NAME OF THE COURSE	Genetics					
Code	PMB023	Year of study	2			
Course teacher	Prof. Jasna Puizina, PhD	Credits (ECTS)	4			
Associate teachers	Assist. Prof. Ivica Šamanić,PhD, Assist. Prof. Željana Fredotović, PhD	Type of instruction (number of hours)	L	S	E	F
			30		30	
Status of the course	Mandatory	Percentage of application of e-learning	10%			

COURSE DESCRIPTION	
Course objectives	Students will be introduced to the structure and organization of genetic material, mechanisms of transmission and regulation of genetic information and diseases that are consequence of the malfunction of the mentioned processes. Students will be introduced to the most important achievements of applied genetics. During the exercises, students will improve their understanding of the adopted concepts by solving numerical and problem tasks. They will get acquainted with the basic methods of work in the molecular biological laboratory hrough practical experiments. The acquired knowledge is necessary for further understanding of biochemistry, biotechnology, bioinformatics and related fields.
Course enrolment requirements and entry competences required for the course	None.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After passing the exam, the student will be able to: 1. connect knowledge about inheritance with knowledge about the structure of DNA, genes and chromosome. 2. demonstrate knowledge of the main models of genetic transmission (inheritance) information. 3. demonstrate knowledge of key molecular mechanisms of expression control and change in genetic information 4. design simple experiments, apply simpler molecular genetic techniques, analyze data, use scientific literature and online databases. 5. competently use standard and specialized laboratory equipment
Course content broken down in detail by weekly class schedule (syllabus)	Lectures 1. Introduction, Mendel's laws, cellular and molecular basis of inheritance 2. Basic models of single gene inheritance - Mendel's laws in human and medical genetics, OMIM 3. Interactions between alleles and genes (incomplete dominance, codominance, lethal alleles, multiple alleles, eepistasis, pleiotropy, complementary genes, duplicate genes). 4. Human Genome Project 5. Mechanisms of sex determination and sex-related genes 6. Linked genes, linkage analysis, chromosome mapping 7. Cytogenetics 8. Chromosome number change 9. Chromosome structure change 10. Eukaryotic genome organization, mobile genetic elements 11. Epigenetics and regulation of gene activity 12. Polygenic inheritance, Extrachromosomal genetic information 13. Stem cell technology and gene therapy 14. Cancer genetics and immunogenetics 15. Genetically modified food Exercises

	1. The cellular basis of inheritance 2. Life cycles – Gametogenesis 3. Mendel's first laws of inheritance: the law of segregation 4. Mendel's second laws of inheritance: the law of independent segregation, X^2 test 5. Multiple alleles, ABO blood type determination 6. The mechanisms of sex determination, Barr body staining 7. Human karyotype 8. Population genetics - Hardy-Weinberg law 9. Identification of perpetrators of crime by analysis of DNA samples 10. GM food identification 11. Recombination and chromosome mapping
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	Students should complete all 30 hours of practice and at least 21 hours of lectures. During practical work, students must have a notebook where they record the results of the exercises and solve the problems. The notebook is eventually reviewed and must be evaluated positively. Students should pass two colloquium during lectures and two colloquia from practicum.

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	2	Research		Practical training	1
	Experimental work		Report		(Other)	
	Essay		Seminar essay		(Other)	
	Tests		Oral exam		(Other)	
	Written exam	1	Project		(Other)	

Grading and evaluating student work in class and at the final exam	The exams are written. Max.100 points = 70 points (lectures) + 30 points (exercises) 90% - 100% grade 5 (excellent) 78% - 89% grade 4 (very good) 66% - 77% grade 3 (good) 55% - 65% grade 2 (sufficient) < 55% grade 1 (insufficient)

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Mirjana Pavlica - online textbook from Genetics	-	http://www.genetika.biol.pmf.unizg.hr
	Puizina Jasna, 2020 lectures- powerpoint slides, including essay questions	-	E-learning and MS Teams

Optional literature (at the time of submission of study programme proposal)	Turnpenny PD and Ellard S, 2011: Emery's Fundamentals of Medical Genetics (in Croatian), Medicinska naklada Zagreb. Tamarin, R.H. 2002: Principles of Genetics, 7th Ed., McGraw Hill Lewis, R. 2005. Human Genetics, 6. izdanje, McGraw Hill Riddley, M. 2001: Genom, Izvori (in Croatian)

Quality assurance methods that ensure the acquisition of exit competences	Student's survey. Consultations with students.
Other (as the proposer wishes to add)	