

Table 5.2 Course specification

Programme: MASTER STUDIES IN BIOLOGY - MOLECULAR BIOLOGY			
Type and level of study: Master studies of Biology – second degree			
Course name: BMB204 Molecular biology of eukaryotes			
Lecturer (First name, middle name, last name): Snežana D. Marković			
Semester: winter			
ECTS: 7			
Required knowledge: Basics of Molecular Biology course			
Aims of the course: Understanding of structural organization and characteristics of the genome in the eukaryotic cell. Acquisition of knowledge of basic molecular processes of replication, transcription, and translation, as well as regulation of gene expression mechanisms in the eukaryotic cell. Education in fundamental applied technics in molecular biology, basic principles in the methodology of genetic engineering.			
Course outcome Knowledge acquisition and understanding of basic processes in transfer and regulation of gene expression in a eukaryotic cell. Studying technics in molecular biotechnology. Developing critical thinking and ability to conduct research work in the field. Ability to apply acquired knowledge and comprehended techniques and skills in practice.			
Course content <i>Theoretical part</i> Nucleus structure. Genomics. Gene concept, eukaryotic cell genome. Genome organization in a nucleus. Structural organization of chromatin and chromosomes. Covalent histone modifications, histone code, and epigenomics. Mechanisms of DNA replication in eukaryotes. DNA polymerases; initiation of replication; replication in telomerase; regulation of replication. Reparation mechanisms of a damaged DNA molecule. Genetic Recombination. Transcription mechanisms in eukaryotes. RNA polymerases. Transcription factors. Transcripts processing – RNA splicing. Eukaryotic mRNA structure. Regulation of gene expression. Mechanisms of translation in eukaryotes. RNA tariffing. Codon-anticodon interaction. Structure, function, and biosynthesis of a ribosome. Biosynthesis of proteins. Chaperones. Posttranslational modifications of proteins. Regulation of protein synthesis. Proteomics. Molecular biotechnology in eukaryotic systems. Molecular biotechnology in medicine. Synthesis of proteins of interest for human therapy. Monoclonal antibody. <i>Practical part: Practice, Other types of lecturing, Research work paper</i> Cellular and molecular biology in laboratory conditions. Methods in molecular biology. Search for genomic databases (NCBI, Entrez,..). PCR Primer Design. Real-Time PCR and SNP genotyping experiments. DNA sequencing and design of the phylogenetic tree of the selected taxon. Human genome sequencing. DNA chip. DNA isolation. Practical performing of PCR method. DNA electrophoresis and DNA laddering.			
Literature: Савић-Павићевић Д, Матић Г. Молекуларна биологија 1. NNK International, Београд, 2011. Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P. Molecular Biology of the Cell. 5 th ed. Garland Science, New York, 2008.			
Number of classes			Other types of classes:
Lecture: 45	Practice: 30	Other: Research work paper	
Lecturing methods: Frontal (PowerPoint presentation), interactive and discussions. Experimental work in Laboratory, resolving problematic tasks, computer simulation experiments, writing of essays with theme of newest scientifically knowledge in field of molecular biology.			
Evaluation of knowledge (maximal points 100)			
Pre-exam obligations	points	Exam	points
Activity in classes	5	Written/practical exam	10
Practical classes	5	Oral exam	40
Tests	30	
Essays	10		