Course unit (module) title	Code
Cell Biology	

Lecturer(s)	Department(s) where the course unit (module) is delivered
Coordinator: Aušra Sasnauskienė, PhD **Other(s):**	Faculty of Medicine Vilnius University

Study cycle	Type of the course unit (module)
Second cycle	Elective

Mode of delivery	Period when the course unit (module) is delivered	Language(s) of instruction
Lectures	Ist semester	English

Requirements for students	
Prerequisites: Bachelor`s degree in biomedical sciences, chemistry or physical sciences	**Additional requirements (if any):**

Course (module) volume in credits	Total student's workload	Contact hours	Self-study hours
5	**132**	**48**	**84**

Purpose of the course unit (module): programme competences to be developed		
The scope of the course unit is to acquire knowledge on cell structure and function at the molecular level. The main competence to be developed by this course is to know the signal transduction principles, cell molecular and functional changes in responce to it.		
Learning outcomes of the course unit (module)	**Teaching and learning methods**	**Assessment methods**
1.1 Ability to outline general characteristics of eucaryotic cell organisation, structure and function of cellular organelles, mechanisms of protein import to cellular organelles, machinery of vesicular transport and cell transformations during the cell cycle and cell death.	Lectures, text-book reading, participation in seminars, solving of cell-biology problems, analysis of scientific review and research papers	Evaluation of midterm and final exam results
2.2 Be able to gather and analyze information on subjects related to system biology	Analysis of scientific review and research papers, relevant to systems biology approaches for cell functional studies	Preparation of the presentation
4.1 Perform theoretical work of system biology approaches in accordance with bioethics requirements	Discussions during lectures and seminars, analysis of scientific review and research papers	Preparation of presentations
5.1. Ability to work autonomously and as a part of a team	Preparation for seminars and participation in discussions during lectures and seminars	Preparation of presentations, evaluation of midterm and final exam results

Content: breakdown of the topics	Contact hours								Self-study work: time and assignments
	Lectures	Tutorials	Seminars	Exercises	Laboratory work	Internship/work placement	**Contact hours**	**Self-study hours**	**Assignments**
1. Introduction: basic properties of the cells; Cell Theory; prokaryotic and eukaryotic cells; multicellularity and cellular differentiation	2						**2**	**3**	Alberts textbook, pp. 109-132
2. The cytoskeleton: microtubules, microfilaments and intermediate filaments	2		2				**4**	**5**	Alberts, pp. 641-649. The latest articles, concerning the subjects of seminars, will be provided during the course.
3. Motor proteins: cell locomotion and intracellular trafficking	2		2				**4**	**5**	Alberts, pp. 951-960; 951-960; 938-942
4. Nucleus: compartments, transport into and out	2						**2**	**5**	Alberts, pp. 649-656
5. Mitochondrial structure and function	2						**2**	**3**	Alberts, pp. 597-615
6. The endocytic pathway. Lysosomes	2		2				**4**	**5**	Alberts, pp. 697-709; 722-738
7. The endomembrane system	2		2				**4**	**5**	Alberts, pp. 566-594; 670-691; 710-722
8. Cell cycle: phases, checkpoints, regulation	2		2				**4**	**5**	Alberts, pp. 1010-1018
9. Mitosis. Meiosis. Cytokinesis	2						**2**	**5**	Alberts, pp. 1004-1010
10. Principles of signal transduction	2		2				**4**	**8**	Lim textbook, pp. 135-155; 243-275
11. Signaling through G protein-coupled receptors	2		2				**4**	**8**	Alberts, pp. 823-849; Lim, pp. 177-217
12. Signal transduction by protein-tyrosine phosphorylation	2		2				**4**	**8**	Alberts, pp. 850-866; Lim, pp. 275-345
13. Cell death pathways	2						**2**	**5**	Alberts, pp.1021-1031
14. The extracellular matrix and cell interactions	2						**2**	**5**	Alberts, pp. 1228-1232
15. Hallmarks of cancer cells	2						**2**	**5**	Alberts, pp. 1091-1103
16. Stem cells	2						**2**	**4**	Alberts, pp. 1252-1260
Total	**32**		**16**				**48**	**84**	

Assessment strategy	Weight %	Assessment period	Assessment criteria
Midterm exam	40	8th week of the course	Open- and closed-ended questions. Value of each question is indicated according to its complexity and is indicated in the test
Final exam	50	Exam session	Open- and closed-ended questions. Value of each question is indicated according to its complexity and is indicated in the test
Participation in the seminars	10	During seminars	The quality of presentation, concerning particular cell biology problem
Total	100		Final mark is based on cumulative score: <50 points – failed (insufficient); 50-54 – 5 (weak); 55-64 – 6 (satisfactory); 65-74 – 7 (average); 75-84 – 8 (good); 85-94 – 9 (very good); 95-100 – 10 (excellent).

Author	Year of publication	Title	Issue of a periodical or volume of a publication	Publishing place and house or web link
Compulsory reading				
B. Alberts, A. Johnson, J. Lewis, D. Morgan, M. Raff, K. Roberts, P. Walter	2014	Molecular Biology of the Cell, 6th ed.		Garland Science
W. Lim, B. Mayer, T. Pawson	2014	Cell Signaling, 1st ed.		Garland Science
Optional reading				
G. Karp	2010	Cell and molecular biology: Concepts and experiments, 6th ed.		John Willey&Sons

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