EXPERIMENTAL METHODS IN LABORATORY BIOMEDICINE II	
GENERAL INFORMATIONS	
Course coordinator	Assoc. Prof. Stana Tokić, MbiolMol, PhD
Assistant/Associate	Asst. Prof. Barbara Viljetić, MEdBiol et Chem, PhD Asst. Prof. Saška Marczi, MEdBiol et Chem, PhD Asst. Prof. Teuta Opačak Bernardi,MbiolMol, PhD Maja Jirouš, MMedLabDiag
Study Programme	Undergraduate university study of Medical laboratory diagnostics
Status of the course	Electoral
Year of study, semester	3rd year, 6th semester
ECTS	**4**
Workload (hours)	Lectures: 20; Seminars: 10; Laboratory exercises: 30
Expected number of students	30
COURSE DESCRIPTION	
Course objectives	
The aim of the course is to describe modern methodological approaches in the diagnostics of human diseases, and to enable students to acquire practical knowledge and skills necessary for work in molecular-biological laboratories.	
Enrolment requirements and entry competencies	
There are no additional requirements	
Learning outcomes at the Programme level	
1.1, 1.2, 2.1, 2.2, 2.6, 3.1, 3.2	
Learning outcomes at the course level	
After completing lectures, seminars and exercises, independent study and passing the exam, students will be able to: 1. Evaluate the advantages and disadvantages of immunohistochemical and immunocytochemical methods for the analysis of cellular proteins 2. To link susceptible genetic and chromosomal changes with the development of the most common cardiovascular, metabolic and autoimmune diseases 3. Predict the method of choice for the analysis of single nucleotide polymorphisms, gene and chromosomal mutations 4. Classify genes of the HLA gene system and compare methods for their molecular typing 5. Differentiate next-generation sequencing methods depending on the type of genetic material and gene targets 6. Choose suitable bioinformatics tools for analysis of sequencing results, and evaluate the basic quality parameters of the NGS library.	
Course content	
Lectures: Introduction, conception and goals of the course; Polymorphisms and mutations in genes as risk factors in the onset of disease. Specific types of hereditary thrombophilias and molecular diagnostics of thrombophilias. Determination of polymorphisms in genes that lead to lipoprotein metabolism disorders and the tendency to develop cardiovascular diseases. DNA typing of HLA class I and class II. Pretransplantation and posttransplantation cross-reactivity tests. Ensuring the quality of work in the laboratory for molecular diagnostics. **Seminars:** Immunochemical and electrophoretic methods. Immunoprecipitation, ELISA, Western-blot, immunohistochemistry and immunocytochemistry. Denaturing electrophoresis, isoelectric focusing, preparative electrophoresis. Next-generation sequencing: applications, advantages and	

disadvantages, library preparation - molecular tools and technologies in application, quality control of NGS experiments, bioinformatics tools - problem solving seminar.
Exercises: Western blot. HLA typing. Immunocytochemistry. Molecular analysis of the CoV-2 virus. Bioinformatics processing of RNASeq analysis results.

Mode of teaching

Lectures, Problem solving seminars, Laboratory exercises

Student obligations

Attending all forms of classes is mandatory, and the student must pass all knowledge tests. A student can excuse himself from 30% (full-time students) and 50% (part-time students) of each form of teaching. Uncompleted exercises and seminars must be passed through the colloquium.

Monitoring student work *(Connectivity of learning outcomes, teaching methods and grading)*

Teaching activity	ECTS	Learning outcome	Student activity	Assessment methods	Grade points	
					Min.	Max.
Attending classes	0.4	1-6	Class attendance	Attendance record	5	10
Seminars	0.8		Preparation of seminar	Seminar presentation	10	20
Exercises	0.8		entrance exams, performing exercises, keeping work diary	work diary, entrance exam	5	20
Final exam	2.0	1-6	Studying for the final exam	Written exam	30	50
Total	**4**				**50**	**100**

Evaluation of the final written exam:

Percentage of correct answers (%)	Ocjenski bodovi
>95	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

Calculation of final grade:
Grade points earned in the final exam are added to the grade points earned during the course. Grading in the ECTS system is done by absolute distribution, i.e. based on total achievement and is 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.

Required reading (available in the library and through other media)		
Title	Number of copies in the library	Availability through other media
Ambriović Ristov A. i sur. Metode u molekularnoj biologiji, Zagreb, Institut Ruđer Bošković, 2007	7	
Nives Pećina-Šlaus i sur. Odabrane metode molekularne biologije, Medicinska naklada, Zagreb, 2009.	12	
Additional reading		
Cox T.M i Sinclair J: Molekularna biologija u medicini, Medicinska naklada Zagreb, 2000		
Course evaluation procedures		
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.		
Note /Other		
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.		