<table>
<tr><td colspan="2">NAME OF THE COURSE</td><td colspan="5">Basic of Genetic Engineering – Laboratory Course</td></tr>
<tr><td>Code</td><td>PMB546</td><td>Year of study</td><td colspan="4">3</td></tr>
<tr><td>Course teacher</td><td>Professor Jasna Puizina, PhD</td><td>Credits (ECTS)</td><td colspan="4">2</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Assist. Prof. Ivica Šamanić, PhD, Assist. Prof. Željana Fredotović, PhD</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></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">10%</td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">Students will perform practical excersise individually or in pairs, including one small research project.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">Completed subjects Genetics and Molecular Biology.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">• Use standard genetic engineering methods and work with E. coli.<br>• Use online software to process DNA sequences, scientific literature and databases data.<br>• Design and perform a simpler gene modification experiment by using the CRISPR / Cas9 technique<br>• Create recombinant DNA using key genetic techniques and methods Engineering<br>• Argue how recombinant DNA methodology can be useful in understanding the functions of individual genes<br>• Explain how we can manipulate nucleic acids and proteins create new properties in transgenic organisms<br>• Argue the risks and benefits of using recombinant DNA and genetic technology modified organisms.<br>• Use standard and specialized laboratory equipment</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1. Bioinformatics - preparation of the experiment: work with programs for plasmid analysis (SNAPGene), design guide-RNA (gRNA) (CHOPCHOP) and other softwares (3hours)<br>2. Preparation of solid and liquid nutrient media, antibiotics, inductors and others reagent, cultivating E. coli on a solid media (4 hours)<br>3. Preparation of competent E. coli cells (4 hours)<br>4. Overnight liquid culture of individual clones, plasmid isolation, quantification of plasmid DNA on a fluorimeter (4 hours)<br>5. Molecular cloning of recombinant plasmid (restriction cutting) enzymes, sgDNA addition, ligation, transformation (4 hours)<br>6. Overnight E. coli liquid culture, plasmid isolation, restriction, quantification, gel electrophoresis (4 hours)<br>7. Co-transformation of competent E. coli cells with two plasmids and bacterial culture on selective media with antibiotics and transcription inducer. (3 hours)<br>8. Visualization of results, data collection, processing and interpretation (3 hours)<br>9. Presentation of results (1 hour)</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☐ lectures<br>☐ seminars and workshops<br>☒ exercises<br>☐ on line in entirety</td><td colspan="3">☒ independent assignments<br>☐ multimedia<br>☒ laboratory<br>☐ work with mentor</td></tr>
</table>

| | | |
|---|---|---|
| | ☐ partial e-learning<br>☐ field work | ☐ (other) |
| Student responsibilities | Students are required to attend at least 70% of the scheduled lectures. Also are required to perform all laboratory exercises, keep a work diary, write in writing report and present it to other students. | |

| 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 | 0,5 | Report | | (Other) | |
| | Essay | | Seminar essay | 0,5 | (Other) | |
| | Tests | | Oral exam | | (Other) | |
| | Written exam | | Project | 0,5 | (Other) | |

| | |
|---|---|
| Grading and evaluating student work in class and at the final exam | Active participation of students in classes is scored as follows:<br>- insufficient (1) the student does not actively participate in classes at all;<br>- sufficient (2) student participates active in teaching only after being asked a question,<br>- a good (3) student occasionally actively participates in teaching but finds it difficult to draw independent conclusions;<br>- very good (4) the student often actively participates in teaching and often draws independent conclusions;<br>- an excellent (5) student almost always actively participates in teaching, thinks critically and draws its own conclusions.<br>The final grade is a combination of individual grades 1) active participation in teaching, 2) final written report on the conducted experiment 3) final oral report (presentation) on the conducted experiment |

| Required literature (available in the library and via other media) | **Title** | **Number of copies in the library** | **Availability via other media** |
|---|---|---|---|
| | Ambriović – Ristov, A. (ur): Metode u molekularnoj biologiji, Institut Ruđer Bošković, Zagreb, 2007. | 2 | - |
| | Internal teaching material (internal script) | - | E- larning, MS Teams |

| | |
|---|---|
| Optional literature (at the time of submission of study programme proposal) | Web materials, original scientific articles and reviews. |
| Quality assurance methods that ensure the acquisition of exit competences | Student survey conducted by the Center for Quality of the University of Split.<br>Internal survey conducted by the subject teacher, oral feedback from students. |
| Other (as the proposer wishes to add) | |