Course Unit Descriptor

Study Programme: Soil, plant and genetics	
Course Unit Title: Basic Principles of Quantitative Genetics	
Course Unit Code: 19MZBGO01O002	
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): compulsory	
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 present students basic genetic processes and laws at big and small population levels and quantifying phenotypic and genotypic variability as well as causes of this variations.

Learning Outcomes: Student who has finished basic principles of quantitative genetics master course will be enabled to further upgrade his knowledge through PhD studies and engage with scientific work on the field of population and quantitative as well as doing scientific and expert team work in plant breeding.

Syllabus:

Theory **1.) Introduction lecture** (basic informations about the course, definition and importance of quantitative genetics); **2.) Genetic structure of the population** (gene and genotype frequency in population, laws of the big population, equilibrium); **3.) Gene frequency changes in population** (mutations, migrations, selection); **4.) Small population and inbreeding** (concept of small population, laws of small population, concept and quantification of relationship); **5.) Components of phenotypic variability** (concept of phenotype, sources of phenotypic variability, sources of genetic variability, interactions); **6.) Genetic determination of quantitative traits** (concept and importance of quantitative traits, gene systems in quantitative traits inheritance); **7.) Heritability** (concept and importance of heritability, calculation of heritability, heritability from hybrid populations); **8.) Combination abilities** (dialel as a method of genetic analysis, conditions for conducting dialel, complete and uncomplete dialel, basic combination abilities, special combination abilities); **9.) Probability** (concept of probability, calculation of probability); **10.) Importance of genetic variability for organism survival** (adaptive value of the organism, genetic load, realization of induced genetic uniformity); **11.) Factors of genetic population evolution** (importance of genetic polymorphism in population, role of evolutional factors in realization of genetic uniformity); **12.) Revial presentation**

Practice Exercises, other forms of classes, academic experimental work: Gene and genotype frequencies in population; Laws of the big population; Equilibrium, Gene frequency changes in population; Small population; Inbreeding; Phenotypic variability components; Gene systems in inheritance of quantitative traits; Heritability; Combination abilities.

Required Reading:

Borojević, S., Borojević, Katarina: Genetika. Univerzitet u Novom Sadu, Novi Sad, 1976

Mišić, Petar: Genetika. Parteon i Institut PKB Agroekonomik, Beograd, 1999

Momirović-Šurlan, Gordana, Rakonjac, Vera, Prodanović, S., Živanović, T.: Genetika i oplemenjivanje biljaka (praktikum). Poljoprivredni fakultet, Univerzitet u Beogradu, Beograd, 2005

Dimitrijević M., Petrović, Sofija: Genetika populacije. Adaptabilnost i stabilnost genotipa. Poljoprivredni fakultet i Naučni

institut za ratarstvo i povrtarstvo, Novi Sad, 2005

Borojević, Katarina: Geni i populacija. Forum, Novi Sad, 1986

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.

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.