

<b>Study Programme:</b> Soil, plant and genetics		
<b>Course Unit Title:</b> Principles of Genetic Manipulation		
<b>Course Unit Code:</b> 19MZBGO01O001		
<b>Name of Lecturer(s):</b> dr Sofija R. Petrović; dr Borislav M. Banjac		
<b>Type and Level of Studies:</b> Master academic studies, second degree academic studies		
<b>Course Status (compulsory/elective):</b> compulsory		
<b>Semester (winter/summer):</b> winter		
<b>Language of instruction:</b> Serbian		
<b>Mode of course unit delivery (face-to-face/distance learning):</b> face-to-face		
<b>Number of ECTS Allocated:</b> 5		
<b>Prerequisites:</b> none		
<b>Course Aims:</b> Aim of this course is to present students basic genetic processes and laws on higher level than bachelor studies and to connect these with actual procedures of genetic manipulation in the process of plant breeding.		
<b>Learning Outcomes:</b> Student who has finished principles of genetic manipulation master course will be enabled to further upgrade his knowledge through PhD studies and engage with scientific work on various genetic disciplines, as well as doing scientific and expert work in plant breeding.		
<p><b>Syllabus:</b></p> <p><i>Theory</i> <b>1. Introduction lecture</b> (about the subject, history of genetics); <b>2.) Choosing genes for genetic manipulation in agricultural species</b> (defining aimed genes, locating aimed genes, developing needed genetic base, strategy of gene marking, use of aimed genes); <b>3.) Structure of genetic material; 4.) Basics of inheritance</b> (Mendels genetic principles, genetic theory of inheritance, polygenes); <b>5.) Genetic variability sources</b> (gene interactions, random drift, crossing over and gene conversion) <b>6.) Extranuclear inheritance; 7.) Mutations</b> (spontaneous mutations, induced mutations, mutations as molecular markers, techniques of mutation in cell and tissue culture, repair mechanisms); <b>8.) Creating genetic variability</b> (classic hybridization and genetic disjunction); <b>9.) Changes in chromosome numbers</b> (spontaneous polyploidy, induces polyploidy, using polyploids in inducing of genetic variability, haploids in cereal improving); <b>10.) Crossing taxonomically distant parents</b> (newly created genetic variability, overcoming barriers in distant crossing, using of distant crosses); <b>11.) Changes in chromosome structure; 12.) Basic principles of genetic engineering; 13.) Transgene plants; 14.) Revial presentation.</b></p> <p><i>Practice</i> Exercises, other forms of classes, academic experimental work: Structure of genetic material; Principles of Mendels genetics; Cell divisions; Allele gene interactions; Related genes and crossing over; Monogene, bigene and trigene inheritance, Changes in chromosome numbers; Crossing taxonomically distant parents; Changes in chromosome structure.</p>		
<b>Required Reading:</b>		
Borojević, S., Borojević, Katarina: Genetika. Univerzitet u Novom Sadu, Novi Sad, 1976		
Marinković, M., Tucić, N., Kekić, B.: Genetika, Naučna knjiga, Beograd, 1982		
Kraljević-Balalić, Marija, Petrović, S., Vapa, Ljiljana: Genetika, teorijske osnove sa zadacima. Poljoprivredni fakultet, Institut za ratarstvo i povrtarstvo i PMF, Novi Sad, 1991		
Dimitrijević, M., Petrović, Sofija: Genetički modifikovani organizmi. Pitanja i dileme. Zelena mreža Vojvodine, Novi Sad, 2004		
<b>Weekly Contact Hours:</b>	<b>Lectures:</b> 45	<b>Practical work:</b> 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):**

<b>Pre-exam obligations</b>	Points	<b>Final exam</b>	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.