



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Biotechnology [S2Bioinf1>BIOTECH]

### Course

Field of study  
Bioinformatics

Year/Semester  
1/1

Area of study (specialization)  
–

Profile of study  
general academic

Level of study  
second-cycle

Course offered in  
polish

Form of study  
full-time

Requirements  
compulsory

### Number of hours

Lecture  
30

Laboratory classes  
30

Other (e.g. online)  
0

Tutorials  
0

Projects/seminars  
0

### Number of credit points

6,00

### Coordinators

prof. dr hab. inż. Ewa Kaczorek  
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### Lecturers

dr inż. Anna Parus  
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dr hab. inż. Wojciech Smulek  
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### Prerequisites

The student should have basic knowledge of biology and chemistry of organic compounds. He/she is able to acquire information from indicated sources, interpret it properly and prepare conclusions.

### Course objective

To provide students with knowledge about biotechnological processes, the construction of apparatus used in biotechnology and to acquaint students with the processes of industrial production based on the use of living organisms.

### Course-related learning outcomes

Knowledge:

Students know and understand:

- complex biological phenomena and processes, and their interpretation is based on empirical grounds, using mathematical methods, including statistical and machine learning (K\_W01)

- basics of biotechnological processes design and methods of their implementation with consideration to the applied apparatus and unit processes (K\_W06)
- fundamentals of biological processes management (K\_W15)
- social, economic and legal conditioning of their activities, including issues concerning protection of intellectual and industrial property (K\_W13)

#### Skills:

Students are able to:

- perform advanced measurements and laboratory experiments and interpret their results (K\_U03)
- apply analytical, simulation and experimental methods to formulating and solving research tasks under the supervision of a supervisor (K\_U06)
- use the language adequate to scientific discussions in communication with different environments (K\_U09)
- to undertake individual and team work in an enterprise, to plan and organize individual and team work, to observe safety rules related to this work (K\_U18)

#### Social competences:

Students are ready to:

- lifelong learning and improving their competences (K\_K01)
- cooperate and work in a group, taking various roles in it (K\_K02)
- determine priorities in order to realize a task defined by oneself or others (K\_K03)
- show a creative attitude in professional and social life (K\_K09)

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lectures end with a written exam. In terms of laboratories - the assessment of work during the performance of experiments and written check of the knowledge necessary to carry out the experiments. Pass level: 50% of the points.

### Programme content

#### Lectures:

The course discusses issues related to the conduct of biotechnological processes and their use in various industries, including: the idea of the biotechnological process, unit operations in biotechnology, bioreactors (structure, types, control techniques), mathematical description and balancing of bioprocesses; production of high value-added compounds, use of genetically modified organisms in biotechnology, bioenergetics

#### Laboratories:

During the course, students will perform practical exercises related to basic processes in biotechnology, selection of the most effective (micro)organism to carry out the process, establishment and control of cell culture, creation of mathematical models of culture, as well as isolation and purification of the final product and biomass management.

### Teaching methods

Lectures end with a credit test including open and closed questions. Labs will be graded on the basis of knowledge colloquium and the performance of practical tasks and reports on the activities performed.

### Bibliography

#### Basic

1. W. Bednarski, J. Fiedurek „Podstawy biotechnologii przemysłowej” Wydawnictwo NaukowoTechniczne
2. A. Chmiel „Biotechnologia” Wydawnictwo Naukowe PWN
3. J. Fiedurek "Procesy jednostkowe w biotechnologii. Ćwiczenia" Wydawnictwo Uniwersytetu Marii Curie-Skłodowskiej

#### Additional

1. J. Buchowicz "Biotechnologia molekularna" Wydawnictwo Naukowe PWN
2. S. Ledakowicz "Inżynieria biochemiczna" Wydawnictwo WNT

## Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,00
Classes requiring direct contact with the teacher	60	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	90	3,00