

COURSE DESCRIPTION (SYLLABUS)

1.	Course: Medical Biotechnology
2.	Language of instruction: English
3.	Faculty: Faculty of Biotechnology
4.	Course/module code:
5.	Course/module type (<i>mandatory or elective</i>) elective - choice limited to Industrial and Medical Biotechnology
6.	Programme: Biotechnology
7.	Study cycle (<i>1st/2nd</i>): 1st cycle
8.	Year: 3rd
9.	Semester (<i>autumn or spring</i>): autumn
10.	Form of tuition and number of hours: Laboratory: 45 h Learning methods: Laboratory practice - conducting experiments
11.	Coordinator(s): Małgorzata Zakrzewska, PhD
12.	Initial requirements (<i>knowledge, skills, social competences</i>): <ul style="list-style-type: none"> • basic knowledge in the fields of general chemistry; • knowledge of protein structure; • knowledge of basic techniques in biophysical chemistry; • ability to carry out chemical and biochemical calculations; • ability to work in the laboratory, including preparation weighed amounts, buffers, usage of centrifuge and spectrophotometer.
13.	Objectives: The objective of the course is to familiarize students with laboratory techniques including: expression, purification and biophysical characterization of recombinant

	protein overexpressed in <i>E. coli</i> system.	
14.	<p>Content:</p> <ul style="list-style-type: none"> • preparation of necessary reagents, culture media and buffers; • transformation of chemically competent cells; • conducting bacterial culture; • purification of the protein using affinity chromatography; • determination of protein concentration; • carrying out SDS-PAGE; • analysis of the recombinant protein using circular dichroism and fluorescence techniques. 	
15.	<p>Learning outcomes:</p> <p>Knowledge:</p> <ul style="list-style-type: none"> • student is able to make qualitative and quantitative description of the processes related to production of recombinant proteins; • student identifies and understands the basic concepts, terms, techniques used in biotechnology; • students has knowledge of the basic techniques and research tools used in biochemistry, molecular biology and biotechnology, such as bacterial culture, transformation, chromatography, spectral measurements, SDS-PAGE etc. • student is able to link theoretical knowledge of biochemistry, biotechnology, molecular biology and microbiology with its practical application in industry, health care; • student knows and applies basic principles of health and safety and ergonomics procedures in the laboratory, know procedures of work with genetically modified organisms. <p>Skills:</p> <ul style="list-style-type: none"> • student applies basic physical, chemical and biochemical techniques necessary for studying biological processes, including protein overexpression in bacterial system, protein purification with chromatography techniques, protein biophysical analysis; • student plans, organizes and performs experiments involving bacterial cultures and genetic modification of microorganisms (bacterial 	<p>Outcome symbols:</p> <p>K1_W01</p> <p>K1_W06</p> <p>K1_W08</p> <p>K1_W09</p> <p>K1_W10</p> <p>K1_U01</p> <p>K1_U02</p>

	<p>expression systems);</p> <ul style="list-style-type: none"> • student reads and understands scientific literature in the field of biotechnology in English; • student carries out simple experiments in the field of biotechnology, describes the results and presents them in the form of a report; • student plans and performs basic physicochemical measurements in the laboratory; • student prepares reports in English, describing performed experiments; • student works as a part of team to solve problems and perform scientific experiments. <p>Competences:</p> <ul style="list-style-type: none"> • student understands the need for broadening knowledge in biotechnology; • student understands the need for careful planning of tasks and scientific experiments; • student knows and follows the rules of health and safety at work. 	<p>K1_U03</p> <p>K1_U05</p> <p>K1_U07</p> <p>K1_U10</p> <p>K1_U13</p> <p>K1_K01</p> <p>K1_K03</p> <p>K1_K05</p>			
16.	<p>Recommended literature:</p> <ul style="list-style-type: none"> • <i>Basic Biotechnology</i>, 3rd Edition, Colin Ratledge and Bjorn Kristiansen, Cambridge University Press; • <i>Molecular Biotechnology</i>, 4th Edition Bernard R. Glick, Jack J. Pasternak and Cheryl L. Patten, ASM Press. 				
17.	<p>Methods of verification of the assumed learning outcomes:</p> <ul style="list-style-type: none"> • preparation of a written report specifically describing the performed experiments; • written test after the practice's completion. 				
18.	<p>Conditions of earning credits:</p> <p>Earning credits takes place on the basis of a written test (two dates) after the end of the practice, before the examination session. The condition for admission to the test is the proper performance of all experiments planned within the practice, as well as the proper preparation of a written report on the experiments performed.</p>				
19.	<p>Student's workload:</p>				
	<table border="1"> <thead> <tr> <th>Activity</th> <th>Number of hours for the activity</th> </tr> </thead> <tbody> <tr> <td> <p>Hours of instruction (as stipulated in study programme :</p> <ul style="list-style-type: none"> • laboratory practice • consultations </td> <td> <p>45 h</p> </td> </tr> </tbody> </table>	Activity	Number of hours for the activity	<p>Hours of instruction (as stipulated in study programme :</p> <ul style="list-style-type: none"> • laboratory practice • consultations 	<p>45 h</p>
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	Student's own work: <ul style="list-style-type: none"> • study before the laboratory; • analysis of the results; • reading of scientific literature; • preparation of scientific report; • preparation for the test. 	20 h
	Total number of hours:	65 h
	Number of ECTS:	3 ECTS