

## SUBJECT/COURSE SYLLABUS

1.	Course name in Polish and English <b>Preparative Biochemistry</b> Preparatyka biochemiczna
2.	Scientific discipline <b>Medical sciences</b> <b>Biotechnology</b>
3.	Language of instruction <b>English</b>
4.	Unit conducting the course <b>Faculty of Biotechnology</b>
5.	Type of course <b>compulsory</b>
6.	Field of study <b>Biotechnology</b>
7.	Level of study <b>first-cycle</b>
8.	Year of study <b>3rd</b>
9.	Semester <b>winter</b>
10.	Course form and number of hours <b>Lecture, 15 h</b>
11.	Prerequisites in terms of knowledge, skills and social competences for the course: <ul style="list-style-type: none"> <li>knowledge of <b>structure and properties of biomacromolecules and biochemistry.</b></li> </ul>
12.	Learning objectives for the course:  Student will learn <b>protein purification techniques</b> and be able to design <b>protein purification strategy.</b>
13.	Curriculum content: <ul style="list-style-type: none"> <li><b>choice of tissue</b> (plant/animal) material and setup of <b>extraction conditions;</b></li> <li><b>clarification and condensation</b> of extracted material;</li> <li><b>desalting</b> of proteins;</li> <li><b>methods of detection of purified proteins;</b></li> <li><b>basic techniques applied during protein and peptides purification</b> (precipitation, fractionation, ion-exchange chromatography, hydrophobic chromatography, gel filtration, affinity chromatography, immuno-precipitation. HPLC and FPLC techniques; reverse phase chromatography (RP);</li> <li><b>purification of recombinant proteins;</b></li> <li><b>scaling up of purification process.</b></li> </ul>

14.	<p>Description of learning outcomes</p> <p>Student:</p> <ul style="list-style-type: none"> <li>explains the basic biological phenomena and processes (e.g., protein structure and properties) that are necessary for protein purification.;</li> <li>applies appropriate mathematical and/or statistical methods to interpret experimental data from protein purification experiments;</li> <li>calculates protein yield, specific activity, and purification fold from experimental data;</li> <li>describes the principles and applications of basic techniques and research tools (e.g., precipitation, fractionation, chromatography) used in preparative biochemistry;</li> <li>designs a multi-step protein purification protocol for a specific protein, justifying the choice of each method based on protein properties;</li> <li>summarizes primary scientific literature in English related to protein purification methods and research, identifying key findings and methodologies;</li> <li>takes advantage of the online resources and literature to retrieve information on protein properties and relevant purification protocols.</li> </ul>	<p>Symbols for relevant directional learning outcomes:</p> <p><b>K1_W01</b></p> <p><b>K1_W02</b></p> <p><b>K1_W02</b></p> <p><b>K1_W06, K1_W08</b></p> <p><b>K1_W09, K1_K03</b></p> <p><b>K1_U03</b></p> <p><b>K1_U04</b></p>
15.	<p>Mandatory literature:</p> <ul style="list-style-type: none"> <li>Materials and additional sources provided/indicated by the lecturer.</li> <li>Scopes RK., <b>Protein Purification. Principles and Practice</b>; Humana Press.</li> </ul> <p>Recommended literature:</p> <ul style="list-style-type: none"> <li>Franks F., <b>Protein Biotechnology – Isolation, characterization and stabilization</b>. Humana;</li> <li>Ableson JM., Simon MI., Deutscher MP. (red.) <b>Methods in Enzymology V182. Guide to protein purification</b>. Academic Press;</li> <li>Burgess R., AR. Liss; <b>Protein Purification. Micro to Macro</b>;</li> <li>Piljac G., Piljac V (ed.), TIZ Cakovec; <b>Genetic Engineering. Liquid Chromatography</b>.</li> </ul>	
16.	<p>Methods of verification of the assumed learning outcomes:</p> <ul style="list-style-type: none"> <li><b>written exam</b></li> </ul>	
17.	<p>Conditions and form of credit for individual components of the course:</p> <ul style="list-style-type: none"> <li><b>positive exam result.</b></li> </ul>	
18.	Student workload expressed in teaching hours and ECTS credits	number of hours allocated for the course of a given type of classes
	<p>classes (according to the study plan) with the instructor:</p> <ul style="list-style-type: none"> <li><b>lecture</b></li> </ul>	<b>15 h</b>

	student's own work (including participation in group work) e.g.: <ul style="list-style-type: none"> <li>• <b>reading the literature indicated;</b></li> <li>• <b>preparation for the final exam.</b></li> </ul>	<b>25 h</b>
	Total number of class hours:	<b>35 h</b>
	Number of ECTS credits:	<b>2 ECTS</b>