Course Unit Descriptor

Study Programme: Soil, plant and genetics

Course Unit Title: Biotechnological methods in Plant Breeding

Course Unit Code: 19MZBGO01I008

Name of Lecturer(s): Velimir N. Mladenov

Type and Level of Studies: master 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:

Course Aims:

To familiarize the student with theoretical and practical knowledge in the field of biotechnology and the application of marker-assisted selection in the process of creating new varieties.

Learning Outcomes:

After completing the second degree, with the help of biotechnological methods, students should acquire knowledge that will enable them to shorten the period in the process of creating new varieties.

Syllabus:

Theory

Breeding requirements and objectives. Contribution of breeding and progress through selection cycles. Reproduction of plants. Qualitative and quantitative properties of plants. The structure of DNA. Morphological markers. Molecular markers. Classification of molecular markers. Principles of molecular plant breeding. Use of molecular markers for genetic diversity assessment and germplasm classification. Selection of parental pairs based on the use of molecular markers. Sources of variation in total phenotypic variability. Genomic imbalance, QTL and joint analysis (Linkage Disequilibrium, Quantitative Trait Loci and Associative analysis). Marker-assisted selection (MAS). Molecular techniques (SSR Simple sequence repeats and SNP Single Nucleotide Polymorphism). Genomic selection. Principles of dihaploid production. Interaction between genotype and environment.

Practice

The practice will be followed by teaching units and the students will prepare seminar papers from certain areas, which they will present during the exercises. For the preparation of seminar papers, they will use the latest sources of literature from international journals.

Required Reading:

1. Sleper D.A. and Poehlman J. M. 2006. Breeding Field Crops. Blackwell publishing. University of Missouri. USA
2. Brown J., Caliagari D.S. and Campos A. 2014. Plant Breeding. Wiley Blackwell. Oxford.
3. Acquahh G. 2012. Principles of Plant Genetics and Breeding. Wiley Blackwell. Bowie State University, Maryland. USA.

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

Teaching Methods:

The theoretical part of the teaching is conducted in the faculty lecture halls. Teaching is conducted through teacher lectures and student group work within the given topics.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Active class	20	written exam	30

participation			
Practical work		oral exam	20
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.			