Study Programme : BSc in Biology

Degree level: Bachelor degree

Course Title: Genetics

Professor: Mihajla Djan, Dragana Obreht

Required/Elective Course: required course

Number of ECTS: 7

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
- explain mutational mechanisms, principles of mutagene impact and DNA repair mechanisms
- 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.
- understand importance of genetic variability maintainance in the field of population, conservation and evolutionary genetics, as well as in plant and animal breeding

Course Content:

Theoretical part Morphology and molecular organisation of chromosomes. Eukaryotic genome organization. Gamete production. Chromosomal changes in human population. Mendel's Laws of inheretance. Gene interactions. Pedigree analysis. Sex determination. Recombinations. Molecular mechanisms of mutation. Changes of chromosomal number and structure. Genetic structure of natural populations. Hardy-Weinberg Law. Factors that influence genetic equilibrium in natural populations. Application of protein and molecular markers in determination of genetic variability in natural populations. Quantitative traits. Inbreeding.

Practical part Karyogram. Non-disjunction of chromosomes diagrams. Chromosomal changes in human population. Mendel's laws of inheritance. χ^2 test. Gene interactions. Sex determination. Pedigree analysis. Crossing over. Polyploides and aneuploids. Aberations of chromosomes. Genetic structure analysis in natural populations. Factors that influence genetic equilibrium in natural populations. Continual variability. Phenotypic variability variances. Inbreeding coefficient. Application of protein and molecular markers in determination of genetic variability in natural populations.

Reading List:

1. Djelic N., Stanimirovic Z. Principles of Genetics. Elit Medica, Belgrade, 2004 (in Serbian)
2. Marinkovic D, Tucic N, Kekic V. Genetics. Naucna knjiga, Belgrade, 1991. (in Serbian)
3. Diklic V, Kosanovic M, Nikolis J. Biology with human genetics. Grafopan, Belgrade, 2001. (in Serbian)
4. Vapa Lj, Obreht D. Genetics through problems and tasks, extended handouts, Faculty of Sciences, Novi Sad, 2005. (in Serbian)
5. Vapa Lj, Radovic D. Genetic Problems. Univeristy of Novi Sad, 1995. (in Serbian)

Total hours:				
Lectures: 3	Practicals: 3	Other:	Student research work:	

Methods of instruction:

Assessment (maximum number of points 100)

Requirements	**points**	**Final exam**	**points**
Active participation in lectures	-	Final test	67
Active participation in practicals	3	Oral exam	-
Tests (3)	30		