

Subject card

Subject name and code	Fundamentals of enzymology, PG_00082052						
Field of study	Chemistry						
Date of commencement of studies	October 2024	Academic year of realisation of subject				2026/2027	
Education level	Bachelor's studies	Subject group				Obligatory subject group in the field of study	
Mode of study	full-time studies	Mode of delivery				at the university	
Year of study	3	Language of instruction				Polish Polish	
Semester of study	5	ECTS credits				2.0	
Learning profile	academic	Assessment form				credit	
Conducting unit	Laboratory of Bioorganic Chemistry -> Department of Molecular Biochemistry -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Dawid Dębowski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	0.0	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	<p>Introduction of some examples of enzymes, their biological functions, inhibitors and substrates.</p> <p>Teaching students to conduct experiments (using the instructions) related to determining the activity of various enzymes.</p> <p>Developing the ability to critically evaluate and interpret the obtained results and analyze source texts.</p>						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[CHEML3_W01] Enumerates basic laws and theories in chemistry, physics, mathematics and biology.	<p>Describes the structure of enzymes and their active sites, their basic functions and features.</p> <p>Knows how to explain the term enzymatic specificity, based on examples of proteases and lipases.</p> <p>Distinguishes and characterizes the basic types of enzymes.</p> <p>Defines the concept of cofactors, gives the examples and provide their division.</p> <p>Lists and describes methods of control of enzymatic activity in the cell.</p> <p>Describes basic issues related to enzymatic kinetics.</p>	[SW4] test/exam - oral or written [SW2] presentation/project/paper/report
	[CHEML3_U07] Prepares documented elaboration on a specific problem in the field of selected chemical and physical issues.	<p>Designs experiments which allows assesment of activity of selected enzymes (proteases, lipases, amylases, phosphatases).</p> <p>Designs experiments which allows assesment of strength of protease inhibitors.</p> <p>Designs peptide fluorogenic substrates for evaluation of activity of selected proteases (trypsin, chymotrypsin and elastase)</p> <p>Prepares final reports on laboratory exercises.</p>	[SU2] presentation/project/paper/report [SU4] test/exam - oral or written
	[CHEML3_K01] Identifies the level of her/his own knowledge and skills and the need for continuous learning and personal development.	<p>Understands the need for constant learning and updating his knowledge.</p> <p>Is aware of the need for critical analysis of one's work and source data.</p>	[SK2] presentation/project/paper/report [SK4] test/exam - oral or written
	[CHEML3_U02] Performs analyses using experimental methods and draws conclusions based on them.	<p>Designs and performs basic experiments with selected enzymes (proteases, amylases, lipases and phosphatases), their inhibitors and fluorogenic substrates.</p> <p>Has ability to analyzes the results of the experiments. Draws conclusions regarding correctness of these experiments.</p>	[SU2] presentation/project/paper/report [SU4] test/exam - oral or written
	[CHEML3_K02] Works individually demonstrating initiative and independence of activity and cooperates in a team fulfilling various roles in it.	Appreciates the need to work in team according to the role (group leader/group member)	[SK2] presentation/project/paper/report [SK4] test/exam - oral or written
	[CHEML3_K06] Raises her/his professional and personal competences by using information provided in various sources.	<p>Understands the need for constant learning and updating his knowledge.</p> <p>Shows cautious criticism in receiving information, especially available in the mass media.</p>	[SK2] presentation/project/paper/report [SK4] test/exam - oral or written
	[CHEML3_U09] Is able to learn independently.	Has ability to use the Internet databases containing scientific publications about enzymes and their inhibitors (such as the PubMed database).	[SU2] presentation/project/paper/report [SU4] test/exam - oral or written

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Subject contents	The student will perform four exercises/experiments covering the following topics: determination of the enzymatic activity of selected serine proteinase (trypsin) and pancreatic lipase. Determination of kinetic parameters (Michaelis constant, kinetic constant) for a selected chromogenic substrate in the reaction with trypsin. Determination of acid phosphatase concentration in potato homogenate. Study of starch degradation catalyzed by amylase.									
Prerequisites and co-requisites	Basic knowledge of Organic chemistry and Biochemistry course. Basic knowledge about laboratory equipment (automatic pipettes, UV-VIS spectrophotometer) and glassware (e.g. burettes).									
Assessment methods and criteria	<table border="1"> <thead> <tr> <th>Subject passing criteria</th> <th>Passing threshold</th> <th>Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>A short test before starting each exercise</td> <td>51.0%</td> <td>90.0%</td> </tr> <tr> <td>Assessment of the report</td> <td>0.0%</td> <td>10.0%</td> </tr> </tbody> </table>	Subject passing criteria	Passing threshold	Percentage of the final grade	A short test before starting each exercise	51.0%	90.0%	Assessment of the report	0.0%	10.0%
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Recommended reading	<p>Basic literature</p> <p>J. M. Berg, J. L. Tymoczko, L. Stryer, "Biochemia", PWN, Warszawa 2009.</p> <p>E. Bańkowski "Biochemia", Elsevier Urban & Partner Wrocław 2004.</p> <p>R.J. Whitehurst, M. Van Oort "Enzymy w technologii spożywczej" PWN, Warszawa 2016.</p> <p>R.A. Copeland "Enzymes: A Practical Introduction to Structure, Mechanism, and Data Analysis", 2nd Edition, Wiley</p> <p>D.E. Metzler Biochemistry: "The chemical reactions of living cells" Second edition, Academic Press</p> <p>Supplementary literature</p> <p>H. Bisswanger "Practical enzymology", Second, completely revised edition, Wiley-Blackwell</p> <p>J-L. Reymond "Enzyme Assays" Wiley-VCH</p> <p>eResources addresses</p> <p>Supplementary https://chemia.ug.edu.pl/wydzial/katedry/katedra-biochemii-molekularnej/dydaktyka/instrukcje-laboratoryjne - Instructions for laboratory classes.</p>									
Example issues/ example questions/ tasks being completed										
Work placement	Not applicable									

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