

		UNIVERSITY OF EAST SARAJEVO Faculty of Medicine					
		Study program:medicine					
		Integrated academic studies		I study year			
Full subject title		CELL BIOLOGY AND HUMAN GENETICS					
Department		Department for cell biology and human genetics, Faculty of Medicine in Foča					
Subject code			Subject status		Semester		ECTS
ME-02-1-003-1			compulsory		II		9
Professor/ -s		assistant professor, Nikolina Elez-Burnjaković, PhD					
Associate/ -s		Senior asisitant, Sara Rakočević, MA, asisitant Anđela Mandić, MA					
Number of lectures/ teaching workload (per week)			Individual student workload (in hours per semester)			Coefficient of student workload S <sub>0</sub> <sup>1</sup>	
L	E	SP	L	E	SP	S <sub>0</sub>	
3	4	0	3*15*1	6*15*1	0*15*1	1	
total teaching workload (in hours, per semester) 3*15 + 6*15 + 0*15 = 135				total student workload (in hours, per semester) 3*15*1 + 6*15*1 + 0*15*1 = 135			
Total subject workload (teaching + student):135 + 135 = 270 hours per semester							
Learning outcomes		1. Identifying the organization and function of the cell at the molecular level, which will facilitate the understanding of pathological processes as the cause of the disease that students meet on other subjects during the studies. 2. Acquiring basic knowledge in human genetics and the application of acquired knowledge in other medical disciplines during the course of the study.					
General competences		They have adopted attitudes concerning medical ethics. They are prepared for further development and advances within the field of medicine. They are acquainted with methodology of scientific research. They are capable of acting in accordance with rational and scientific concepts and principles. They advocate for the patient's right to participate fully in medical treatment decisions, including the right to the refusal of care or participation in the process of education and scientific research. They are eager to collaborate with other medical professionals.					
Preconditions		No preconditions					
Teaching methods		Lectures, exercises, seminar papers and consultations					
Subject content per week		<b>Lectures:</b> 1.Evolution of a cell. Chemical composition of the cell (biologically important chemical elements, water and organic molecules). 2. Organization of eukaryotic cells. Transport through cell membranes. 3. Organization of eukaryotic cells. Cell study methods. Model organisms. 4. Enzymes and living systems. Cellular breathing. Mitochondria – ATP synthesis 5. Hereditary material. Nucleic acids. DNA and RNA. The flow of information in a cell. 6. Replication of DNA molecules. Transcription. Processing the primary transcript. Genetic code. 7. Translation. Regulation of gene activity. Regulation of gene activities on the DNA level. Regulation of gene activities at the level of transcription and translation. Chromosomes, chemical composition and structure. Human genome. 8. Cell cycle (control factors) and cell populations. Gametogenesis. 9. Genetic determination of sex. Disorders of gender development. Genetic mutations. Mechanisms of mutation formation. Mutagenic agents. 10. Recombination. Crossovers. DNA reparation mechanisms. Diseases caused by disorders of reparation mechanisms. 11. Changes in the number of chromosomes. Aneuploidy and polyploidy. Frequency of chromosomal aberrations. Indications for karyotype analysis. 12. Changes in the structure of chromosomes. Deletion. Duplication. Ring chromosome. Isochromosomes. Inversions and translocations. 13. Inheritance in humans. Monogenic inheritance. Codominant inheritance. Multifactorial Inheritance.					

<sup>1</sup> Coefficient of student workload S<sub>0</sub> is calculated as it follows:

a) for the study programs not going through the licensing process: S<sub>0</sub> = (total workload in semester for all the subjects 900 hrs – total teaching workload L+E in semester for all the subjects 870 hrs)/ total teaching workload L+E in semester for all the subjects \_\_\_\_ hrs = \_\_\_\_\_. Consult form content and its explanation.  
b) for the study programs going through the licencing process, it is necessary to use form content and its explanation.

	<p>Mitochondrial inheritance. Genealogy. Genetic counseling and prevention of hereditary diseases.</p> <p>14. Genetics of cancer. Characteristics of the malignant cell. Genetic changes during carcinogenesis. Factors of the environment and carcinogenesis. Cancer as a multifactorial disease.</p> <p>15. Population genetics. Frequency of gene alleles. Panmixion, inbreeding and outbreeding. Genetic engineering. DNA cloning. Nucleic acid hybridization. DNA sequencing. Gene therapy. Molecular markers in human genetics.</p> <p><b>Exercises:</b></p> <p>1. Introduction to microscopy (microscopy). Prokaryotic and eukaryotic cells (drawing, animations)</p> <p>2. Cell membrane and membrane organelles (drawing, animations). Non-membrane organelles (drawing, animation)</p> <p>3. Molecular genetics (drawing, tasks).</p> <p>4. Karyotype. Barr body (microscope sample preparation). Seminar papers</p> <p>5.Mitosis (animation, observation of sample). Meiosis (animation, drawing)</p> <p>6.Gametogenesis (observation of sample, drawing). Seminar papers.</p> <p>7. Numerical aberrations of sex chromosomes (tasks). Numerical aberrations of autosomes (tasks)</p> <p>8. Structural aberrations (tasks).</p> <p>9. Mendel's laws of inheritance (tasks).</p> <p>10. Genes interactions (tasks). Sex-linked inheritance (tasks).</p> <p>11. Genealogy (tasks).</p> <p>12. Population genetics (tasks).</p> <p>13. Molecular Genetics Methods: DNA Laboratory (laboratory work). Isolation of DNA (laboratory work).</p> <p>14. Oncogenetics</p> <p>15. Chromosome detection and analysis (Karyotyping)</p>			
Compulsory literature				
Author/s	Publication title, Publisher	Year	Pages (from-to)	
Robert L. Nussbaum, Roderick R. McInnes, Huntington F. Willard	Genetics in Medicine, Thompson and Thomspson, ISBN: 9781416030805, 7th edition	2007		
Ricki Lewis	Human genetics: Concepts and Applications, ISBN 978–0–07–352527–3, 9th edition	2010		
Additional literature				
Author/s	Publication title, Publisher	Year	Pages (from-to)	
Bruce Alberts, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, Peter Walter	Molecular biology of the cell, Garland Science, Taylor & Francis Group, ISBN 978-0-8153-4432-2, 6th edition	2015		
Geoffrey M Cooper	The cell, Sunderland (MA): Sinauer Associates, ISBN-10: 0-87893-106-6	2000		
Student responsibilities, types of student assessment and grading	Grading policy		Points	Percentage
	Pre-exam activities			
	lecture/exercise attendance		10	10%
	seminar paper		10	10%
	colloquium		30	30%
	Final exam			
	practical exam		10	10%
	final test		40	40%
	TOTAL		100	100 %
Certification date	June 17th 2024			