Study Programme : MSc in Biology

Degree level: Master degree

Course Title: Human Genome

Professor: Mihajla Djan

Required/Elective Course: elective course

Number of ECTS: 7

Prerequisites: previously gained ECTS, at least 10 ECTS from courses in the field of Genetics

Course Objective: The course objective is introduce students to organisation and expression of human genome and genetic mechanisms of hereditary diseases. Through the course student uses different approaches to numerous information sources and gets new knowledge about fundamental concept and technological achievements in human genome research.

Course Outcome:

After successfully realized pre-exam and exam obligations, student is able to:

- distinguish structural and functional levels of human genome organisation
- describe idea, history and technology of Human Genome Project
- identify tissue-specific or species-specific mechanisms of gene expression regulation
- understand genetic experiment processes that lead to determination of causes of hereditary diseases with different complexity and ethiology
- explain methodology of basic molecular genetic techniques in prenatal diagnostics, population genetics and forensics
- use web sources, scientific literature and to interpretate results in written and oral form

Course Content:

Theoretical part Organisation and distribution of human genes. Mitochondrial genome, pseudogenes, gene fragments, repetitive DNA. Human Genome Project. Gene expression regulation. Selective gene expression. Monoallelic expression mechanisms. Imprinting. Dynamic mutations: molecular mechanisms of mutations, pathogenesis and clinical features od diseases. Sex chromatine and dosage effect. Sex chromatine mutations and gender reversions. DNA polymorphism. DNA fingerprinting. Gene expression analysis. Mapping and identification of molecular basis of hereditary diseases. Principles and methods in prenatal diagnostics. Genetic counceling. Gene therapy. Examples of gene therapy in human population.
Practical part Gene and chromosomal basis of hereditary diseases. Solving problems – monogenic diseases, non-disjunction of chromosomes, complex hereditary diseases, pedigree analysis, anticipation. DNA polymorphism and genetic markers in human population: choice of markers for diagnostic and population genetic analyses, choice of markers in forensics. Use of web sources with information about organisation and function of human genome: NCBI, OMIM, EBI, GENOME, ENSEMBL.

Reading List:

Stachan T, Read AP. Human Molecular Genetics 3 Garland Publishing, UK, 2004.

Diklic V, Kosanovic M, Dukic S, Nikolis J. Biology with Human Genetics. Grafopan, Belgrade, 2001. (in Serbian)

Zergollen Lj. et al. Human Genetics, chosen chapters. Medicinska naklada, Zagreb, 1994. (in Croatian)

Total hours:				
Lectures: 2	Practicals: 1	Other:	Student research work:5	

Methods of instruction:

Theoretical lectures, solving problems, tutorial, research work

Assessment (maximum number of points 100)

Requirements	**points**	**Final exam**	**points**
Active participation in lectures	-	Practical exam	50
Active participation in practicals	10	Oral exam	-
Test(s) or			
Pre-exam testing	40		

Remark: