

<i>Name of the course</i>	Basic Neuroscience			Code	
<i>Type of study program Cycle</i>	Integrated university study, medicine			Year of study	2 nd .
<i>Credits (ECTS) :</i>	8,0	<i>Semester</i>	1 st .	Number of hours per semester (l+s+e)	L/S/E 20/56/24
<i>Status of the course:</i>	mandatory	<i>Preconditions:</i>		<i>Comparative conditions:</i>	/
<i>Access to course:</i>	Second year students			<i>Hours of instructions:</i>	According to schedule
<i>Course teacher:</i>	Professor Zoran Đogaš, MD, PhD				
<i>Consultations:</i>	As agreed with students				
<i>E-mail address and phone number:</i>	e-mail: zoran.dogas@mefst.hr, tel. 557-905				
<i>Associate teachers</i>	Professor Maja Valić, MD, PhD Associate Professor Renata Pecotić, MD, PhD Assistant Professor Ivana Pavlinac Dodig, MD, PhD				
<i>Consultations:</i>	As agreed with students				
<i>E-mail address and phone number:</i>	e-mail: ivana.pavlinac@mefst.hr, tel. 557-862				
<i>The aims of the course:</i>	General morphology – external and internal structure of the brain, cellular and molecular neuroscience; synaptic transmission; sensory systems; motor systems; general and management functions of the brain, higher cerebral functions.				
<i>Learning outcomes (general and specific competences):</i>	To recognize and describe the morphological features of structures of the central nervous system, midbrain, telencephalon, peripheral nervous system as well as spinal cord and explain their function. Describe the basic electrophysiological features of neurons, explain generation of transmembrane resting potential, action potentials and postsynaptic potentials. Describe the method of information transfer between neurons, classify and explain the basic characteristics and mechanism of neurotransmitters' action. Describe the structure of receptors and discuss their role in information transmission. Describe, explain and sketch the organization of sensory systems and apply knowledge in solving examples from clinical practice. Describe, explain and sketch the organization of motor systems and apply knowledge in solving examples from clinical practice. Describe and interpret the structure and neurophysiological features of the higher brain functions: learning and memory, emotions, sexuality, vigilance and sleep and neural control of breathing and heartbeat. Apply knowledge from theoretical classes and demonstrate problem-solving skills in electrophysiological problem tasks on the computer. Apply knowledge from theoretical classes and demonstrate skills recordings of bioelectrical (EEG, EMG, EOG) potentials from human				

	bodies.			
Course content (Syllabus):	Neuroscience is one of the basic medical sciences studying morphology and function of a healthy nervous system, with an emphasis on the mechanisms responsible for achieving its role as a central organism control and management system. This course will introduce students to and enable them to approach problems in this area using scientific methods. The aim of the Basic neuroscience course is to teach a student how to use the acquired knowledge on physics, chemistry, biochemistry, biology, anatomy, histology and physiology in acquiring knowledge on the normal function of the nervous system to the extent necessary for further successful studying. Topics to be covered through lectures, seminars and practical lessons, including an indication of the prescribed literature, will be announced on the beginning of the course.			
Format of instruction (mark in bold)	Lectures	Exercises	Seminars	Independent assignments
	Consultations	Work with mentor	Field work	Other
Student responsibilities	Attendance of all forms of instruction is MANDATORY (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.			
Screening student work (mark in bold)	Class attendance	Class participations	Seminar essay	Practical training
	Oral exam	Written exam	Continuous assessment	Essay
Detailed evaluation within a European system of points				
STUDENTS RESPONSIBILITIES	HOURS	PROPORTIONS OF ECTS CREDITS	PROPORTIONS OF GRADE	
Class attendance and participations	(20+24+56)=100	3,3	40%	
Written exam	140	4,7	60%	
Total	240	8,0	100%	
Further clarification: 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.				
Final score: The final assessment is carried out according to the Regulation of Studies of the University of Mostar and applies to all study groups. According to the Regulations on studying final grade is obtained as follows: A = 91-100% 5 B = 79 to 90% 4 C = 67 to 78% 3 D = 55 to 66% 2				

F = 0 to 54% 1	
Required literature:	<ul style="list-style-type: none"> • Siegel, A. and Sapru, H.: ESSENTIAL NEUROSCIENCE, 4th Edition, Wolters Kluwer/ Lippincott Williams & Wilkins • John Huguenard and David A. McCormick: Electrophysiology of the Neuron, Windows Version, A Companion to <i>Neurobiology</i> by Gordon Shepard
Optional literature:	<ul style="list-style-type: none"> • Purves et al Neuroscience 5th edition published by Sinauer Associates • Kandel, E.R., Schwartz, J.H. and Jessel, T.M.: PRINCIPLES OF NEURAL SCIENCE, 4th edition, McGraw-Hill; New York, SAD, 2000. • Zigmond, MJ et al.: Fundamental Neuroscience, Academic Press; San Diego, SAD, 1999. • Guyton, A.C. and Hall: MEDICAL PHYSIOLOGY, 11th edition. 2006.
Additional information about the course	<p>Teaching quality analysis by students and teachers</p> <p>Exam passing rate analysis</p> <p>Committee for control of teaching reports</p> <p>External evaluation</p>

