FACULTY OF CHEMISTRY

SUBJECT CARD

Name of subject in Polish	Podstawy biotechnologii
Name of subject in English:	Fundamentals of biotechnology
Main field of study (if applicable):	Chemical technology
Specialization (if applicable):	Technology of Fine Chemicals
Profile:	academic
Level and form of studies:	2nd level, full-time
Kind of subject:	obligatory
Subject code:	BTC024021
Group of courses:	NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30				
Number of hours of total student workload (CNPS)	60				
Form of crediting	Examination				
For group of courses mark final course with (X)					
Number of ECTS points	2				
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	1				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Biological background at academic level
2. Knowledge of the basics of microbiology

SUBJECT OBJECTIVES

C1 Understanding the uniqueness of the biological technological process.
C2. Acquiring the basic knowledge about useful industrial biocatalysts.
C3. Learning about examples of biotechnologically produced consumer goods.

SUBJECT LEARNING OUTCOMES

relating to knowledge:

PEK_W01 Student is able to characterize the types of biotechnological processes and ways to conduct them.
PEK_W02 Student know how to characterize bioproduction methods of exemplary consumer goods, including fine chemicals.
PEK_W03 Student knows the use of biocatalysis as a technique for the synthesis of compounds of commercial importance.
PEK_W04 Students knows how to use biotechnology in environmental protection and agriculture.

PROGRAM CONTENT

Lectures		**Number of hours**
Lec 1	**Introduction** - Biotechnology: definition and historical approach. Colors of biotechnology. Basic types of biotechnological processes.	2
Lec 2	**Biotechnological process** - Bioreactors. Isolation and improvement of industrially relevant microorganisms.	2
Lec 3	**Biotechnology process** - Fermentation as a method of fine chemicals production - exemplary industrial processes.	4
Lec 4		

Lec 5	**Introduction to biotransformation:** Fundamentals of biochemical characteristics of enzymes. Precision of the biocatalyst - chemo-, regio- and stereoselectivity.	2
Lec 6	**Biotechnology process**: biotransformation: enzyme *vs* whole cell- biocatalyst, methods of preparation and modification of biocatalyst.	2
Lec 7	**Biotechnology process**: biotransformation: methods of biocatalyst preparation and modification, reaction environment. Facts and myths about biocatalysis	2
Lec 8	**Biotechnology process**: biotransformation as a tool for the synthesis of chiral building blocks	2
Lec 9	**Biotechnology process** - biocatalysis as a technique for obtaining compounds of the "fine chemicals" type - industrial production.	2
Lec 10	**Industrial application of biocatalysis** - HFCS production process	2
Lec 11	**Food biotechnology**: brewing	2
Lec 12	**Food biotechnology**: dairy products	2
Lec 13	**Agrobiotechnology**. The importance and examples of the use of transgenic plants.	2
Lec 14	**Biotechnology in environmental protection**. Biological methods of wastewater treatment. Bioremediation technologies. Characteristics of the phytoremediation process.	2
Lec 15	Perspectives and new trends in biotechnology.	2
	Total hours	**30**

TEACHING TOOLS USED

N1. Multimedia presentation.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Learning outcomes number	Way of evaluating learning outcomes achievement
C	PEK_W01- PEK_W04	Final exam (Test) 3.0 if 50-55% of points 3.5 if 56-60% of points 4.0 if 61-70% of points 4.5 if 71-80% of points 5.0 if 81-95% of points 5.5 if 96-100% of points

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Industrial biotechnology : sustainable growth and economic success / ed. by Wim Soetaert, Erick J. Vandamme. Weinheim : Wiley-VCH, 2012
[2] Biotechnology/ ed. by Ulrich Kück; Nicole Frankenberg-Dinkel; De Gruyter, 2015
[3] Kurt Faber Biocatalysis in organic synthesis/ ed. Wolf-Dieter Fessner; Nicholas J Turner; C. C. R Allen, tomy 1-3, Stuttgart : Georg Thieme Verlag KG, 2015

(all positions available in paper or electronic form at BG PWr)

SECONDARY LITERATURE:

[1] [1] Scientific literature (publications) in the field of the presented material

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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