



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Biotechnology [S1Bioinf1>BIOTECH]

### Course

Field of study

Bioinformatics

Year/Semester

2/4

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

30

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

6,00

### Coordinators

dr inż. Agata Zdarta

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### Lecturers

### 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 the knowledge of conducting biotechnological processes, the construction of apparatus used in biotechnology, and to familiarize students with industrial production processes based on the use of living organisms.

### Course-related learning outcomes

Knowledge:

Graduates know and understand:

- basic biological phenomena and processes, and bases their interpretation on empirical foundations, using mathematical methods, including statistical and machine learning (K\_W01)
- basics of biotechnological processes design and methods of their implementation, including the used apparatus and unit processes (K\_W15)
- theoretical fundamentals of biological processes modeling (K\_W17)

- social, economic and legal conditioning of their activities, including the issues of intellectual and industrial property protection (K\_W21)

#### Skills:

Graduates are able to:

- use basic laboratory techniques in synthesis, isolation and purification of chemical compounds, including bio-molecules and biologically active compounds (K\_U03)
- use analytical, simulation and experimental methods to formulate and solve research tasks under the supervision of a supervisor (K\_U07)
- use the language adequate to scientific discussions in communication with different environments (K\_U10)
- to undertake work in an enterprise, individually and as a team, to plan and organize individual and team work, to observe safety rules related to this work (K\_U17)

#### Social competences:

Graduates are ready to:

- learn throughout life and improve their competences (K\_K01)
- cooperate and work in a group, taking various roles in it (K\_K02)
- determine priorities in order to implement a task defined by themselves or others (K\_K03)
- think and act in an entrepreneurial way (K\_K07)

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures end with a written exam. In terms of laboratories - evaluation of the work during the performance of experiments and a written test of the knowledge necessary to perform them. The minimum percentage of points to obtain a passing grade: 50% of the points.

### Programme content

#### Lectures:

The course discusses issues related to the conduct of biotechnological processes and their use in various industries.

#### Laboratories:

During the course, students will perform practical exercises related to basic techniques and processes in biotechnology.

### Course topics

#### 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

Lecture with multimedia presentation, discussion with students.

Practical laboratory classes.

Lectures will end with a credit test containing open and closed questions. Laboratories will be evaluated on the basis of a colloquium of knowledge 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