NAME OF THE COURSE	Biophysics of Biological Membranes					
Code	PMP213	Year of study	GU-1			
Course teacher	Marija Raguž, PhD, Associate Professor	Credits (ECTS)	6,0			
Associate teachers	Zvonimir Boban	Type of instruction (number of hours)	L	S	E	F
			30	5	25	
Status of the course	Compulsory	Percentage of application of e-learning	20%			

COURSE DESCRIPTION		
Course objectives	Introduction to the structure and dynamics of biological membranes through physical concepts and available experimental methods, and data analysis applied to these systems.	
Course enrolment requirements and entry competences required for the course	None	
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successfully completing the course, students will be able to: 1. Identify and define the membrane system with description of structure and dynamics. 2. Understand and apply selected biophysical experimental methods for styding biological systems. 3. Explain and evaluate basics of physical models that describe biological membranes. 4. Analyze, explain and present the results of spectroscopic methods applied to the biological membrane system.	
Course content broken down in detail by weekly class schedule (syllabus)	Lectures and seminars: (4P) Description, structure and dynamics of biological membranes (3P) Formation of biological membranes (2P) Phase transitions in the described systems (4P + 1S) Electron parametric resonance (4P) Nuclear magnetic resonance (4P + 1S) Fluorescence spectroscopy (4P + 1S) Fluorescence microscopy (3P) Calorimetry Exercises: 1. Methods of preparation of biological systems: (2V) Preparation of multilamellar liposomes (4V) Electroformation of giant unilamellar vesicles (2V) Extrusion of large unilamellar vesicles (2V) Preparation of small unilamellar vesicles (3V) Methods of preparation of supported membrane bilayer using small, large and giant unilamellar vesicles 2. Experimental investigations of structure and dynamics of biological membranes: (3V) Fluorescence microscopy (3V) Fluorescence spectroscopy (3V) Electron microscopy (3V) Atomic force microscopy Elective topics (2P+2S): Electron microscopy Atomic force microscopy X-ray diffraction	
Format of instruction	☒ lectures ☒ seminars and workshops ☐ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia ☒ laboratory ☐ work with mentor ☐ homework assignments

Student responsibilities	Active participation in classes and assignments. Work on the experimental devices.

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)*

Name	Ects	Name	Ects	Name	Ects
Class attendance	2	Research		Experimental work	1
Oral exam	2	Report		Homework assignments	
Seminar essay	1	Essay			
Tests		Practical training			
Written exam		Project			

Grading and evaluating student work in class and at the final exam	Students have an oral exam, which can be replaced by the presentation of the specific topic.

Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
Scientific articles	0	

Optional literature (at the time of submission of study programme proposal)	[1] M. Furić, Moderne eksperimentalne metode, tehnike i mjerenja u fizici, Školska knjiga, Zagreb, 1992. [2] R. A. Dunlap, Experimental Physics – Modern Methods, Oxford University Press, New York, 1988.
Quality assurance methods that ensure the acquisition of exit competences	Students' evaluation via anonymous questionnaires at the end of the course. The survey is conducted according to the rules of the University of Split.
Other (as the proposer wishes to add)	