

Study Programme: Animal Production
Course Unit Title: Population Genetics
Course Unit Code: 19MST1115
Name of Lecturer(s): Full professor Snežana Trivunović, assistant professor Ljuba Štrbac, teaching assistant Momčilo Šaran
Type and Level of Studies: Master academic studies
Course Status (compulsory/elective): Elective
Semester (winter/summer): Winter
Language of instruction: Serbian, but individual consultations and materials are offered to incoming students in English
Mode of course unit delivery (face-to-face/distance learning): face-to-face
Number of ECTS Allocated: 6
Prerequisites: None
<p>Course Aims:</p> <p>Education of students for the understanding and practical application of the effects and variability of genes in populations, as well as the causes and factors that lead to the disruption of the balance of genes and genotypes in the population, as well as changes in properties and their maintenance in generations of descendants and the evolution of species. Students will learn about the effects of genetic and non-genetic factors, and their interactions on the phenotypic variability of quantitative traits.</p>
<p>Learning Outcomes:</p> <p>A student who systematically and thoroughly understands the laws related to the genetic specificities of quantitative traits and the methods used for their analysis, which will serve him to develop ideas and implement them for the genetic improvement of economically important traits of domestic animals. A student who is familiar with scientific research work in the field of domestic animal breeding through the use and analysis of literature, collecting and interpreting data, making valid judgments for solving certain problems in this field.</p>
<p>Syllabus:</p> <p><i>Theory</i></p> <p>Genetic constitution of the population (frequency of genes and genotypes in the population). Hardy-Weinberg law of large population. Laws of small population. Changes in the frequency of genes and genotypes in the population. Effective population size. Variability of quantitative traits. Interaction between genotype and external environment. Statistical methods in quantitative genetics. Genetic parameters. Breeding value. Selection based on linear models. QTL and genomic selection.</p> <p><i>Practice</i></p> <p>Pedigree analysis. Effective population size. Estimation of variance components. Assessment of genetic parameters. Assessment of breeding values. Assessment of genetic trend.</p>
<p>Required Reading:</p> <ol style="list-style-type: none"> Đedović, R. (2016): Populaciona genetika i oplemenjivanje domaćih i gajenih životinja, Faculty of Agriculture, Belgrade Ervin Zečević, Admir Dokso, Halil Omanović, Muhamed Brka (2015): Populacijska genetika u stočarstvu, Faculty of Agriculture and Food, University of Sarajevo.

3. Meyer K. (2007): WOMBAT – A tool for mixed model analyses in quantitative genetics by REML, J. Zhejiang Uni. SCIENCE B, 8: 815–821.

Weekly Contact Hours:

Lectures: 2

Practical work: 2

Teaching Methods:

The theoretical part of the class is conducted with the use of presentations prepared so that students have a visual representation of the teaching units. Practical teaching takes place in the laboratory for the application of computers and software in the field of population genetics.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	Final exam	points
Active class participation	10	written exam	-
Practical work	30	oral exam	50
Preliminary exam(s)		
Seminar(s)	10		

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