

## Syllabus

Course title: <b>Enzymology Enzymologia</b>		
Programme: <b>Biotechnology</b>		Code: <b>5.8</b>
Type of course: <b>elective</b>	Course level: <b>first cycle studies</b>	Semester: <b>III</b>
Form of classes: <b>lectures, lab course</b>	Number of hours per week/meeting: <b>2L, 2Lab</b>	Credit points: <b>3 ECTS</b>
Education profile: <b>General academic</b>		Course language: <b>English</b>
Enrolment: yes/ <del>no</del>		

## GUIDE TO THE SUBJECT

### I. COURSE CHART

#### COURSE OBJECTIVES

- C.1. Presentation of knowledge about the structure/function relationships in biocatalysed reactions
- C.2. Presentation of possible catalytic mechanisms of given reaction types and strategies for the analysis of kinetic mechanisms of catalysed reactions
- C.3. Provide students with knowledge about the use of enzymes in industrial and environmental processes

#### PRELIMINARY COURSE REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of the basics of chemistry
2. Knowledge of the basics of biology
3. Knowledge of the basics of microbiology

#### LEARNING OUTCOMES

- EK 1** The student after completed course knows the structure/function relationships in biocatalysed reactions
- EK 2** Student is able to predict possible catalytic mechanisms of given reaction types and to present strategies for the analysis of kinetic mechanisms of catalysed reactions
- EK 3** Student is able to account for industrial applications of biocatalysis

#### COURSE CONTENT

Form of classes - lectures	Hours
Introduction to enzymology; catalysts and catalysts	6

Enzyme specificity and catalytic strategies	4
Classification of enzymes, review of enzyme classes	4
Kinetics of enzymatic reactions	4
Inhibition of enzymes	2
Regulation of enzyme activity	2
Enzymes in various industries	6
Final test	2
<b>Form of classes - laboratory</b>	<b>Hours</b>
Organizational classes, working principles in the laboratory, basic equipment and their operation, laboratory procedures	2
Isolation and purification of enzymes	4
Enzymatic reactions	12
Enzyme activity	6
The hyperbolic kinetics of enzymatic reactions, enzyme inhibition, graphical determination of parameters of enzymatic reactions, enzyme units	4
Passing reports, passing the laboratories, assignment	2

### COURSE STUDY METHODS

1. blackboard, interactive whiteboard
2. multimedia presentation
3. Performing laboratory experiments

### METHODS OF ASSESMENT ( F - formative; S - summative)

F1. Assessment of self-preparation for classes
F2. Evaluation of laboratory classes
P1. A final test, including lecture material and laboratory classes
P2. Tests allowing to the laboratory classes
P3. Evaluation of the results of laboratoryclasses

### STUDENT WORKLOAD

Form of activity	Workload (hours)
<b>Participation in lectures</b>	28 h
<b>Participation in classes</b>	- h
<b>Laboratory</b>	30 h
<b>Participation in project classes</b>	- h
<b>Participation in seminar</b>	- h
<b>Preparation course on e-learning</b>	- h
<b>Test</b>	2 h

<b>Entrance test for laboratory classes</b>	6 h
<b>Project's defence</b>	- h
<b>Exam</b>	- h
<b>Consultation hours</b>	8 h
<b>DIRECT TEACHING, hours/ ECTS</b>	<b>74 h / 2 ECTS</b>
<b>Preparation for tutorials</b>	- h
<b>Preparation for laboratories</b>	15 h
<b>Preparation for projects</b>	- h
<b>Preparation for seminars</b>	- h
<b>Preparation for e-learning classes</b>	- h
<b>Participation in e-learning classes</b>	- h
<b>Working on project</b>	- h
<b>Preparation for tests</b>	20 h
<b>Preparation for exam</b>	- h
<b>SELF-STUDY, hours/ ECTS</b>	<b>35 h / 1 ECTS</b>
<b>TOTAL (hours)</b>	<b>∑ 109 h</b>
<b>TOTAL ECTS</b>	<b>3 ECTS</b>

#### **PRIMARY AND SUPPLEMENTARY TEXTBOOKS**

Frey,, P.A. Hegeman,, A.D. <b>Enzymatic Reaction Mechanisms</b> Oxford University Press, 2007
Introduction to enzyme and coenzyme chemistry / Tim Bugg.
Enzyme Kinetics and Mechanim / Paul Cook and WW Cleland.
Enzyme kinetics : behavior and analysis of rapid equilibrium and steady-state enzyme systems/ Irwin Segel
Structure and mechanism in protein science: a guide to enzyme catalysis and protein folding / Alan Fersht.
Online access books: 1. Enzyme kinetics and mechanisms / Kenneth B. Taylor.
2. Comprehensive enzyme kinetics / Vladimir Leskovac.
3. Computational approaches to biochemical reactivity / edited by Gábor NáraySzabó and Arieh Warshel.
4. Enzymatic reaction mechanisms/ Perry A. Frey and Adrian D. Hegeman

#### **SUBJECT COORDINATOR (NAME, SURNAME, E-MAIL ADDRESS)**

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#### **NAME OF LECTURER (s) (NAME, SURNAME, E-MAIL ADDRESS)**

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<b>Learning outcome</b>	<b>In relation to the learning outcomes specified for the field of study</b>	<b>Course objectives</b>	<b>Course content</b>	<b>Course study methods</b>	<b>Methods of assesment</b>
<b>EK1</b>	<b>K_W01, K_W02, K_W05, K_U06, K_K01</b>	<b>C1., C2., C3.</b>	lectures/lab.	<b>1, 2, 3</b>	<b>F1., F2, P1., P2., P3.</b>
<b>EK2</b>	<b>K_W01, K_W02, K_W05, K_U06, K_U07, K_K01</b>	<b>C1., C2., C3.</b>	lectures/lab	<b>1, 2, 3</b>	<b>F1., F2, P1., P2., P3.</b>
<b>EK3</b>	<b>K_W05, K_W12, K_U06, K_U07, K_K01</b>	<b>C1., C2., C3.</b>	lectures/lab	<b>1, 2, 3,</b>	<b>F1., F2, P1., P2., P3.</b>

## **II. OTHER USEFUL INFORMATION**

1. All the information on the class schedule is posted on the student information board and online at: [www.is.pcz.pl](http://www.is.pcz.pl)
2. The information about the consultation hours is provided to students on the first class meeting and posted online at website of *Faculty of Infrastructure and Environment*
3. The information on course completion and grade is provided to students on the first class meeting.