

Study Programme : BSc in Ecology				
Degree level: Bachelor degree				
Course Title: Genetics and Genotoxicology				
Professor: Dragana Obreht, Mihajla Djan				
Required/Elective Course: required course				
Number of ECTS: 6				
Prerequisites: -				
Course Objective: The course objective is to learn and understand processes and mechanisms of transmission, structure and expression of genetic information at the levels of molecule, chromosome, organism and population.				
Course Outcome: After successfully realized pre-exam and exam obligations student is able to: - understand and use basic genetic terms and recognize importance of genetics in modern science - give detail description of chromatine, morphological and functional organization of chromosomes - distinguish clearly phases of mitosis and meiosis, understand importance of cell divisions in transmission genetics - apply through examples Mendel’s laws, understand intralocus and interloci gene interactions - predict possible mechanisms of inheritance and construct pedigrees based on given data - apply Hardy-Weinberg law in population and observe possible effects of mutations, migrations, genetic drift and selection to genetic equilibrium. Distinguish principles of quantitative and qualitative genetic analysis. - distinguish clearly effects of different genotoxic agents and types of mutational mechanisms - explain methodology of basic genotoxicity tests and molecular genetic methods of mutagenesis				
Course Content: <i>Theoretical part</i> Introduction to Genetics, history and clasification of different subdisciplines. Structure and function of genetic material. Gene expression. Molecular organisation of chromosomes. Fundamental principles of inheritance. Cell division: Mitosis and Meiosis. Extension of Mendelian analisys. Genetic structure of natural populations. Basic Quantitative genetics. Genotoxic effects of chemical, physical and biological mutagens. Molecular mechanisms of gene mutations. DNA repair mechanisms. Changes of chromosomal number and structure. Oncogenetics. Principles of detection and evaluation of genotoxic effects. Molecular genetic methods of mutagenesis and mutation detection. <i>Practical part</i> Structure of DNA and RNA. Karyogram. Meiosis, Gametogenesis. Mono-, Di-, and Tri-hybrid cross, χ^2 test. Codominance, Partial dominance. Multiple alleles. Lethal genes. Sex determination. Pedigree analysis. Genetic structure analysis in natural populations. Factors that influence genetic equilibrium in natural populations. Quantitative Genetics. Phenotypic variability variances. Inbreeding coefficient. Euploidy and Aneuploidy. Chromosomal aberration. Application of mutagenesis methods and genotoxicity tests.				
Reading List: 1. Vapa Lj, Obreht D. Genetics through problems and tasks, extended handouts, Faculty of Sciences, Novi Sad, 2005. (in Serbian) 2. Vapa Lj, Radovic D. Genetic Problems. Univeristy of Novi Sad, 1995. (in Serbian) 3. Diklic V, Kosanovic M, Nikolis J. Biology with human genetics. Grafopan, Belgrade, 2001. (in Serbian) 4. Djelic N., Stanimirovic Z. Principles of Genetics. Elit Medica, Belgrade, 2004 (in Serbian) 5. Zimonjić, D.B., Savković, N., Anđelković, M. (1990): Genotoxic agents, Scientific Book, Belgrade (in Serbian)				
Total hours:				
Lectures: 3	Practicals: 2	Other:	Student research work:	
Methods of instruction: Lectures, practicals, problem solving sessions				
Assessment (maximum number of points 100)				
Requirements	points	Final exam		points
Active participation in lectures	-	Final test		50
Active participation in practicals	2	Oral exam		-
Practicals – take home problems	8			
Tests (2)	40			
Remark: -				