STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Introduction to biotechnology	**1010702221010702650**

Field of study	Profile of study (general academic, practical)	Year /Semester
Chemical Technology	**(brak)**	**1 / 2**
Elective path/specialty: **Composites and Nanomaterials**	Subject offered in: **Polish**	Course (compulsory, elective): **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time): **full-time**	
No. of hours: Lecture: **30** Classes: **-** Laboratory: **30** Project/seminars: **-**		No. of credits: **5**
Status of the course in the study program (Basic, major, other): **(brak)**	(university-wide, from another field): **(brak)**	
Education areas and fields of science and art: **technical sciences**		ECTS distribution (number and %): **5 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge in the field of biology
2	**Skills**	The skills to use basic laboratory equipment with respect to the Health and Safety rules
3	**Social competencies**	Presentation of short reports regarding a specific topic

Assumptions and objectives of the course:

The aim of this study course is to familiarize the students with fundamental terms associated with biotechnology and to enhance their knowledge on the theoretical and practical aspects of working with microorganisms

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Has knowledge regarding the resources, products and biotechnological - [K_W05]
2. Has an enhanced knowledge regarding the environmental protection issues associated with the realization of chemical processes - [K_W08]
3. Has a well established and improved knowledge regarding a selected speciality - [K_W11]

Skills:

1. 1. Has the skills to gather and critically evaluate data from the literature, databases and other sources as well as to formulate reviews and reports - [K_U01]
2. Has the skills to use proper English language in professional relations - [K_U03]
3. Has the skills to independently determine the directions for further education and realize self-education - [K_U05]
4. Has the skills to professionally present the scientific results in the form of a reports, thesis or presentation - [K_U06]

Social competencies:

1. Ma ukształtowaną świadomość ograniczeń nauki i techniki związanych z technologią chemiczną, w tym z ochroną środowiska naturalnego - [K_K02]
2. Profesjonalnie rozpoznaje problemy i podejmuje właściwe wybory związane z wykonywaniem zawodu, w zgodzie z zasadami etyki zawodowej - [K_K03]
3. Potrafi myśleć i działać w sposób kreatywny i przedsiębiorczy - [K_K06]
4. Rozumie potrzebę przekazywania społeczeństwu informacji o aktualnym stanie i kierunkach rozwoju technologii chemicznej, o zasadach użytkowania i postępowania z produktami chemicznymi, o zagrożeniach związanych z pozyskiwaniem surowców, produkcją chemiczną i dystrybucją - [K_K07]

Assessment methods of study outcomes

Forming rating:

a) as a part of the lecture: colloquia based on the data from the previous lectures.

Final rating:

a) as a part of the lecture: topic-specific presentations, exam in the form of a multiple choice test (with at least a single correct answer) ? each question rated according to a 0-1 scale, completion at 55%.

Course description

Historical outline of biotechnology and the directions of its further development. The selected aspects of biotechnology (agrobiotechnology, medical, industrial and environmental biotechnology). Definition and basic classification of bioprocesses. The role of processes using microorganisms in different branches of biotechnology. Methods and techniques used for isolation and identification of microorganisms useful for biotechnology. Metabolic pathways as the basic principles of cellular biosynthesis. Relation between the growth phase of microorganisms and the products of their metabolism. Enzymes and biocatalysis. The means of achieving overproduction of metabolites. Tempering of selected microbial traits, which are crucial for efficient biotechnological production. The basics behind genetic engineering. Kinetics and crucial parameters during biosynthesis of selected products (pharmaceuticals, biofuels, biosurfactants). Bioreactors and methods of conducting industrial production. Bioremediation and biological methods of decontaminating the environment.

Basic bibliography:

1. Basic Biotechnology, Colin Ratledge, Bjorn Kristiansen 2001
2. Biology of microorganisms, Brock, Madigan, Martinko, Dunlap, Clark 2009
3. Biotechnology: An Introduction, Susan R. Barnum 2006
4. Biotechnology from A to Z, Bains William Oxford University Press, 1998
5. Introduction to Biotechnology, William J. Thieman 2007

Additional bibliography:

Result of average student's workload

Activity	Time (working hours)
1. Wykład	30
2. Konsultacje do wykładu	13
3. Ćwiczenia laboratoryjne	30
4. Konsultacje do ćwiczeń laboratoryjnych	20
5. Przygotowanie prezentacji tematycznych	20
6. Konsultacje do prezentacji tematycznych	10
7. Egzamin	2

Student's workload

Source of workload	hours	ECTS
Total workload	125	5
Contact hours	103	0
Practical activities	0	0