BIOTECH-E04 : **EXPERIMENTAL MOLECULAR BIOLOGY**	
GENERAL INFORMATION	
Course Coordinator(s)	Barbara Viljetić, PhD, assist. prof.
Associate(s)	Teuta Opačak Bernardi, PhD, assist. prof. Stana Tokić, PhD, assist. prof. Marijana Jukić, PhD, Postdoctoral fellow
Study Programme	Interdisciplinary Graduate Study Programme in English: Biotechnology
Course Status	Elective
Year of Study, Semester	1st Year/ 2nd Semester
Credits (ECTS)	**3**
Teaching Method (number of classes)	Lectures: 10; Seminars: 10; Exercises: 10
Expected Number of Students in the Course	25-30
COURSE DESCRIPTION	
Course Aims	
The aim of the course is to expand the existing knowledge about molecular biology and to acquire new knowledge and skills related to experimental molecular biology.	
Prerequisites for Enrolment and the Entry Competencies Required for the Course	
Completed undergraduate university study programme from the area of natural sciences (chemistry, biology) or biotechnical sciences, or biomedicine and healthcare.	
Learning Outcomes at the Programme Level Contributed by the Course	
BIOTECH-7; BIOTECH-10; MEDBIOT-1; MEDBIOT-2; INDBIOT-1; INDBIOT-2	
Learning Outcomes at the Course Level	
After completing the course, the student will be able to: 1. Present how biological systems (cell lines and organisms) can be genetically modified. 2. Present how genetically modified cell lines and organisms can be used in medicine, pharmacy and agriculture. 3. Develop practical skills and knowledge through experimental work in the laboratory; learn general safety routines in the laboratory, independently use the equipment, evaluate, demonstrate and discuss the experimental results. 4. Refer to the empirical basis of research in the field of biotechnology through critical reading of original scientific articles. 5. Evaluate achievements of biotechnology and discuss the ethical issues that may arise from the application of biotechnology in various fields. 6. Critically evaluate the scientific literature.	
Course Content	
Lectures. Recombinant DNA technology. Construction and screening of gene libraries. Cloning vectors. Molecular cloning. Genetic transformation of prokaryotes. Genomics and proteomics tools and techniques. Directed mutagenesis and synthesis of modified proteins. Monoclonal antibodies, biofluorescent and bioluminescent systems. Proteins and nucleic acids as therapeutics. Gene manipulation. Transgenic organisms. Ethical issues. **Seminars.** Recombinant DNA technology; transfection, selection, DNA sequencing, establishment of transgenic organisms and applications. **Exercises.** Total RNA Isolation. Measuring gene expression using qPCR. Detection of particular gene expression in a genetically modified organism. Analysis and presentation of the results.	
Teaching Methods	
Lectures; seminars; laboratory exercises	
Students' Obligations	
Attendance at all forms of classes is mandatory and the students are obligated to attend all knowledge tests. The students may be absent from 30% (full-time students) and 50% (part-time	

students) of each of the forms of classes, provided that the absence is justified. An exercise or a seminar which has not been completed must be made up through a midterm exam.

Monitoring the Activity of the Students *(Connecting Learning Outcomes, Teaching Methods, and Grading)*

Class-related activity	ECTS	Learning outcome	Student activity	Evaluation method	Grade points	
					Min.	Max.
Attending classes (lectures, seminars, exercises)	1	1-6	Attendance at classes, Seminars and laboratory work	Keeping records Presentation and reports	1 19	5 45
Final exam	2	1-5	Studying for the final exam	Written exam	30	50
Total	**3**				**50**	**100**

Evaluation of the written part of the final exam:

Percentage of correct answers (%)	Grade
>95.00	50
90.00-94.99	47
85.00-89.99	45
80.00-84.99	40
75.00-79.99	38
70.00-74.99	35
65.00-69.99	33
60.00-64.99	30

Forming the final grade:
The points granted for the final exam are added to the grade points awarded during class attendance. The grading process is conducted by absolute distribution, i.e. based on total achievements, and compared to the numerical system in the following manner:
A – Excellent (5): 90-100 grade points; B – Very Good (4): 80-89.99 grade points; C – Good (3): 65-79.99 grade points; D – sufficient (2): 50-64.99 grade points

Mandatory Literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
R. Rapley, D. Whitehouse (Ed.) Molecular Biology and Biotechnology: 6th Ed. Royal Society of Chemistry, 2015.		
Stephenson FH: Calculations for Molecular Biology and Biotechnology, 3rd Edition. Academic Press, 2016.		

Additional Literature

1. Glick BR, Patten CL: Molecular Biotechnology: Principles and Applications of Recombinant DNA, 5th Edition. ASM Press, 2017
2. Bansal MP: Molecular Biology and Biotechnology: Basic experimental protocols. The Energy and Resources Institute, TERI, New Delhi 2013

Quality Assurance Procedures Designed to Ensure the Acquisition of Outcomes and Competencies

Anonymous, quantitative, standardised student survey on the course and the teacher's work implemented by the Quality improvement office of the Faculty of Medicine Osijek and/or the Faculty of Food Technology Osijek.

Note

E-learning is not included in the class quota, but it is used in teaching and it contains links to various sites and video and audio materials available on websites.