Annexes: calendar classes

The number of teaching units	TOPICS AND LITERATURE
I.	<p>TITLE: BASICS OF BRAIN ANATOMY</p> <p>LECTURES</p> <p>Introductory lecture; Neuron is a basic structural-functional unit of the CNS; CNS research methods; Development of the CNS and processes of development reorganization and plasticity; Peripheral nervous system and the spinal cord; Diencephalon and telencephalon</p> <p>SEMINARS</p> <p>The structure of gray and white matter of the spinal cord The structure of gray and white matter of the brainstem and cerebellum The structure of gray and white matter of the diencephalon and telencephalon Neuroanatomy, summary</p> <p>EXERCISES</p> <p>Review of the CNS structures Appearance and distribution of gray and white matter of the spinal cord Appearance and distribution of gray and white mat</p> <p>Short description: Students Name, recognize and describe morphologic characteristics of the central nervous system, midbrain, brainstem, peripheral nervous system, spinal cord and describe their function</p> <p>Literature: required literature</p>
II.	<p>TITLE: BASICS OF ELECTROPHYSIOLOGY OF THE NEURON</p> <p>LECTURES</p> <p>Neuron is a basic structural-functional unit of the CNS Biophysical basics of excitability</p> <p>SEMINARS</p> <p>Cell membrane, ion channels, passive and active properties of the neuron</p> <p>Electrophysiology of the neuron and types of the potentials</p>

	<p>EXERCISES Resting potential Action potential Synaptic potential.</p>
	<p>Short description: Students will learn basic of electrophysiological characteristics of the neuron, explain mechanisms of the generation of transmembrane resting potentials, action potentials and postsynaptic potentials.</p>
	<p>Literature: required literature</p>
III.	<p>TITLE: INTERCELLULAR SIGNALING LECTURES Neurotransmitters in health and disease Serotonin SEMINARS Structure and function of the synapse and the cellular basis of behavior (neuron sequences, pathways, circles, networks, systems) Neurotransmitters, neuropeptides and their receptors EXERCISES Signalization</p>
	<p>Short description: Students will learn principle of the information transmission between neurons, classify and explain characteristics and mechanisms of neurotransmitters' action, describe the structure of the receptors, and discuss their role in the information transmission.</p>
	<p>Literature: required literature</p>
IV.	<p>TITLE: SENSORY SYSTEM LECTURES General organization of the sensory system Physiology of the eye and phototransduction SEMINARS Pain, heat and cold – anterolateral sensory system Touch, pressure, and kinesthesia - the dorsal column system Ear - organ of hearing and balance Auditory and vestibular system Organization of the retina, primary visual pathway and primary visual cortex Perception of colours, shapes, depth and movement; and the organization of the associative visual fields of the cerebral cortex EXERCISES Physiology of the senses</p>
	<p>Short description: Students will describe, explain and outline principles of sensory system organization and apply adopted knowledge in solving examples of clinical cases</p>
	<p>Literature: required literature</p>
V.	<p>TITLE: MOTOR SYSTEM LECTURES General organization of the motor system Role of the motor cortex in voluntary movements SEMINARS Spinal motor mechanisms and reflexes Role of the descending pathways from the brainstem in maintaining posture and muscle tone; spinal shock Motor functions of the cerebellum Motor functions of the basal ganglia The hypothalamus controls the endocrine and the autonomic nervous system EXERCISES Muscles and electromyography</p>
	<p>Short description: Students will describe, explain and outline principles of</p>

	motor system organization and apply adopted knowledge in solving examples of clinical cases
	Literature: required literature
VI.	<p>TITLE: GENERAL BRAIN FUNCTION</p> <p>LECTURES Development of the CNS and processes of development reorganization and plasticity Stages of wakefulness and sleep; Sleep Medicine Physiology of intracranial pressure and cerebral circulation The structure of neurotransmitter systems and reticular formation</p> <p>SEMINARS General brain function: ascending activating system, EEG, alertness levels and levels of consciousness Neurobiology of biological rhythms and motivational states Neurobiology of emotion and sexuality Neurobiology of attention and association functions of the prefrontal and posterior parietal cortex Anatomy and psychology of learning and memory Cellular mechanisms of learning and memory</p> <p>EXERCISES Polisomnography Polisomnography report Reflexes and reaction time EEG and evoked potentials</p> <p>Short description: Students will describe, explain and interpret neurophysiologic characteristics of the general brain function: learning and memory, emotions, sleep and wakefulness, neuronal control of breathing and hearth function. Students will use acquired theoretical knowledge and demonstrate skills in recording of human bioelectrical potentials (EEG, EMG, and EOG).</p>
	Literature: required literature