

1.	Course title	Molecular biology of the cell		
2.	Course code	InIS-BI-3-03		
3.	Study program	Intelligent Systems Engineering		
4.	Unit offering the course	FCSE		
5.	Undergraduate/master/PhD	Master		
6.	Year/semester 1(2)/winter/compulsory	7. ECTS: 6		
8.	Teacher(s)	Dr. Sasho Panov, Associate Professor		
9.	Course prerequisites	None		
10.	Goals (competences): The students will achieve basic and extended understanding of general concept of cell molecular biology, structure and function of biomacromolecules (DNA, RNA and proteins) and fundamental genetic processes: replication, transcription and translation, as well as essential concepts of gene regulation.			
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.					
		2.					
	22.2.	Additional					
		No.	Authors	Title	Publisher	Year	
		1.					
		2.					
		3.					