<table>
<tr><td>1.</td><td>Subject</td><td colspan="4">MOLECULAR BIOLOGY</td></tr>
<tr><td>2.</td><td>Code</td><td colspan="4">MLD – 111</td></tr>
<tr><td>3.</td><td>Study program:</td><td colspan="4">Three-year professional studies of medical laboratory diagnostics</td></tr>
<tr><td>4.</td><td>Conducted by</td><td colspan="4">UKIM Medical Faculty – Skopje
Department of Human Genetics</td></tr>
<tr><td>5.</td><td>Degree of education (first or second cycle)</td><td colspan="4">First cycle</td></tr>
<tr><td>6.</td><td>Academic year/semester</td><td>First/I</td><td>7.</td><td>Credits</td><td>4</td></tr>
<tr><td>8.</td><td>Professor</td><td colspan="4">Head of the Department: prof. d-r Aleksandar Petlichkovski
*the lessons are held by all the members of the Department</td></tr>
<tr><td>9.</td><td>Prerequisite</td><td colspan="4">None</td></tr>
<tr><td>10.</td><td>Goals</td><td colspan="4">The students will be able to:
Describe and compare the composition of DNA and RNA molecules
Define and describe the replication, transcription and translation processes
Describe the chromosome composition and explain the cell cycle
Describe and list the types of mutations and their effect on protein function
List and describe the most important methods in molecular biology and explain their use
Participate in planning and performing certain microbiologic analysis under guidance
Choose and use with understanding professional literature from the microbiology field</td></tr>
<tr><td>11.</td><td colspan="5">Content summary:
Theoretical lessons:
Prokaryotic and eukaryotic cell
Cell organelles
Differentiation of cells, cell signaling
Chromatin and chromosomes
Cell cycle, mitosis, meiosis, crossing over and genetic recombination
Structure and function of DNA, replication, change in the DNA sequence and consequences
Types, structure and function of RNA. Transcription and transcription regulation. Introns and exons, RNA recombination. Translation
Protein structure and function with special attention paid on antigens and antibodies
Practical lessons:
Basis of mutageneisis and cancerogenesis
Types of samples in biomedicine
Molecular biology methods: nucleic acids isolation
Nucleic acid electrophoresis
Determining DNA clearance
Polymerase chain reaction (PCR)
DNA sequencing
ELISA, flow cytometry, karyotyping</td></tr>
<tr><td>12.</td><td colspan="5">Teaching methods: Interactive lessons (theoretical), practical lessons</td></tr>
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13.	Total classes:		90		
14.	Organization		60 theoretical, practical lessons, seminars 30 lessons – learning at home		
15.	Types of teaching activities		15.1	Lessons: theoretical classes	15
			15.2	Practical lessons	30
				Seminars	15
16.	Other types of activities		16.1	Practice	
			16.2	Self-supporting practice	
			16.3	Learning at home	30
17.	Knowledge assesment		Points		
	17.1	Tests			
	17.2	Final exam			Min.-Max.
			Written test		24 - 40
			Oral exam		18 - 30
	17.3	Active participation			Min. – Max. Points
			Theoretical lessons		6 - 10
			Practical lessons		12 - 20
18.	Grading criterion (points/grades)	Up to 59 points	5 (five) F		
		From 60 to 68 points	6 (six) E		
		From 69 to 76 points	7 (seven) D		
		From 77 to 84 points	8 (eight) C		
		From 85 to 92 points	9 (nine) B		
		From 93 to 100 points	10 (ten) A		
19.	Requirements for obtaining a signature and attending the final examination	To obtain a signature, the student must gain minimum points from visiting the theoretical lessons and practical lessons. To attend the final exam, the student must gain minimum points and pass the mid-term exams. In the exam session, the student first attends the mid-term exams (that he did not pass) and then the final exam. The grade is based on the sum of the points of all the activities, mid-term exams and final exam.			
20.	Language	Macedonian			
21.	Method of evaluating the quality of the lessons	Anonymous student evaluation of the subject, the professors and the collaborators who hold the lessons.			
22.	Literature				
	22.1	Mandatory literature			
		1.	Prof. d-r A.Petlichkovski, Genetics, Authorized lectures, University Ss. Cyril and Methodius, Medical Faculty, Skopje, 2019		
		2.	Prof. d-r Kochova et al., Medical Genetics, University Ss. Cyril and Methodius, Medical Faculty, Skopje, 2013		
		3.	Prof. d-r M.Spiroski et al., Human Genetics Practicum 1, University Ss. Cyril and Methodius, Medical Faculty, Skopje, 2009		

		4.	Prof. d-r M.Kochova et al., Human Genetics Practicum 2, University Ss. Cyril and Methodius, Medical Faculty, Skopje, 2009
	22.2	Additional literature	
		1.	Peter Russel, iGenetics, 3rd ed., Pearson, 2009