

KARTA PRZEDMIOTU

Nazwa przedmiotu: **Cell biology (BioCh-BS>SM1SCB190)**

Nazwa w języku polskim:

Nazwa w jęz. angielskim: **Cell biology**

Dane dotyczące przedmiotu:

Jednostka oferująca przedmiot: Wydział Chemiczny

Przedmiot dla jednostki: Politechnika Śląska

Domyślny typ protokołu dla przedmiotu:

ZAL

Język wykładowy:

polski

Strona WWW:

<https://platforma.polsl.pl/rch/course/view.php?id=156>

Skrócony opis:

In the initial stage of the course students will be required knowledge from the construction of prokaryotes and eukaryotes, as well as knowledge about the function and construction of cellular components, especially in the molecular, biological and physiological aspects. The main aim of this course is to introduce students to modern cell biology and advanced research techniques used for cell exploration. During the course cell structure and interactions between particular components will be also discussed.

Opis:

Acquainting with the fundamental knowledge of cell structure and components, and specific intracellular compartments (organelles) and their functions. Students will gain knowledge on modern exploration techniques for cells and learn about research trends in the field of cellular biology. After completing the course students will understand the physiological processes occurring in living cells, at different levels of their organization and complex interactions.

English lectures outline: The main aim of this course is to introduce students to modern cell biology and advanced research techniques used for cell exploration. During the course cell structure and interactions between particular components will be also discussed. The main topics for lectures:

- Examples of molecular biotechnology Centers; the most important expertise, methods, and equipment of research laboratories. This section introduces modern strategies in an interdisciplinary scientific environment, based on the life sciences.
- Nuclear organization, genomes structure and organization.
- Gene structure of different organisms and transcription process. In the second part of this lecture, the main advanced techniques for studying DNA/RNA structure and synthesis will be discussed.
- Transcription and translation processes; introduction to routine reactions in the lab environment, including Real-time PCR reaction designing.
- Gene expression study: microarray assay - a new method for exploring functional aspects of information transfer.
- Cell structure: molecular and metabolic compartments inside the cell (plasma membrane, cytosol, nucleus, endoplasmic reticulum, Golgi apparatus, mitochondria, lysosomes, peroxisomes, cytoskeleton).
- Methods for studying the structure and function of cells (flow cytometry, microscopy, light, electron microscopy, AFM).

Seminars:

- Flow cytometry for distinguishing the different types of cells;
- Confocal microscopy for the function of the cell organelles studies;
- The use of fluorescently labeled proteins to study the function of organelles;
- Tests for cell membrane permeability;
- Methods for the isolation of cell organelles;
- Evaluation of the intensity of vesicular transport;
- Comparison of active transport and cellular diffusion;
- Evaluation of the intensity of autophagy;
- Analysis of the lysosomal fraction;
- Analysis of gene expression on the transcriptome level;
- Analysis of the protein expression on the proteome level;
- Analysis of the mitochondrial mass and potential;
- Methods for cell cycle testing;
- Types of cell death.

Literatura:

1. Bruce Alberts, Dennis Bray, Karen Hopkin, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter. Essential Cell Biology, Second Edition; 2005.

2. David Boal. Mechanics of the cell. Cambridge University Press. 2002.

Efekty uczenia się:

Student has knowledge of: cell structure and function of cellular structures (organelles) (K2A_W01).

Has knowledge about the techniques and methods for separation of cellular components (K2A_W09).

Has knowledge about new research techniques, trends and directions of development for this discipline and can use it (K2A_W10, K2A_W1, K2A_W13; K2A_U13, K2A_U24, K2A_U26).

Obtains information from literature, databases and other sources related to the life sciences, biochemical and medical, integrates them, interprets and draws conclusions also formulates opinions (K2A_U01, K2A_U02).

Has the ability to self-learning (K2A_U05).

Possess ability to experiments and research projects planning to investigate cellular processes; interprets the results and draws correct conclusions (K2A_U09, K2A_U12).

Metody i kryteria oceniania:

Quizzes, presentations, exercise reports (at least 2) - 20% of the final grade.

Lecture test - written test with 40-50 questions (single or multiple choice answers) or written answers to open questions (5-10) - 80% of the final grade.

Przynależność do grup przedmiotów w cyklach:

Opis grupy przedmiotów	Cykl pocz.	Cykl kon.
Biotechnologia rok 1 semestr 1 przedmioty obowiązkowe II stopnia (BioCh-1(01)II-O)	2020/2021-L	

Punkty przedmiotu w cyklach:

<bez przypisanego programu>			
Typ punktów	Liczba	Cykl pocz.	Cykl kon.
Europejski System Transferu Punktów (ECTS)	4	2020/2021-Z	