IU-MSE21 |
| | - applies knowledge from theoretical classes and demonstrates the skills of recording bioelectric (EEG, EMG, EOG) potentials from the human body. | IU-MF MSE304-8 | IU-MSE1 IU-MSE21 |
| Prerequisites for the course enrolment | In accordance with the Rulebook on the Integrated Studies at the School of Medicine University of Mostar. | | |
| Course content | Week / shift | Topic | |
| | Lectures | (L1) Introductory lecture (L2) Neuron is a basic structural-functional unit of the CNS (L3) CNS research methods. Development of the CNS and processes of development reorganization and plasticity (L4) Biophysical basics of excitability (L5) Neurotransmitters in health and disease (L6) Serotonin (L7) General organization of the sensory systems. Taste and smell (L8) Physiology of the eye and phototransduction (L9) General structure of the motor systems (L10) Motor cortex and voluntary movements (L11) Brain lateralization (L12) Control of breathing during wakefulness and during sleep. Sleep medicine. (L13) General brain function | |
| | Seminars | (S1) The structure of gray and white matter of the spinal cord (S2) The structure of gray and white matter of the brainstem and (S3) The structure of gray and white matter of the diencephalon (S4) Telencephalon (S5) Neuroanatomy, summary (S6) Cell membrane, ion channels, passive and active neuron properties (S7) Structure and function of the synapse and the cellular basis of behavior (neuron sequences, pathways, circles, networks, systems) (S8) Neurotransmitters, neuropeptides and their receptor (S9) Electrophysiology of neurons, summary (S10) Pain, heat and cold – anterolateral sensory system Touch, pressure, and kinesthesia - the dorsal column system (S11) Ear - organ of hearing and balance. Auditory and vestibular system (S12) Organization of the retina, primary visual pathway and primary visual cortex (S13) Eye movement and the organization of associative visual fields (S14) Sensory system, summary (S15) Spinal motor mechanisms and reflexes. Role of the descending pathways from the brainstem in maintaining posture and muscle tone; spinal shock šok (S16) Motor functions of the cerebellum and the basal ganglia (S17) Motor system, summary (S18) Organization and structure functions of the limbic system (S19) Neurobiology of emotion and sexuality (S20) Anatomy and psychology of learning and memory (S21) Hypothalamus; autonomic and endocrine control (S22) Clinical seminar | |

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| | | (S23) General brain functions; EEG (S24) Stages of wakefulness and alertness; sleep (S25) Neurobiology of attention and associative functions of the prefrontal and posterior parietal cortex (S26) Cellular mechanisms of learning and memory | | | | | | | | | |
| | Exercises | (E1) Appearance and distribution of gray and white matter of the spinal cord (E2) Appearance and distribution of gray and white matter of the brainstem (E3) Clinical-anatomic syndromes of the spinal cord (E4) Resting potential (E5) Action potential (E6) Synaptic potential (E7) Signalization (E8) Reflexes and reaction time (E9) Physiology of sensation (E10) Muscle and electromyography (E11) EEG and evoked potential (E12) <i>SleepLab</i> Polysomnography | | | | | | | | | |
| Language | English | | | | | | | | | | |
| E-learning | Classes are conducted in person. If necessary, lectures, seminars and part of the exercises can be combined (in person and online) via e-learning platforms (GoogleMeet) – up to 20% of classes can be performed online. | | | | | | | | | | |
| Teaching methods | Teaching, interactive and active-experiential. | | | | | | | | | | |
| Types of assessment (indicate - Bold) | | | | | | | | | | | |
| Type of pre-examination obligation | | | | | Type of exam | | | | | | |
| midterm | seminar paper | essay/report | practical/project task | other | written exam | oral exam practical | | | | | |
| Allocation of ECTS credits and share in the grade | | | | | | | | | | | |
| Student obligations | | Learning outcome code | Hours of workload | Share in ECTS | Share in grade | | | | | | |
| Attending classes | | | 100 | 3.3 | 0% | | | | | | |
| Activity during seminars | | IU-MFMSE304-1,2,3,4,5,6,7,8 | 40 | 1.3 | 0% | | | | | | |
| Pre-exam/Written exam | | IU-MFMSE304-1,2,3,4,5,6,7,8 | 100 | 3.4 | 100% | | | | | | |
| In total | | | 240 | 8 | 100% | | | | | | |
| Method of calculating the final grade | | | | | | | | | | | |
| <p>The final grade is based on the result achieved on the written exam.</p> <p>According to the Rulebook on the Integrated Studies at the School of Medicine University of Mostar, grades are assigned as following:</p> <p>0-54% insufficient (1); 55-66% sufficient (2); 67-78% good (3); 79- 90% (very good 4); 91-100% excellent (5).</p> | | | | | | | | | | | |
| Literature (indicate) | Title (title, author, year) | Edition | | Language | | | | Type of literature | | | |
| | | own | other | croatian | english | other | multilingual | book | article | script | other |
| Compulsory | Siegel, A. and Sapru, H.: ESSENTIAL NEUROSCIENCE, 4 th Edition, Wolters Kluwer/ Lippincott Williams & Wilkins | | x | | x | | | x | | | |
| | John Huguenard and David A. McCormick: Electrophysiology of the | | x | | x | | | x | | | |

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| | Neuron, Windows Version, A Companion to <i>Neurobiology</i> by Gordon Shepard | | | | | | | | | |
| Additional | Purves et al Neuroscience 5 th edition published by Sinauer Associates | | x | x | | | | x | | |
| | Kandel, E.R., Schwartz, J.H. and Jessel, T.M.: PRINCIPLES OF NEURAL SCIENCE, 4th edition, McGraw-Hill; New York, SAD, 2000. | | x | x | | | | x | | |
| | Guyton, A.C. and Hall: MEDICAL PHYSIOLOGY, 11th edition. 2006. | | x | x | | | | x | | |

Additional course information

The Basic neuroscience course is performed with a total duration of 100 hours, divided into five teaching units (Neuroanatomy, Basics of neuron electrophysiology, Sensory systems, Motor systems, General brain functions). Topics that are covered through lectures, seminars and practical lessons are announced on the beginning of the course, including an indication of the prescribed literature.

Attendance of all forms of instruction is obligatory (except the attendance of individual consultations), and all students are obligated to study the prescribed material IN ADVANCE for seminars and practical lessons, using the main textbook and/or the additional literature.

Activity at the seminars is rewarded with pluses, whilst not being prepared will be marked as a minus. All absences and minuses have to be compensated through a colloquium at least 2 days before the exam. Students not taking the exam in the pre-exam period have to take a colloquium in a 10 days period after the end of the Basic neuroscience course, in order to compensate their absences and minuses.

Neuroscience is tested in the form of written exam that consists of 100 multiple answer questions with only one answer being correct. Each correct answer carries one point. In order to pass the exam (grade sufficient), the student must answer 55% of the questions correctly.

The final grade is based on the result achieved on the written exam.