

1.	Course title	Introduction to Molecular Biology		
2.	Course code	BIO-3-01		
3.	Study program	Master Studies of Informatics Sciences and Computer Engineering - Module Bioinformatics		
4.	Unit offering the course	FCSE		
5.	Undergraduate/master/PhD	Master		
6.	Year/semester 1/winter/compulsory	7. ECTS: 6		
8.	Teacher(s)	Dr. Sasho Panov, Associate Professor		
9.	Course prerequisites	None		
10.	Goals (competences): The student will achieve basic principles, concepts and methods in molecular biology			
11.	Course content: Introduction - basic concepts of life sciences and molecular aspects of biology. Definition of Molecular Biology and short historical retrospective. Central "dogma" of molecular biology. DNA molecules store the genetic information in living cell; basic characteristics of hereditary molecules; DNA structure and Watson-Crick model; structure and function of RNA molecules; structural organization of DNA in chromosomes. Proteins - nomenclature and size of protein molecules. Hierarchical levels of protein organization - primary, secondary, tertiary and quaternary structure. Structural classification of the proteins. Examples of globular, fibrillar and membranous proteins. DNA replication; DNA polymerases; replication initiation; replication forks; replication elongation; replisome-molecular machine for DNA replication; specifics of eukaryotic DNA replication; replication termination. Transcription - synthesis of RNA from DNA template. Transcription in prokaryotes; transcription initiation, elongation and termination in <i>E. coli</i> ; Transcription in eukaryotes. Posttranscriptional modifications: processing of 5'- and 3'-ends of primary transcripts form protein-coding genes; RNA splicing of primary transcripts; alternative splicing. Translation - protein synthesis. Genetic code. Transfer RNAs; ribosomes as translation machinery. Translation process; initiation, elongation and termination of translation. Regulation of gene expression.			
12.	Teaching methods: Lectures supported by slide presentations, interactive lectures, trainings (using lab equipment and software packages), team work, case studies, invited guests and lectures, individual practical assignments presentations, seminar paper, e-learning (forums, consultations).			
13.	Total available time	6 ECTS x 30 hours = 180 hours		
14.	Distribution of the available time	30 + 15 + 135 = 180 hours		
15.	Teaching activities	15.1.	Lectures	30 hours
		15.2.	Training (labs, problem solving), seminar and team work	15 hours
16.	Other activities	16.1.	Project work	60 hours
		16.2.	Self study	25 hours
		16.3.	Home work	50 hours

17.	Grading					
	17.1.	Tests			45 points	
	17.2.	Seminar work/project (written or oral presentation)			45 points	
	17.3.	Active participation			10 points	
18.	Grading criteria		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.	Final exam prerequisites		Successfully completed activities 15.1 and 15.2			
20.	Course language		Macedonian and English			
21.	Quality assurance methods		Internal evaluation and student questionnaires			
22.	Literature					
	22.1.	Compulsory				
		No.	Authors	Title	Publisher	Year
		1.	Sasho Panov	Fundamentals of molecular biology and molecular genetics	Ss. Cyril and Methodius University	2013
		2.	Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P.	Molecular Biology of the Cell. 5th edition	<i>Garland Science</i>	2007
	3.	Krebs J. E., Goldstein E. S., Kilpatrick S. T.	Lewin's Genes X	<i>Prentice Hall</i>	2009	
	22.2.	Additional				
		No.	Authors	Title	Publisher	Year
		1.				
		2.				
3.						