

NAME OF THE COURSE		Molecular Neurobiology				
Code	PMB730	Year of study	2			
Course teacher	Natalija Filipović, PhD Associate Professor	Credits (ECTS)	3			
Associate teachers	Katarina Vukojević, PhD, Professor Nives Kević, PhD, Assistant Professor Anita Racetin, mag.educ.biol.et chem. Marija Jurić, MD	Type of instruction (number of hours)	L	S	E	F
			20	20	8	
Status of the course	elective	Percentage of application of e-learning				
COURSE DESCRIPTION						
Course objectives	The objectives of the course are to familiarize students with the basics of the structure, function and development of the nervous system; outline the basic molecular mechanisms underlying function; get acquainted with the molecular mechanisms underlying the pathophysiology of the most important diseases and disorders of the nervous system.					
Course enrolment requirements and entry competences required for the course	Students should have basic knowledge in cell biology and histology.					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	<p>Expected learning outcomes:</p> <ul style="list-style-type: none"> <li>• Explain the basics of the structure and development of the nervous system.</li> <li>• Describe the metabolic functions of the nervous system and its supply.</li> <li>• Interpret the molecular basis of nerve impulse formation and transmission.</li> <li>• Explain the molecular and cellular changes underlying learning, memory, and adaptation to experiences.</li> <li>• Explain the molecular mechanisms that lead to the most common diseases of the nervous system.</li> </ul>					
Course content broken down in detail by weekly class schedule (syllabus)	<p><b>Lectures:</b></p> <ol style="list-style-type: none"> <li>1. Basics of central and peripheral nervous system anatomy (2 hours).</li> <li>2. Basics of histological structure of the nervous system. Cells of the nervous system: neurons and glia. (2 hours).</li> <li>3. Blood supply to the nervous system. Blood-brain barrier. Cerebrospinal fluid. Energy metabolism of the nervous system. Immune brain privilege. (2 hours).</li> <li>4. Basics of nerve impulse formation and propagation. Ion channels. Synaptic transmission. (2 hours).</li> <li>5. Neurotransmitters and neuromodulation. (2 hours).</li> <li>6. Early development of the nervous system. Neurogenesis. (2 hours).</li> <li>7. The assembly of neural circuits and the change of neural circuits influenced by experience. (2 hours).</li> <li>8. Synaptic plasticity. (2 hours).</li> <li>9. Regeneration and repair of the nervous system. (2 hours).</li> <li>10. Memory and forgetting. Sleep and wakefulness. (2 hours).</li> </ol> <p><b>Seminars:</b></p> <p>Journal Club: Presentation and Analysis of Scientific Articles. Each seminar will be accompanied by an appropriate lecture, with a presentation and critical analysis of the latest scientific knowledge on the pathophysiological mechanisms and molecular base for therapeutic approach to disorders (20 hours)</p>					

	<p>exercises:</p> <ol style="list-style-type: none"> <li>1. Independent preparation of brain, spinal cord and rat / mouse ganglia preparations by immunohistochemical staining for neuron and glial cell markers (4 hours)</li> <li>2. Microscopy of tissue sections: rat / mouse nerve tissue stained with specific neuron markers (2 hours)</li> <li>3. Microscopy of tissue sections: rat / mouse nerve tissue stained with specific glial cell markers (2 hours)</li> </ol>					
Format of instruction	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> <i>on line</i> in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work		<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			
Student responsibilities	Student's obligations are: regular attendance of lectures, seminars and exercises; active participation in classes - preparation for upcoming units; preparation and presentation of seminar work, critical discussion of thematic units at seminars of other students.					
Screening student work ( <i>name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course</i> )	Class attendance	0,5	Research		Practical training	
	Experimental work	0,5	Report		(Other)	
	Essay		Seminar essay	1	(Other)	
	Tests		Oral exam		(Other)	
	Written exam	1	Project		(Other)	
Grading and evaluating student work in class and at the final exam	The final grade is based on the results achieved in the written exam and seminar. Written exam and seminar contribute to the final grade with 50% share each. The written exam is graded according to the following scale: <50% insufficient (1); 50-69% sufficient (2), 70-79% good (3), 80-89% very good (4), 90-100% excellent (5).					
Required literature (available in the library and via other media)	<b>Title</b>			<b>Number of copies in the library</b>		<b>Availability via other media</b>
	Purves D. et al. Neuroscience, 6 <sup>th</sup> Ed. (2017), Sinauer Associates is an imprint of Oxford University Press - selected chapters					
	Kandel E.R., Schwartz J.H. et al., Principles of Neural Science, Fifth Edition, (2013), McGraw-Hill Companies Inc. - selected chapters					
Optional literature (at the time of submission of study programme proposal)	<ol style="list-style-type: none"> <li>1. Mescher A. Junqueira's Basic Histology: Text and Atlas, 15th ed. (2018), McGraw-Hill Education, New York, USA</li> <li>2. Siegel A., Sapru H.N. Essential Neuroscience, 2<sup>nd</sup> ed. (2011) Lippincott Williams &amp; Wilkins, a Wolters Kluwer – odabrana poglavlja</li> <li>3. Selected scientific papers</li> </ol>					
Quality assurance methods that ensure the acquisition of exit competences	Quality assurance will be ensured at the three levels: university, faculty and faculty.					

Other (as the proposer wishes to add)	
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