NAME OF THE COURSE	Introduction to cell biophysics						
Code	PMB711	Year of study	2				
Course teacher	Larisa Zoranić, PhD, Associate Professor	Credits (ECTS)	3				
Associate teachers		Type of instruction (number of hours)	L	S	E	F	
			30	5	10		
Status of the course	Elective	Percentage of application of e-learning	10%				

COURSE DESCRIPTION						
Course objectives	Basic understanding of biophysics, models of biological macromolecules and biological processes, described through the ideas of classical mechanics, thermodynamics and statistical mechanics.					
Course enrolment requirements and entry competences required for the course	Molecular biology, biochemistry, basics of physics					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	On completion of this course a student should be able to: 1. recognize the ideas and importance of a quantitative approach in biology 2. describe the basic of thermodynamics and statistical mechanics through examples from biophysics 3. describe some of the mechanical models used in the description of biological systems 4. explain some of the biological processes using physical models (equations)					
Course content broken down in detail by weekly class schedule (syllabus)	Weekly class schedule: 1. Introduction to biophysics. Spatio-temporal scales of biological systems. 2. Basic models in biophysics.3. Mechanical and chemical equlibrium in a cell. 4. Free energy. Configuration energy. 5. Statistical description of biological systems. Entropy. Models of two states. 6. Ligand-receptor binding. Hill's equation. ATP hydrolysis. 7. Water as the most important biological solvent. pH. 8. Description of the structure of biological macromolecules - polymer model. 9. Protein folding. Hydrophobic effect and hydrophobic force 10. Models of biological membranes. Spring model. 11. Dynamics in cells. Diffusion. 12. Models of chemical reactions. 13. Enzyme kinetics. Michaelis-Menten model. 14.-15. Project-oriented teaching - depending on the chosen topics, examples: hemoglobin, charges in the cell, osmosis.					
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, student commitment in class, problem solving and seminars.					
Screening student work *(name the*	Class attendance	1.0	Research		Practical training	

proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Experimental work		Report		(Other)	
	Essay		Seminar essay	0.5	(Other)	
	Tests		Oral exam	1.0	(Other)	
	Written exam		Project	0.5	(Other)	

Grading and evaluating student work in class and at the final exam	Commitment, preparation of homework and seminars, participation in the project part of teaching, and oral exam are assessed.		
Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Physical Biology of the Cell, Rob Phillips, Jane Kondev, Julie Theriot and Hernan G. Garcia, Garland Science, Taylor & Francis Group, 2013.	1	
	Molekularna biofizika , Antonio Šiber , skripta, 2012.		
Optional literature (at the time of submission of study programme proposal)	1. Molecular and Cellular Biophysics Meyer B. Jackson, University of Wisconsin Medical School, Cambridge University Press 2006 . 2. Bioenergetika, rad membranskih proteina Juretić Davor, Informator, Zagreb, 1997. 3. Scientific articles, lectures		
Quality assurance methods that ensure the acquisition of exit competences	The success of the program is monitored by the quality of knowledge shown in exams as well as the assessment of enthusiasm for the subject, through conversation with students, student progress during classes, and student participation in discussions of articles. External evaluation includes student surveys.		
Other (as the proposer wishes to add)			