<table>
<tr><td colspan="2">NAME OF THE COURSE</td><td colspan="5">Cell Biology</td></tr>
<tr><td>Code</td><td>PMB010</td><td>Year of study</td><td colspan="4">1.</td></tr>
<tr><td>Course teacher</td><td>Ph.D. Elma Vuko, Assistant Professor</td><td>Credits (ECTS)</td><td colspan="4">6</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td></td><td>45</td><td></td></tr>
<tr><td>Status of the course</td><td>Obligatory</td><td>Percentage of application of e-learning</td><td colspan="4">10%</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Acquisition of knowledge about the structure and function of cells from unicellular organisms to specialized cells of multicellular organisms, cellular structures and organelles at the microscopic and molecular level. Acquisition of knowledge about genetic information that determines cell structure and function, cell interaction, cell cycle, division and death.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">• Acquire basic skills within the methods and tools of cell biology
• Understand the basic principles of biological chemistry that govern cell life
• Critically compare the cellular organization of prokaryotes and eukaryotes, plant and animal cells
• Understand the structure and role of DNA as a carrier of genetic information and the mechanisms responsible for its transmission
• Compare the structure and function of eukaryotic cells and its structures
• Describe the structure and function of individual organelles
• Understand the role of metabolic organelles in energy production
• Understand the cell cycle and the cell division
• Explain the meaning of meiosis, spermatogenesis, oogenesis and fertilization
• Understand cell differentiation, proliferation and cell death</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">1. The origin and evolution of the cell. Prokaryotes vs. eukaryotes. Plant vs. animal cells. Cell research. Cells as experimental models. Tools of cell biology.

2. Cellular molecules - the chemical basis of life. Water, carbohydrates, lipids, proteins, nucleic acids.

3. Cell membrane. Transports across the cell membrane. Endocytosis.

4. Cell wall: bacteria, eukaryotic cells, fungi. Vacuole. Extracellular matrix. Cell-cell interactions.

5. Cytoskeleton: microfilaments, microtubules and intermediate filaments.

6. DNA: structure, replication, genes and proteins, mRNA, central dogma, RNA viruses, genetic code.</td></tr>
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	7. Organization of cellular genomes: structure of eukaryotic genes, chromosomes and chromatin, telomere. Transcription in prokaryotes and eukaryotes, negative and positive transcription control. Processing of rRNA, tRNA, mRNA 8. Protein synthesis. tRNA. Ribosomes. 9. Nucleus. Nucleus envelope. Internal organization of nuclei. Nucleolus and rRNA processing, ribosome assembly. 10. Energy flow. Chloroplasts and other plastids. Photosynthesis. 11. Mitochondria. Crebs cycle. Electron transport chain. Peroxisomes, glyoxylate cycle, photorespiration. 12. Endoplasmic reticulum. Golgi apparatus. Lysosomes. 13. Cellular signaling. Signaling molecules and their receptors. Pathways of intracellular signal transduction. Signal networks. 14. Cell cycle: phases, regulation, checkpoints. Mitosis. Cytokinesis. Meiosis and fertilization. 15. Cell death and cell renewal. Apoptosis. Stem cells. Therapeutic cloning. Exercises: Exercise protocols follow the content of the weekly lectures. The students do the exercises independently during the scheduled class and hand over the completed protocol to the subject teacher for review and signature.
Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☐ partial e-learning ☐ field work ☐ independent assignments ☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	Attendance at a minimum of 70% of lectures. Exercises must be done 100%.

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	0,5	Research		Practical training	2
	Experimental work		Report		(Other)	
	Essay		Seminar essay		(Other)	
	Tests		Oral exam		(Other)	
	Written exam	3,5	Project		(Other)	

Grading and evaluating student work in class and at the final exam	Two partial written colloquia are held during the semester. The written exam contains the entire course material. Scoring: <60% student failed; 60-69% sufficient (2); 70-79% good (3); 80-89% very good (4); 90-100% excellent (5). The weekly exercise protocol is reviewed and evaluated by the subject teacher each week.

Required literature (available in the	**Title**	**Number of copies in the library**	**Availability via other media**

library and via other media)	G. M. Cooper, R. E. Hausman, Stanica: molekularni pristup, Medicinska naklada, Zagreb, 2010 (or newer editions on english language)	5	
Optional literature (at the time of submission of study programme proposal)	Alberts, B., Bray, D., Levis, J., Raff, M., Roberts, K., Watson, J.D. (1994 or newer): Molecular Biology of the Cell. Garland Publishing, New York M. W. Berns: Stanica, Školska knjiga, Zagreb, 1997.		
Quality assurance methods that ensure the acquisition of exit competences	The evaluation of the subject and the work of the teachers will be conducted through a university student survey at the end of the semester. Students' results on the exam will be analyzed, and used for the purpose of improving quality in the next academic year.		
Other (as the proposer wishes to add)			