



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Management of biotechnological processes [S1TOZ1>ZPB]

Course

Field of study	Year/Semester
Circular System Technologies	3/6
Area of study (specialization)	Profile of study
–	general academic
Level of study	Course offered in
first-cycle	Polish
Form of study	Requirements
full-time	elective

Number of hours

Lecture	Laboratory classes	Other
30	0	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

The student should have basic knowledge of biology, organic chemistry, chemical technology and economics. They can obtain information from the indicated sources, interpret them correctly and draw conclusions.

Course objective

Acquainting students with the principles of work organization in biotechnological enterprises. Paying attention to legal regulations and technological requirements in the case of biotechnological production. Presentation of the principles of safety as well as supply chain planning, raw material, energy and economic balance. Market research, distribution, marketing and brand building strategies will be presented.

Course-related learning outcomes

Knowledge:
student:

1. has knowledge of the development of ideas, goals, principles of operation and the organizational structure of the circular economy; knows the economic, economic and legal-administrative aspects of its functioning along with their interrelationships - k_w05

2. has knowledge of raw materials, products and processes used in closed-loop technologies - k_w10
3. has a basic knowledge of the life cycle of products, devices and installations used in closed-loop technologies - k_w12
4. knows the principles and methodology of economic evaluation of engineering activities - k_w16

Skills:

student:

1. plans, selects equipment and scientific apparatus, carries out research, analyzes the results and formulates conclusions on this basis - k_u03
2. performs analysis, verifies existing technical solutions in the field of closed-loop technology - k_u11
3. is able to plan the stages of transformation and adaptation of existing facilities and devices and to design new facilities and devices in terms of meeting the principles of circular economy and to predict and assess the impact of the implementation of such projects on the natural environment - k_u14
4. can make mass and energy balances of both unit processes and entire installations occurring in closed cycle technologies - k_u17

Social competences:

student:

1. cares about the safety of his own work and that of others, applies appropriate procedures and rules in emergencies - k_k04
2. thinks and acts in an entrepreneurial manner - k_k06
3. supports the idea of harmonious, global civilization and economic development, promoting the principles of a circular economy, sustainable development and rational management of natural environment resources on a local and global scale - k_k09

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

The lectures end with a final test including 4 open (everyone for 2 points) and 4 closed questions (everyone for 1 point).

Programme content

Production in biotechnology enterprises, taking into account economic, energy, material, legal, technological, management and marketing aspects.

Course topics

The lectures within the discussed subject will present various aspects related to production in the biotechnology sector:

- a) economical (costs of raw materials, enzymes, microorganisms, costs of creating the installation and its operation at the desired level of purity and quality, energy and cost consumption of the process)
- b) energy and materials (taking into account the needs of a low-emission and non-waste economy, issues related to the carbon footprint, etc.)
- c) legal (legal environment in particular sectors of biotechnology, with particular emphasis on law in the European Union, ethical issues)
- d) management and marketing (logistics related to the supply of raw materials, spatial and time planning of the investment and its operation, promoting the product and keeping it on the market)
- e) technological (scale-up, monitoring and automation of the technological process)

Teaching methods

Lecture with multimedia presentation, discussion with students

Bibliography

Basic

1. W. Bednarski, J. Fiedurka „Podstawy biotechnologii przemysłowej” Wydawnictwo Naukowo Techniczne 2009
2. "Analiza ekonomiczna w przedsiębiorstwie", praca zbiorowa, red. M. Jarzemowska, Polskie

Wydawnictwo Ekonomiczne 2018

3. E. Michalski "Zarządzanie przedsiębiorstwem" Wydawnictwo Naukowe PWN 2013

4. S. Ledakowicz "Inżynieria biochemiczna" Wydawnictwo M-Partner 2017

Additional

1. G. A. Płaza "Green production - green industry : bioeconomy and bio-based products", Politechnika Śląska 2018

2. "Innowacje i komercjalizacja w biotechnologii", praca zbiorowa, red. D.M. Trzmielak, Uniwersytet Łódzki 2013

3. K. Cynk "Etyczne i społeczne konsekwencje osiągnięć nowoczesnej biotechnologii", Uniwersytet Rzeszowski 2013

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	38	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	37	1,50