



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Cellular biology [S1Bioinf1>BIOLKOM]

Course

Field of study
Bioinformatics

Year/Semester
1/2

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
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

dr inż. Amanda Pacholak
amanda.pacholak@put.poznan.pl

Lecturers

Prerequisites

Students should have basic knowledge of biology and organic chemistry. They can obtain information from indicated sources, properly interpret them and draw conclusions.

Course objective

To acquaint students with the functioning of living cells, their structure and principles of functioning (life processes, division, etc.), taking into account differences and similarities between various types of cells.

Course-related learning outcomes

Knowledge:

Graduates know and understand:

- basic biological phenomena and processes, and their interpretation is based on empirical grounds, using mathematical methods, including statistical and machine learning (K_W01)
- cell structure and functions of cell structures, biochemical basis of metabolic pathways (K_W06)
- rules of inheritance, molecular mechanisms of replication and flow of genetic information and regulation of its expression (K_W05)

Skills:

- integrate and interpret information obtained, draw conclusions and formulate and justify opinions (K_U02)
- apply basic laboratory techniques and tools to solve problems in bioinformatics, biotechnology and related disciplines, evaluate their usefulness (K_U05)
- apply analytical, simulation and experimental methods to formulating and solving research tasks under the guidance of a supervisor (K_U07)

Social competences:

- lifelong learning and improving one's competences (K_K01)
- determine priorities in order to realize a task defined by oneself or others (K_K03)
- cooperate and work in a group, taking various roles in it (K_K02)
- take responsibility for own and others work safety; take appropriate actions in case of emergency (K_K06)

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

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.

Programme content

The course covers the fundamentals of cell biology, including the structure and function of prokaryotic and eukaryotic cells, as well as the organization and role of subcellular components and biological membranes. It explores processes such as membrane transport and cellular signaling, and provides an overview of atypical cells. Participants are introduced to microscopy techniques and the basics of cell culture work, and they perform basic morphological analyses and cell staining procedures.

Course topics

Lecture: Introduction to cell biology. Imaging techniques (observations) of cells. Cell biochemistry. Discussions about the structure of prokaryotic and eukaryotic cells, including: functions of cell organelles, organization and role of the cytoskeleton, molecular structure and function of the cell membranes. Transport processes across biological membranes. Getting acquainted with the principles of cell culture (eukaryotic and prokaryotic cells). Cell signaling. Abnormal cells.

Laboratory classes: Cell and tissue preparations. Microscopic observations of prokaryotic and eukaryotic cells. Staining of cells. Conducting cell cultures.

Teaching methods

Lecture: multimedia presentation, discussions with students.

Laboratory classes: practical activities, working in groups, discussion with students.

Bibliography

Basic

- Alberts B. et al. Fundamentals of cell biology, Vol. 1 and 2, Wydawnictwo Naukowe PWN, Warsaw 2019
- Kilariski W. Strukturalne podstawy biologii komórkowych, Wydawnictwo Naukowe PWN, Warszawa 2012
- Klyzyko-Stefanowicz L. Cytobiochemistry, Wydawnictwo Naukowe PWN, Warsaw 1995

Additional

- Stokłowska S. (eds.) Cell and tissue culture, Scientific Publishers PWN, Warsaw 2012
- Bukala B. Biology Cell chemical composition and structure, Szkolne Wydawnictwo Omega, Cracow 2020

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	55	2,00