GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Applied Enzymology, PG_00058616		
Field of study	Biotechnology		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Iwona Gabriel	
	Teachers	dr inż. Kamila Rząd dr hab. inż. Iwona Gabriel	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	15.0	0.0	15.0	30

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	30	8.0	37.0	75

Subject objectives

Expanding knowledge in the field of ENZYMOLOGY

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U02] has practical skills in commonly used biochemical methods including enzyme activity and kinetics assays, electrophoresis, western blotting, ELISA assays, fluorescence microscopy, flow cytometry	The student performs spectrophotometric measurements. The student selects chromatographic techniques useful for the separation of biomolecules. The student analyzes the composition of the protein mixture using electrophoretic techniques. The student determines the parameters of the enzymatic reaction. The student interprets the results of the experiments.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
[K7_K04] is aware of the need to solve problems and perform tasks, independently formulate questions to solve a given problem or task; is able to plan the execution of a larger task by dividing it into partial tasks and draw up an appropriate schedule	The student knows the basic principles of planning and conducting experimental work in the field of biochemistry and is able to perform analysis of experimental data.	[SK5] Assessment of ability to solve problems that arise in practice
[K7_W02] has advanced knowledge of structure and activity of enzymes and biologically active compounds also in pharmacological context, knows basic instrumental methods of qualitative and quantitative analysis and activity studies of biomolecules	The student explains the molecular basis of enzymatic catalysis, inhibition and inactivation. The student determines the activity of enzyme preparations based on the experimental data.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation

<table>
<tr><td>Subject contents</td><td>As part of laboratory exercises, experimental classes are carried out covering issues related to 1) chromatographic techniques used in protein purification (Purification of beta-galactosidase from E.coli using bioaffinity chromatography) 2. electrophoretic techniques (Analysis of the effectiveness of beta-galactosidase purification using SDS -PAGE) 3. enzyme activity determination methods (trypsin and a-amylase) and 4) enzyme immobilization techniques. The seminar classes will discuss, among others: topics related to the characteristics of selected enzymes as biocatalysts, selected mechanisms of enzymatic reactions, types of enzyme inhibitors and inactivators, methods of physiological regulation of enzyme activity, enzymes in biotechnology, enzyme immobilization, clinical aspects of enzymology, basics of enzyme engineering.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of biochemistry</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Laboratory classes</td><td>60.0%</td><td>30.0%</td></tr>
<tr><td>Exam</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>Seminar</td><td>60.0%</td><td>20.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>L. Stryer Biochemistry (III-rd edition), PWN Warsaw 2002,

R.K. Murray, Harpers biochemistry, PZWL, Warsaw, 2018, ed.VII</td></tr>
<tr><td>Supplementary literature</td><td>G. L Peterson Methods in Enzymology Vol. 91, Academic Press, New York (1983)

E. L. V. Harris and S. Angal Protein purification methods; a practical approach, Oxford University Press, Oxford 1989

Scopes, R. K., Protein purification, Springer Verlag, New York 1987

R. L. Dryer, G. F. Lata Experimental Biochemistry, Oxford University Press, New York, 1989</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Enzymes as catalysts. The concept of substrate specificity. Basic elements of enzyme structure and molecular basis of enzymatic catalysis. Active Center. Transition State Theory. Strategy and tactics in enzyme purification. Chemical and spectral methods of studying the enzyme active site . Enzyme kinetics. Inhibition and inactivation. Molecular mechanisms of enzymatic reactions. Types of enzyme inhibitors and inactivators. Methods of physiological regulation of enzyme activity.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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