



Subject card

Subject name and code		APPLIED ENZYMOLOGY, PG_00063455						
Field of study		Biotechnology						
Date of commencement of studies		October 2024	Academic year of realisation of subject			2024/2025		
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			2.0		
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 hab. inż. Iwona Gabriel dr inż. Kamila Rząd				
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	5.0		15.0	50	
Subject objectives		Expanding knowledge in the field of ENZYMOLOGY						
Learning outcomes		Course outcome	Subject outcome			Method of verification		
		[K7_K03] understands the social role and importance of providing reliable information and opinions to the public	The student knows the benefits of using biotechnological methods for society. The student is aware of their limitations.			[SK5] Assessment of ability to solve problems that arise in practice		
		[K7_U02] uses research methods used in biotechnology and related fields	The student explains the molecular basis of enzyme catalysis, inhibition and inactivation. Defines methods of physiological regulation of enzyme activity. Uses biochemical techniques such as chromatographic, electrophoretic and spectroscopic methods.			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject		
		[K7_W02] explains the structure and function of biomolecules and the methods and instruments for determining their quantity and activity	The student explains the molecular basis of enzyme catalysis, inhibition and inactivation. Defines methods of physiological regulation of enzyme activity. Uses biochemical techniques such as chromatographic, electrophoretic and spectroscopic methods.			[SW1] Assessment of factual knowledge		
Subject contents		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, the use of enzymes in medicine and the biotechnology industry, enzyme immobilization, clinical aspects of enzymology, basics of enzyme engineering.						

Prerequisites and co-requisites	Basic knowledge of biochemistry		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Seminar	60.0%	50.0%
	Laboratory classes	60.0%	50.0%
Recommended reading	Basic literature	L. Stryer Biochemistry (III-rd edition), PWN Warsaw 2002,  R.K. Murray, Harpers biochemistry, PZWL, Warsaw, 2018, ed.VII	
	Supplementary literature	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	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	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.		
Work placement	Not applicable		

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