<table>
<tr><td colspan="2">NAME OF THE COURSE</td><td colspan="5">Model Organisms in Molecular Biology</td></tr>
<tr><td>Code</td><td>PMB720</td><td>Year of study</td><td colspan="4">2</td></tr>
<tr><td>Course teacher</td><td>Sanja Puljas, PhD, Assistant Professor
Antonela Paladin, PhD, Assistant Professor
Ivica Šamanić, PhD, Assistant Professor</td><td>Credits (ECTS)</td><td colspan="4">3</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>15</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of application of e-learning</td><td colspan="4"></td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">Introduce students to model organisms and research in molecular biology.
Learn the basic principles of working with model organisms, legislation, and the reasons for using model organisms.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">By the end of this course students will be able to:
• explain the properties of individual organisms as a model for research in molecular biology.
• select the appropriate model organism in a specific biological study.
• choose optimal techniques and methods in designing your own experiment.
• understand ethics in working with laboratory animals.
• familiarize yourself with the legal framework for the use and keeping of
• experimental animals.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures:
1. Introduction to model organisms: what model organisms are and why they are used. Overview of model organisms.
2. Escherichia coli bacterium as a model organism, biology and genetics of E. coli, pathogenic strains, E. coli in genetics and biochemistry.
3. Saccharomyces cerevisiae, model of unicellular eukaryotic organisms.
4. Dyctiostelium, cellular slime molds or social amoebae.
5. The nematode Caenorhabditis elegans model for multicellular organisms.
6. Drosophila melanogaster, fruit or vinegar fly.
7. Drosophila melanogaster as a model in developmental biology.
8. Danio rerio, the zebrafish, Vertebrate model organism.
9. Xenopus laevis and X. tropicalis, African frogs, positive and negative properties of the model organism, transgenic animals.
10. Mus musculus, model organisms for understanding and studying human diseases, biomedicine research, the mammalian model.
11. Animal cell culture: basic cultivation conditions, basic techniques, cytotoxicity studies, tumorigenesis, aging, etc.
12. Arabidopsis thaliana as a model plant.</td></tr>
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	13. Plant cell culture: basic conditions for cell culture, preparation and application of genetically modified plants. 14. and 15. Application of model organisms for research in various fields of biological research: developmental biology, biochemistry, genetics, toxicological research, biomedicine, etc. **Laboratory exercises:** Maintenance of model organisms in the laboratory. Working with individual model organisms. Biological processes revealed by experiments on model organisms. Techniques and methods in designing your own experiment.

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	Active participation in classes and assignments. Work on the experimental tasks.	

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	
	Experimental work		Report		(Other)	
	Essay		Seminar essay		(Other)	
	Tests		Oral exam		(Other)	
	Written exam	0,5	Project	1	(Other)	

Grading and evaluating student work in class and at the final exam	The written part and presentation of the seminar paper and the written exam are evaluated.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Metode u molekularnoj biologiji, 2007. Andreja Abramovič Ristov (ur). Institut Ruđer Bošković.	3	
	Cooper GM (2000): The cell: a molecular approach, ASM Press Washington DC, Sinauer Ass. Sunderland Massachusetts.	1	
	Murray P. Pendarvis, John L. Crawley - Exploring Biology in the Laboratory-Morton Publishing Company (2011)		
	Robert L. Jarret_ Kevin McCluskey - The Biological Resources of Model Organisms-CRC Press (2020)		

Optional literature (at the time of submission of study programme proposal)	Relevant scientific articles

Quality assurance methods that ensure the acquisition of exit competences	Personal consultations, surveys, records of attendance at lectures, active participation in courses.
Other (as the proposer wishes to add)	