KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI
Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego
UNIA EUROPEJSKA
EUROPEJSKI FUNDUSZ SPOŁECZNY

Course title	ECTS code
Fundamentals of enzymology	13.3.0472

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Chemii	Chemia	type	pierwszego stopnia
		form	stacjonarne
		specialty	chemia biomedyczna, chemia kosmetyków, chemia żywności
		specialization	wszystkie

Teaching staff

prof. UG, dr hab. Dawid Dębowski; dr Natalia Ptaszyńska; dr Agata Gitlin-Domagalska

Forms of classes, the realization and number of hours

Forms of classes

Laboratory classes, Lecture

The realization of activities

classroom instruction

Number of hours

Lecture: 30 hours, Laboratory classes: 30 hours

ECTS credits

4
classes - 60 h
tutorial classes – 5 h
student's own work – 25 h

Total: 100 h - 4 ECTS

The academic cycle

2024/2025 winter semester

Type of course

obligatory

Language of instruction

polish

Teaching methods

- Laboratory experiments Problem-solving tutorials
- conducting experiments
- multimedia-based lecture

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

Graded credit

Assessment methods

- written exam with open questions
- graded course credit based on individual grades obtained during the semester
- oral exam

The basic criteria for evaluation

Lecture: positive grade received in written exam composed of 5-10 open questions covering issues listed in the course contents, answers to the questions will require solving tasks related to the learning outcomes; the scale of grades will be adjusted to the range of all rated exams
Term "0" - positive grade received in written exam composed of 5-10 open questions covering issues listed in the course contents (only for students who obtained grade 5 from laboratory course)
To take the exam the laboratory classes must be passed
Laboratory classes: • positive grade received in 4 preliminary testes (4 – 6 questions), that check knowledge required to perform experiments during the classes; accomplishment of all planned experimental work (quality of laboratory work, ability to team work and mode of work would be graded); analysis of obtained results performed as written report;
To complete the laboratory course each negative grade must be improved.

Method of verifying required learning outcomes

Required courses and introductory requirements

A. Formal requirements

Organic chemistry, biochemistry

B. Prerequisites

Fundamentals of organic chemistry and biochemistry, skills to work in a chemical laboratory, knowledge of basic laboratory glassware, learning the principles of work in a biochemical laboratory

Aims of education

- to acquaint students with all issues mentioned in the lecture contents;
- to acquaint students with the basic enzymatic processes taking place in the body and their physiological significance and pathological states
- to teach students how to perform experiments, using delivered instructions, aimed at testing enzymatic activity;
- to develop the ability to critically asses and interpret obtained experimental results and analysis of scientific sources;

Course contents

A. Lecture: History of enzymology. Protein structures. Classification and division of enzymes. Enzymes in online databases (including BRENDA, MEROPS, EXPASY). Simple and complex enzymes. Substrate specificity of enzymes. Basics of enzymatic kinetics. Basic types of physiological regulation of enzymatic activity. Mechanisms of inhibition, classification of enzyme inhibitors. The concept and unit of enzymatic activity. Mechanisms of proteinase activity. Exemplary enzymes used in diagnostics and analysis. The use of enzymes in the food, pharmaceutical and cosmetics industries. Ribozymes.

B. Laboratory classes : five exercises / experiments covering the following issues: determination of the enzymatic activity of the selected serine proteinase and pancreatic lipase. Determination of kinetic parameters (KM, kcat) for the selected chromogenic substrate of bovine β-trypsin. Determination of acid phosphatase content in potato homogenate. Study of starch digestion by amylase.

Bibliography of literature

Literature required to pass the course
J. M. Berg, J. L. Tymoczko, L. Stryer, „Biochemia”, PWN, Warszawa 2009.
E. Bańkowski „Biochemia”, Elsevier Urban & Partner Wrocław 2004.
D.E. Metzler “Biochemistry: The chemical reactions of living cells” Second edition, Academic Press
Monographic works provided by assistants leading classes,
Extracurricular readings
J.R. Whitaker, A.G.J Voragen, D.W.S. Wong “Handbook of food enzymology” CRC Press 2002
Various academic handbooks concerning biochemistry

The learning outcomes (for the field of study and specialization)

Knowledge

1. defines and demonstrates type of enzymes
2. describes isolation and purification techniques of enzymes
3. has ability to utilize the online databases containing enzymes
4. distinguishes and characterizes basic types of physiological regulation of enzymatic activity
5. characterizes basic concepts describing the enzymatic kinetics
6. lists and characterizes exemplary enzymes used in diagnostics and analysis as well as enzymes that are markers of diseases.

Skills

1. uses chemical terminology necessary to present (both in oral and written form) the content provided during the course;
2. has the ability to design and conduct basic experiments with enzymes, their inhibitors and substrates by choosing appropriate laboratory equipment, chemical reagents and applying appropriate techniques.
3. analyzes the results of performed experiments, draws conclusions about the correctness of their course;
4. is able to use the basic data bases and interprets the results found there

Social competence

1. Understands the need of continuous education;
2. Takes care of laboratory equipment;
3. Carefully uses laboratory equipment and works cautiously with chemicals;
4. Appreciates the need of ability to team work according to assigned role (team leader/team member);
5. Is aware of the need of critical analysis of own work;
6. Shows cautious criticism when acquiring knowledge, especially these coming from mass media;
7. Is aware of the necessity of fair and reliable work;

Contact

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