GENERAL INFORMATION		
Course name	**Omics – medicine**	
Course director	**Prof. Marija Heffer, MD, PhD**	
Assistants	Asst. Prof. Goran Ćurić, MD, PhD	
Study program	**Integrated undergraduate and graduate university study program Medical Studies in German**	
Course status	Elective	
Year of study, semester	1st year, 2nd semester	
Credits allocated and form of instruction	ECTS student workload	**1**
	Number of teaching hours (L+S+E)	(5+8+2) 15

COURSE DESCRIPTION

Course objectives

Familiarization with diagnostic tools of the 'omics' type, from the principle of taking and storing to the analysis of biological samples and the construction and use of large databases generated in this way.
Familiarization with the potential of genomic analysis in the identification of inherited diseases, multiple molecular diagnoses, in the non-invasive diagnosis of chromosomal aneuploidies, targeted tumor therapy, pharmacogenomics and clinical microbiology. A critical review of gene therapy and genome editing and the potential of application of functional nutrition and probiotics in the treatment and prevention of chronic diseases by affecting the microbiome composition.

Course requirements

Attended Medical biology course.

Learning outcomes relevant to the study program

1.1., 2.1., 3.4., 3.5.

Expected learning outcomes *(5-10 learning outcomes)*

Upon successful completion of the course Omics medicine, the student will be able to:

1. Explain the advantages and disadvantages of certain biological samples for genomic analysis
2. List the ethical and methodological principles of taking and storing samples and forming a biobank
3. Explain the key principle of operation of sequencing platforms (NGS and Nanopor)
4. Identify potential candidates for genomic analysis
5. List examples of clinical application of genomic analysis in diagnostics and personalized therapy.

Course content

Samples for genomic analysis. Taking blood and buccal mucosa samples, labeling and storage. Genomic analysis databases and bioinformatics search tools. Platforms for genomic analysis (NG and Nanopor). Diagnostics of inherited diseases and multiple molecular diagnoses using clinical examples. Non-invasive diagnostics of chromosomal aneuploidies and sources of error. Genomic analysis of tumors as a tool for personalized therapy. Pharmacogenomics using clinical examples. Medicines for which knowledge of the patient's metabolic profile is relevant. Genomic analysis of microorganisms as a tool of clinical microbiology.
The relationship between chronic diseases and microbiome composition. Application of functional nutrition and probiotics. Possibilities of gene therapy with special reference to genome editing using examples from clinical practice.

Form of instruction	☒lectures ☒seminars and workshops ☒exercises ☐distance learning ☐field course	☒individual assignments multimedia and Internet ☐laboratory ☐mentoring activities ☐other

Student obligations

Attending all forms of instruction is mandatory, and students must take all exams. A student can be excused from 30% of every form of instruction. Missed exercises and seminars must be compensated by sitting for an exam.

Monitoring student learning

Attendance	x	Active participation	x	Seminar paper	x	Experimental work	
Written exam	x	Oral exam		Essay		Research	
Project		Continuous assessment		Paper		Practical work	
Portfolio							

Assessment and evaluation of students during class and on the final exam

Curricular activities	ECTS	Learning outcome	Student participation	Assessment methods	Points		
					Min.		M
Attendance	-	1-5	Class attendance,	Records			
Seminar	0.2	1-5	Seminar paper	Presentation	10		
Exercises	0.2	1-5	Entry exam, preparing exercises, keeping an exercise log	Log, entry exam	20		
Exam (partial exams)	0.2	1-5	Studying for partial exams	2 partial exams	10		
Final exam	0.4	1-5	Studying for the final exam	Written exam	10		
Total	**1**				**50**		**1**

Formulation of the final grade
Points achieved in class are combined with points achieved on the final exam. The

grading in the ECTS system shall be carried out by using absolute distribution, i.e. shall be based on the final achievement and compared to the numerical system as follows: A – excellent (5): 90-100 points; B – very good (4): 80-89.99 points; C – good (3): 65-79.99 points; D – sufficient (2): 50-64.99 points.

Mandatory reading

1. Buselmaier und Haussig**:** Biologie für Mediziner (Springer-Lehrbuch), 2018

Additional reading

1. Stanica: molekularni pristup. Translation of the textbook G.M. Cooper & R.E. Hausman, The Cell – A Molecular Approach, Medicinska Naklada, Zagreb, 2010.
2. Selected scientific papers

The number of copies of mandatory reading in proportion to the number of students currently taking this course

Title	*Number of copies*	*Number of students*
Buselmaier und Haussig**:** Biologie für Mediziner (Springer-Lehrbuch), 2018	A purchased license for online textbooks shall be used https://bfdproxy48.bfd-online.de/login.htm?back=http%3a%2f%2fpartner.bfd-online.info.bfdproxy48.bfd-online.de%2fameos%2fbfdAboGateway%3faboId%3d264117. Access will be granted to all students enrolled in the study program	

Quality monitoring methods ensuring the acquisition of knowledge upon completion, skills and competences

An anonymous, quantitative, standardized student survey on the course and the work of professors conducted by the Quality Assurance Office of the Faculty of Medicine in Osijek and a unified university student survey conducted by the Quality Assurance Center of the Josip Juraj Strossmayer University of Osijek.