

# OS6a - Biotechnology in environmental protection - course description

General information	
Course name	OS6a - Biotechnology in environmental protection
Course ID	13.4-WB-OS2P-BT_oś-S17
Faculty	Faculty of Exact and Natural Sciences
Field of study	Environmental Protection
Education profile	academic
Level of studies	First-cycle studies leading to Bachelor's degree
Beginning semester	winter term 2021/2022

Course information	
Semester	5
ECTS credits to win	5
Course type	obligatory
Teaching language	english
Author of syllabus	<ul style="list-style-type: none"><li>dr Andrzej Jurkowski</li></ul>

Classes forms					
The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	30	2	-	-	Exam
Class	30	2	-	-	Credit with grade

## Aim of the course

Getting to know the bioprocesses, the type of bioreactors, enlarging the scale of processes, biological methods of sewage treatment, recovery of protein from biomass, safety rules of biotechnology and biorisks

## Prerequisites

Fundamentals of biotechnology, biology, chemistry.

## Scope

The lectures Safety in the biotechnology science. The classification microorganisms in terms biorisks. Immobilized enzyme: production and application. Types of bioprocesses: biosynthesis, biotransformation, biohydrolysis, fermentation, bioleaching, biodegradation. Biotechnological reactors: types, principles of action, demands. Criteria change the scale biotechnological processes. Biological methods of wastewater treatment. Microbiology of activated sludge. The recovery of the protein from the biomass produced wastewater. Bioremediation of soils. Isolation of microorganisms from the environment resistant to heavy metals. Composting of waste. Microbial decomposition of materials. Disposal of solid waste.

The Exercises. Microscopic examination of the activated sludge. Biological control methods composting process. Microbial decomposition of materials. Isolation of microorganisms from the environment resistant to heavy metals. Adsorption of metal cations by fungi.

## Teaching methods

-feeding (lecture in the form of a multimedia presentation)

-practical (laboratory exercises in the form of experience with the use of equipment and facilities in the biotechnology laboratory)

## Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
describes events and processes related to environmental protection	<ul style="list-style-type: none"><li><a href="#">K1A_W36</a></li></ul>	<ul style="list-style-type: none"><li>an evaluation test</li><li>an exam - oral, descriptive, test and other</li></ul>	<ul style="list-style-type: none"><li>Lecture</li><li>Class</li></ul>
describes events and processes related to environmental protection	<ul style="list-style-type: none"><li><a href="#">K1A_W36</a></li><li><a href="#">K1A_W52</a></li><li><a href="#">K1A_U52</a></li></ul>	<ul style="list-style-type: none"><li>an evaluation test</li><li>an exam - oral, descriptive, test and other</li></ul>	<ul style="list-style-type: none"><li>Lecture</li><li>Class</li></ul>
is aware of the need for a systematic review of scientific literature, update knowledge and knows its practical application	<ul style="list-style-type: none"><li><a href="#">K1A_U04</a></li><li><a href="#">K1A_U30</a></li></ul>	<ul style="list-style-type: none"><li>an evaluation test</li><li>an exam - oral, descriptive, test and other</li></ul>	<ul style="list-style-type: none"><li>Lecture</li><li>Class</li></ul>

## Assignment conditions

The lecture - the test is conducted in written form. It last 60 minutes and contains 5 opened questions. 60% points are required to get mark credit.

Laboratory - the condition for passing is to obtain positive marks from reports on all laboratory exercises and to write a final test (5 questions, 60 minutes, a positive grade - at

least 60% of points).

## Recommended reading

- J. Monika. Environmental Biotechnology. 2014. [Alpha Science International Ltd](#)
- Klimiuk E., M. Łebkowska. Biotechnologia w ochronie środowiska. PWN. 2003.
- Błaszczak M.K. Mikroorganizmy w ochronie środowiska. PWN. 2007.
- Chmiel A. Biotechnologia. Podstawy mikrobiologiczne i biochemiczne. PWN. 1998.
- Miksch K., Sikora J. Biotechnologia ścieków. PWN. 2010.
- Jędrzak A. Biologiczne przetwarzanie odpadów. PWN. 2007.

## Further reading

## Notes

Modified by dr Andrzej Jurkowski (last modification: 24-05-2021 12:28)

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