

Course Unit Descriptor

Study Programme: Forensics			
Course Unit Title: Forensic genetics			
Course Unit Code: FB-09			
Name of Lecturer(s): Mihajla Dan, Nevena Veličković			
Type and Level of Studies: Master Academic Degree			
Course Status (compulsory/elective): elective			
Semester (winter/summer): summer			
Language of instruction: English			
Mode of course unit delivery (face-to-face/distance learning): face-to-face			
Number of ECTS Allocated: 6			
Prerequisites: -			
Course Aims: The aim of the course is to provide understanding and application of knowledge about processes and mechanisms of transmission of genetic information, at molecular, chromosomal, organisms and population levels in forensic analyses and gaining broad spectrum of key knowledge of DNA analyses methods.			
Learning Outcomes: After successful finalizing of pre-exam and exam obligations, student is able to: <ol style="list-style-type: none"> 1. Apply basic genetic terms relevant in the field of forensics 2. Present gained knowledge about processes and mechanisms of genetic information transmission at molecular, cellular, organism and population levels 3. Apply adequate computer packages for genetic data analyses in forensics 4. Define advantages and disadvantages of different DNA technologies methods 			
Syllabus: <i>Theory</i> Eukaryotic genomes organization: nuclear genome, mtDNA, cp DNA. Genetic polymorphism. DNA sequences classification. Morphological and molecular organization of chromosomes. Basic patterns of inheritance. Pedigree analyses. Comparative overview of different DNA extraction protocols: plant, animal and human material. DNA based methods in forensics: RFLP, PCR-RFLP, VNTR, STR, DNA barcoding, SNP, RNA assay, genomic analyses. DNA based sex determination in different organisms. Software and statistical methods in genetic data analyses. <i>Practice</i> Lab work: DNA and RNA extraction from plant, animal and human tissues. DNA extraction from non-invasive samples. PCR amplification of selected set of molecular markers for identification of plant and animal species. Metabarcoding in animals. PCR-RFLP of selected set of molecular markers for identification of plant and animal species. Computer lab: microsatellite genotyping, SSR profile analyses.: Peak Scanner, Arlequin. Pedigree analyses. MtDNA sequences analyses:: BioEdit, BLAST. Databases of DNA sequences for different organisms and online tools.			
Required Reading: <ol style="list-style-type: none"> 1. Goodwin W., Linacre A. & Hadi S. An Introduction to Forensic Genetics. John Willy and Sons Ltd., 2007. 2. Stachan T., Read A.P. Human Molecular Genetics 3 Garland Publishing, UK, 2004. 3. Sambrook J., Russel D.W. Molecular Cloning: A Laboratory Manual. 3rd Edition, CSHL, New York, 2001. 4. Primose S.B., Twyman R.M. Principles of Genome Analysis and Genomics. Blackwell Publ. UK, 2003. 5. Barnes M.R., Gray I.C. Bioinformatics for geneticists. John Willey & Sons Ltd. UK, 2003. 			
Weekly Contact Hours: 5 (75)		Lectures: 3 (45)	Practical work: 2 (30)
Teaching Methods: Lectures, lab practical lectures, computer practical lectures			
Knowledge Assessment (maximum of 100 points):			
Pre-exam obligations	points	Final exam	Points
Active class participation	5	written exam	
Practical work	5	oral exam	60
Preliminary exam(s)		
Seminar(s)	30		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			