



# UNIWERSYTET PRZYRODNICZY WE WROCŁAWIU

## Basic of Cell Biology Educational subject description sheet

### Basic information

<b>Field of study</b> Biotechnology		<b>Education cycle</b> 2022/23	
<b>Speciality</b> -		<b>Subject code</b> ND000000NBTS.I1BO.0117.22	
<b>Organizational unit</b> The Faculty of Biotechnology and Food Science		<b>Lecture languages</b> english	
<b>Study level</b> First-cycle (engineer) programme		<b>Mandatory</b> optional	
<b>Study form</b> Full-time		<b>Block</b> major subjects (conducted) in foreign languages	
<b>Education profile</b> General academic		<b>Disciplines</b> Biological sciences	
		<b>Subject related to scientific research</b> Yes	
		<b>Subject shaping practical skills</b> Nie	
<b>Teacher responsible for the subject</b>	Adam Dobrowolski		
<b>Other teachers conducting classes</b>	Adam Dobrowolski		
<b>Period</b> Semester 1	<b>Examination</b> exam	<b>Number of ECTS points</b> 2.0	
	<b>Activities and hours</b> lecture: 30		

## Goals

C1	A course in the basics of cell biology introduces students to issues related to the structure and activities of the cell. The knowledge of the cell structure and the understanding of the mechanisms of the cell at the molecular level will allow students to more easily acquire knowledge from the following courses eg. biochemistry, microbiology. The course aims to familiarize students with the language used in the life sciences and to offset the level of knowledge of the first year course of study.
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## Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
<b>Knowledge - Student knows and understands:</b>			
W1	has a knowledge of molecular organization of prokaryotic and eukaryotic cells	NB_P6S_WG01, NB_P6S_WG02	written exam
W2	knows and understand the complex and balanced nature of metabolic processes in the cell	NB_P6S_WG05	written exam
<b>Skills - Student can:</b>			
U1	distinguish cell-building molecules	NB_P6S_UW02	written exam
U2	can analyze biochemical phenomena that occur in the cells of living organisms, and uses them in the development of biotechnological processes	NB_P6S_UO12, NB_P6S_UW05	written exam
U3	analyzes cellular mechanisms influencing the function of the whole multicellular organism.	NB_P6S_UK09, NB_P6S_UW05	written exam
U4	Use the correct terminology in the foreign language	NB_P6S_UK11	written exam
<b>Social competences - Student is ready to:</b>			
K1	critical assessment of own knowledge in the field of cell biology	NB_P6S_KK01	written exam
K2	the use of knowledge in the field of cell biology in solving professional problems.	NB_P6S_KK02	written exam

## Balance of ECTS points

Activity form	Activity hours*	
lecture	30	
exam / credit preparation	21	
consultations	2	
lesson preparation	7	
<b>Student workload</b>	<b>Hours</b> 60	<b>ECTS</b> 2.0
<b>Workload involving teacher</b>	<b>Hours</b> 32	<b>ECTS</b> 1.1

\* hour means 45 minutes

## Study content

No.	Course content	Activities
1.	<p>Characteristics of living organisms, evolution prokaryotes and eukaryotes. Unity and diversity in the organization of prokaryotic cell (archaeobacterial and bacteria) and eukaryotic (plant, animal). The organization and functioning of the cell level: the molecular chemical composition, structure and functions of proteins, the role of lipids, polysaccharides, construction and function of nuclear DNA, mitochondrial and plastid replication, repair, DNA recombination, gene expression; Structure and functions of the plasma membranes, organelles, cytoskeleton, communications within and intercellular. The diversity of structure and function of cells in different tissue types. The cell nucleus, cell division and cell cycle control mechanisms, development and cell death, apoptosis. Research techniques used in cell biology.</p> <p>Titles of lectures:</p> <ol style="list-style-type: none"> <li>1. Introduction - cellular foundations of life</li> <li>2. Abiogenesis - first cell (theories of the origin of life)</li> <li>3. Cell-building molecules</li> <li>4. Structure of the prokaryotic cell 1</li> <li>5. Structure of the prokaryotic cell 2 (diversity of microorganisms)</li> <li>6. DNA structure, chromosomes, replication</li> <li>7. DNA repair and gene expression</li> <li>8. Regulation of gene expression</li> <li>9. Biological membranes, membrane transport</li> <li>10. Organelles: mitochondria and chloroplasts</li> <li>11. Intracellular compartments and transport inside the cell</li> <li>12. Intercellular signaling</li> <li>13. The cytoskeleton</li> <li>14. Cell division and cell cycle regulation</li> <li>15. Techniques used in the study of cells, summary</li> </ol>	lecture

## Course advanced

### Teaching methods:

educational film, lecture

Activities	Examination methods	Percentage in subject assessment
lecture	written exam	100%

## Literature

### Obligatory

1. Essential Cell Biology, Bruce Alberts, Karen Hopkin, Alexander D Johnson, David Morgan, Martin Raff, Keith Roberts, Peter Walter, W W NORTON & CO, 2019
2. Molecular Biology of the Cell, Bruce Alberts, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, Peter Walter, WW Norton & Co, 2015

### Optional

1. The Cell: A Molecular Approach, Geoffrey M. Cooper, Oxford University Press, 2015
2. Cell and Molecular Biology: Concepts and Experiments, John Wiley & Sons, 2009 Cell and Molecular Biology: Concepts and Experiments, John Wiley & Sons, 2009
3. Molecular Cell Biology, Lodish Harvey, Berk Arnold, Kaiser Chris A., Krieger Monty, Bretscher Anthony, Ploegh Hidde, Amon Angelika, Martin Kelsey, Macmillan Education 2016

## Kierunkowe efekty uczenia się

Kod	Treść
NB_P6S_KK01	The graduate is ready to critical assessment of own knowledge and skills and seeking experts' opinions
NB_P6S_KK02	The graduate is ready to use the knowledge in the field of biotechnology and food sciences to solve professional problems
NB_P6S_UK09	The graduate can communicate with specialists in the field of biotechnology and food technology using specialized terminology
NB_P6S_UK11	The graduate can use foreign language at B2 level of the European Language Description System
NB_P6S_UO12	The graduate can collaborate and work in a group, taking various roles, being responsible for the safety of own and other work
NB_P6S_UW02	The graduate can plan and perform experiments, including choosing the correct biological material for research and biotechnological processes, interpret obtained results and draw conclusions
NB_P6S_UW05	The graduate can identify and evaluate the quality of biotechnological and food products, and their impact on human and animal health as well as natural environment
NB_P6S_WG01	The graduate knows and understands at an advanced level facts and concepts in chemistry, mathematics, physics, biochemistry, microbiology, cell biology and molecular biology adapted to Biotechnology
NB_P6S_WG02	The graduate knows and understands molecular and cellular basics of the functioning of organisms
NB_P6S_WG05	The graduate knows and understands at an advanced level, the possibilities of using various organisms and enzymes to carry out biotechnological processes and techniques of cellular metabolism control