Course Unit Descriptor

Study Programme: Soil, plant and genetics

Course Unit Title: Molecular Genetics I

Course Unit Code: 19MZBGO01I006

Name of Lecturer(s): dr Sofija R. Petrović; dr Borislav M. Banjac

Type and Level of Studies: Master academic studies, second degree academic studies

Course Status (compulsory/elective): elective

Semester (winter/summer): winter

Language of instruction: Serbian

Mode of course unit delivery (face-to-face/distance learning): face-to-face

Number of ECTS Allocated: 5

Prerequisites: none

Course Aims: Aim of this course is to introduce students to basics of molecular genetics (nucleic acids, structure and function of genetic material, genetic manipulation and gene products manipulation.

Learning Outcomes: Student who has finished molecular genetics I master course will be enabled to further upgrade his knowledge through PhD studies in direction of genetic material manipulation on molecular level, as well as scientific and expert team work on the field of molecular genetics.

Syllabus:

Theory **1.) Introduction lecture** (heredity, Mendelism, chromosomes, birth of molecular genetics); **2.) Cells** (cell chemistry, proteins, nucleic acids); **3.) DNA and chromosomes** (DNA structure, chemistry and chromosome structure); **4.) Structure, expression and function of genes; 5.) Mobile gene elements; 6.) DNA replication; 7.) DNA reparation and recombination; 8.) RNA** (role and types); **9.) Transcription; 10.) Translation; 11.) Gene expression control** (overview, DNA connecting motifs in gene regulating proteins); **12.) Genetic regulatory mechanisms (switches)** (self-regulation, positive and negative gene regulation, complex systems, post-transcriptional control); **13.) Manipulating with proteins, DNA and RNA** (cell culture and isolation); **14.) Isolating, cloning and sequencing of DNA; 15.) Revial presentation**

Practice Exercises, other forms of classes, academic experimental work. Dna structure; Chromosome morphology; Chromosome chemistry; Gene structure and function; DNA replication; RNA (role and types); Transcription; Translation; Gene expression control; Gene regulatory mechanisms (switches); Manipulating with proteins, DNA and RNA; Isolating, cloning and sequencing of DNA.

Required Reading:

James D. Watson: Molekularna biologija gena. Naučna knjiga, Beograd (translated from Eng.), 1977

Old, R.W., Primrose, B.S.: Principles of Gene Manipulation – An Introduction to Genetic Engeenering, Blackwell Scienitific Publications, 1985

Marinković, D., Tucić, N., Kekić, B.: Genetika. Naučna knjiga, Beograd, 1985

Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., Walter, P.: Molecular Biology of the Cell. Garland Science, Taylor & Francis Group, 2002

Primrose, B. S.,Twyman, R. M.: Principles of Gene Manipulation – An and Genomics, Blackwell Publishing, 2006

Kraljević-Balalić, Marija, Petrović, S., Vapa, Ljiljana: Genetika, teorijske osnove sa zadacima. Poljoprivredni fakultet, Institut za ratarstvo i povrtarstvo i PMF, Novi Sad, 1991

Weekly Contact Hours:	**Lectures:** 45	**Practical work:** 30

Teaching Methods: Teaching is conducted with use of modern technology, theoretical part of lectures is taking place in faculty classrooms. All lectures are computer processed and presented. Practical part of lectures is taking place in cabinets equipped with climate control units, with individual seats for students (40 seats), classrooms are equipped with PC, projector, overhead projector and microscopes.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Active class participation	5	written exam	30
Practical work	2.5	oral exam	30
Preliminary exam(s)	3x10	…….	
Seminar(s)	2.5		

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.