COURSE DESCRIPTION (SYLLABUS)

1.	Course: **Molecular Organization of the Cell**
2.	Language of instruction: **English**
3.	Faculty: **Faculty of Biotechnology**
4.	Course/module code: **29-BT-S1-E5-MOCLeng**
5.	Course/module type (*mandatory* or *elective*) **obligatory**
6.	Programme: **Biotechnology**
7.	Study cycle (*1st/2nd*): **1st cycle**
8.	Year: **3rd**
9.	Semester *(autumn* or *spring):* **autumn**
10.	Form of tuition and number of hours: Laboratory: **50 h** Learning methods: **laboratory course, design/execution of experiments, team work**
11.	Coordinator(s): **Aleksander Czogalla, PhD**
12.	Initial requirements *(knowledge, skills, social competences):* • **basic knowledge on architecture of living organisms at various levels;** • **basic knowledge on major molecules that build cells and subcellular structures;** • **basic knowledge on biochemical reactions and enzymes that catalyze them;** • **knowledge on storage, inheritance and expression of genetic information;** • **networking and team work.**
13.	Objectives: **The major objective of the course is to provide detailed description of the structure and function of cells, subcellular compartments and organelles at molecular level.**

	Namely, membrane structure, vesicular transport, structure and function of major cellular organelles, cytoskeleton and adhesion molecules will be discussed. The laboratory course will get students acquainted with various experimental techniques that enable fractionation and fraction analysis using biochemical and microscopic techniques. Students will also be introduced to methods of cell activation and signal transduction analysis. Basic course on confocal microscopy will also be provided.	
14.	Content: • **selected methods cell structure and function analysis**; • **basic approaches in fluorescence microscopy, including sample preparation**; • **methods employing antibodies and fluorescent dyes**; • **methods based on fractionation of subcellular structures, including fraction analysis in terms of enzymatic activity and presence of certain subtypes of biological macromolecules;** • **analysis and discussion on cellular compartmentalization (cytoskeleton, Golgi, endoplasmic reticulum, nucleus etc.);** • **analysis and discussion on cellular membranes, lipid bilayer, plasma membrane and inner membranes**; • **analysis and discussion on inter- and intramolecular signal transduction, cellular receptors, methods that lead to identification of activated elements of signaling cascades.**	
15.	Learning outcomes: **Students should gain knowledge on molecular biology of cells at a structural and molecular level. Students should also understand the basics of state-of-the-art methods used to study molecular organization and function of cells.**	Outcome symbols: K1_W01, K1_W05, K1_W06, K1_W08, K1_W10 K1_U01, K1_U02, K1_U03, K1_U10, K1_U13, K1_K01, K1_K02, K1_K03, K1_K05
16.	Recommended literature • **Harvey Lodish, Arnold Berk, Chris A. Kaiser, Monty Krieger, Anthony Bretscher, Hidde Ploegh, Angelika Amon, Kelsey C. Martin - Molecular Cell Biology, ISBN-10: 1-4641-8339-2; ISBN-13: 978-1-4641-8339-3;** • **Bruce Alberts; Alexander Johnson; Julian Lewis - Molecular Biology Of The Cell, ISBN-13: 9780815344643;** • **Manuals provided during the course.**	
17.	Methods of verification of the assumed learning outcomes: • **report** • **test**	
18.	Conditions of earning credits: **positive report's and test's grades**	

19.	Student's workload:	
	Activity:	Number of hours for the activity:
	Hours of instruction (as stipulated in study programme): Laboratory classes: 50 h	50 h
	Student's own work • **reading literature** • **preparation of reports** • **preparation for the test**	25 h
	Total number of hours:	**75 h**
	Number of ECTS:	**3 ECTS**