

Level: bachelor				
Course title: Introduction to Molecular Biology, OB011				
Status: elective				
ECTS: 6				
Requirements: none				
Learning objectives (1) To provide students with knowledge of gene structure, genome organization and the packaging of DNA into chromosomes; (2) To enable students to understand the flow of genetic information from DNA via RNA to proteins; (3) To enable students to understand the regulation of gene expression; (4) To enable students to apply basic molecular biology methods for nucleic acid analysis.				
Learning outcomes Upon successful completion of this course, student is able to: (1) demonstrate knowledge of gene structure, genome and chromatin organization, (2) explain the mechanisms that allow the flow of genetic information from DNA to protein, (3) explain at which levels and how gene expression is regulated, (4) apply basic molecular biology methods for nucleic acid analysis and interpret the results.				
Syllabus <i>Theoretical instruction</i> Research topics in molecular biology. Gene structure. Genome organization in prokaryotes and eukaryotes. Unique, moderately repetitive and highly repetitive sequences. The packaging of DNA into chromosomes and chromatin structure regulation. Replication. Mutability and reparation. Homologous recombination. Site specific recombination and transposition. Transcription and post-transcriptional processing of primary transcripts (splicing, RNA editing). Translation and genetic code. Regulation of gene expression. Regulatory RNAs (RNA interference). Selectivity and sensitivity of bidirectional transport between the nucleus and cytoplasm. Genetic system of mitochondria and chloroplasts. Application of selected techniques in molecular biology (electrophoresis and blotting techniques, PCR, sequencing). Recombinant DNA technology. Animal models: transgenic "knock-out" and "knock-in" mice. Genomics. <i>Practical instruction</i> Isolation and quantification of DNA and RNA. Agarose electrophoresis of DNA and RNA. Restriction Enzyme Digestion of DNA. Multiplication of a specific DNA fragment (PCR).				
Weekly teaching load				Other:
Lectures: 3	Exercises: 2	Other forms of teaching:	Student research:	