

NAME OF THE COURSE		Advanced Laboratory Course in Biochemistry					
Code	PMC208	Year of study	1.				
Course teacher	Viljemka Bučević Popović, PhD, Assistant Professor Matilda Šprung, PhD, Assistant Professor	Credits (ECTS)	2				
Associate teachers		Type of instruction (number of hours)	L	S	E	F	
Status of the course	Obligatory	Percentage of application of e-learning			30		
COURSE DESCRIPTION							
Course objectives	Getting acquainted with the instruments and methods used in modern biochemical laboratories.						
Course enrolment requirements and entry competences required for the course	<p>There are no prerequisites for enrolment. Entry competencies needed for following the course:</p> <ol style="list-style-type: none"> <li>1. knowledge of the basics of practical work in the biochemistry laboratory</li> <li>2. knowledge of chemical properties of biomolecules</li> <li>3. understanding fundamental biochemical processes in living cells</li> </ol>						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	<p>After completing the exam, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Perform experiments and operate instruments used in modern biochemical laboratories</li> <li>2. Compare different techniques for determining the concentration and purification of biological macromolecules</li> <li>3. Perform protein purification from a given biological sample and analyze it using electrophoretic techniques</li> <li>4. Determine concentration of biological macromolecules</li> <li>5. Perform protein-ligand binding experiments and data analysis</li> <li>6. Present and interpret the results obtained in biochemical laboratory</li> </ol>						
Course content broken down in detail by weekly class schedule (syllabus)	<p>EXERCISES:</p> <ol style="list-style-type: none"> <li>1. Heterologous expression of protein in <i>E. coli</i>. Growth media preparation, bacteria culture preparation, induction of protein expression. Cell biomass harvest. (4 hours)</li> <li>2. Bacterial cell lysis, preparation of cell protein extracts. Purification of protein by chromatography on an FPLC apparatus. (4 hours)</li> <li>3. Analysis of proteins by electrophoresis (SDS-PAGE). (4 hours)</li> <li>4. Determination of concentration of biological macromolecules. (4 hours)</li> <li>5. Monitoring denaturation of biological macromolecules. (4 hours)</li> <li>6. Assessment of protein-ligand binding and determination of binding affinities by microscale thermophoresis method (5 hours)</li> <li>7. Exploring protein interactors in the cell lysates (5 hours)</li> </ol>						
Format of instruction	<input type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input type="checkbox"/> exercises <input type="checkbox"/> <i>on line</i> in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work		<input 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	Attending classes, entry quizzes, final exam						
Screening student work (name the	Class attendance	1.0	Research		Practical training		

<i>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>	Experimental work		Report		(Other)	
	Essay		Seminar essay		(Other)	
	Tests	0.25	Oral exam		(Other)	
	Written exam	0.75	Project		(Other)	
Grading and evaluating student work in class and at the final exam	Quizzes – 20% Final exam – 80%					
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>
	Advanced Biochemistry Practical (laboratory manual)					available
Optional literature (at the time of submission of study programme proposal)	Price, Nairn: Exploring proteins: a student's guide to experimental skills and methods, Oxford University Press, 2009. Wilson, Walker: Principles and Techniques of Biochemistry and Molecular Biology, Cambridge University Press, 2010. Janson, Jan-Christer: Protein purification, Wiley, 2011. Boyer, Rodney: Modern experimental biochemistry, Addison, Wesley, Longman, Inc. 2000.					
Quality assurance methods that ensure the acquisition of exit competences	The quality of teaching will be monitored by collecting feedback from students through personal consultations, joint conversations and anonymous student surveys. The students' performance in the final exam will be analyzed and used to improve the teaching performance in the next academic year.					
Other (as the proposer wishes to add)						