Zał. nr 5 do ZW 78/2023

Attachment no. 4. to the Program of Studies

FACULTY CHEMISTRY

SUBJECT CARD

Name of subject in Polish Biokataliza w przemyśle spożywczym, browarniczym i farmaceutycznym
Name of subject in English Biocatalysis in food, brewery and pharmaceutical industry
Main field of study (if applicable): Chemical Engineering and Technology
Specialization (if applicable): Advanced Chemical Engineering
Profile: academic
Level and form of studies: 2nd level
Kind of subject: obligatory
Subject code W03CET-SM2007W, W03CET-SM2007L, W03CET-SM2007S
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	15		45		15
Number of hours of total student workload (CNPS)	50		75		25
Form of crediting (Examination / crediting with grade)	exam		crediting with grade		crediting with grade
For group of courses mark (X) final course					
Number of ECTS points	**2**		3		1
including number of ECTS points for practical classes (P)			3		1
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	0,6		1,8		0,6

1w+3l +1s (2+3+1 ECTS).

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1.Fundamentals of physical chemistry
2 Fundamentals of chemical engineering

SUBJECT OBJECTIVES

C1 To become familiar with the concepts of industrial biotechnology.
C2 To become familiar with methods of obtaining and characterising bioproducts.
C3 To become familiar with the possible applications of enzyme and microorganism in food, brewery and pharmaceutical industry.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 Knows the concepts of industrial biotechnology.
PEU_W02 Has knowledge of methods of obtaining bioproducts.
PEU_W03 Has knowledge of techniques for biocatalysis in industry.
PEU_W04 Knows the applications of industrial biotechnology in various fields

relating to skills:
PEU_U01 Can select a method and synthesise a chosen bioporoduct.
PEU_U02 Can carry out investigations of bioproduct properties and their characterisation using specialised equipment
PEU_U03 Can analyse and process the obtained test results
PEU_U04 Can find in literature the information about bioprocesses and present them to another students.

relating to social competences:
PEU_K01 Is able to cooperate in a laboratory group
PEU_K02 Feels responsible for the results of the assigned task

PROGRAMME CONTENT

Lecture		**Number of hours**
Lec 1	Biocatalysis in food industry: dairy, bakery.	2
Lec 2	Production of protein and peptide preparations.	2
Lec 3	Organic acid production	2
Lec 4	fermented beverage industry	2
Lec 5	vaccine production	2
Lec 6	antibiotics production	2
Lec 7	production of enzyme preparations	
Lec 8	Written course credit	1
	Total hours	**15**

production of food supplements

Laboratory		**Number of hours**
La1	Analytical methods for monitoring biocatalytic processes	5
La2	Beer production – part 1	5
La3	Enzymatic catalysis - determination of reaction kinetic parameters	5
La4	Production of an immobilized biocatalyst of industrial importance	5
La5	Production of lactose-free milk	5
La6	Cold pasteurization of milk using catalase	5
La7	Hydrolysis of penicillin G in a stirred batch reactor	5
La8	Selection of the degree of conversion of D-glucose to D-fructose in a packed bed column (immobilized enzyme)	5
La9	Beer production – part 2	5
	Total hours	45

Seminar		**Number of hours**
Se1	Biocatalysis in food industry	6

Se2	Biocatalys in brewery and winery.	3
Se3	Biocatalysis in pharmaceutical industry.	6
	Total hours	15

TEACHING TOOLS USED
N1. Lecture with multimedia presentation N2. Laboratory instructions N3. Laboratory workstations N4. Students presentation.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
P (lecture)	PEU_W01 PEU_W02 PEU_W03 PEU_W04	Credit test
F1 (laboratory) P=F1	PEU_U01 PEU_U02 PEU_U03 PEU_K01 PEU_K02	Laboratory exercise reports (arithmetic mean)
P (seminar)	PEU_U04	presentation
3.0 jeżeli 3.00 ≤ P < 3.25 3.5 jeżeli 3.25 ≤ P < 3.75 4.0 jeżeli 3.75 ≤ P < 4.25 4.5 jeżeli 4.25 ≤ P < 4.75 5.0 jeżeli 4.75 ≤ P		

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE:
[1] V.Beschkov, D.Yankov, Downstream Processing in Biotechnology, De Gruyter 2021 [2] N.Dunford, Food and Industrial Bioproducts and Bioprocessing, Iowa State University Press 2020
SECONDARY LITERATURE:
[3] PDF presentation
SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)
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