



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali		
ACADEMIC YEAR	2022/2023		
MASTER'S DEGREE (MSC)	FIRM AND QUALITY FOR THE AGRICULTURAL AND FOOD SYSTEM		
SUBJECT	ZOOTECNICAL BIODIVERSITY AND ANIMAL GENETIC IMPROVEMENT		
TYPE OF EDUCATIONAL ACTIVITY	B		
AMBIT	50548-Discipline del miglioramento genetico		
CODE	20936		
SCIENTIFIC SECTOR(S)	AGR/17		
HEAD PROFESSOR(S)	PORTOLANO BALDASSARE	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	6		
INDIVIDUAL STUDY (Hrs)	90		
COURSE ACTIVITY (Hrs)	60		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	PORTOLANO BALDASSARE Monday 10:00 12:00 Palazzo Principe di Napoli, Via Cappuccini, Trapani Wednesday 15:00 17:00 Dipartimento Scienze Agrarie e Forestali - Zootecnica Thursday 15:00 17:00 Dipartimento Scienze Agrarie e Forestali - Zootecnica		

DOCENTE: Prof. BALDASSARE PORTOLANO

PREREQUISITES	Knowledge of quantitative traits genetic and principles of population genetics. Gene Flow and population Structure. Genetic drift and effective population size. Elementary matrix algebra, starting with matrix notation up to matrix multiplication and solutions of simultaneous equations using matrix inversion. The genetic models of quantitative traits: the base genetic model, the infinitesimal genetic model.
LEARNING OUTCOMES	<p>Knowledge and ability to understand: The aims of the course are to provide the students with the necessary tools for the acquisition of basic knowledge of programming and management of genetic and genomic selection of livestock.</p> <p>Ability to apply knowledge and understanding: The course topics were finally selected to give to the students the ability to assess and deal independently the issues concerning the selection and the genetic improvement of livestock production systems of small and large ruminants according to the types of breeding systems.</p> <p>Communicative abilities: The communicative abilities are related to the capacity to use technical language of these disciplines to interface better with the actualities of the livestock farms.</p> <p>Making judgments: One of the expected results of the course is the acquisition of the ability to infer from the results achievable with specific selection schemes, of the ability to assess the entrepreneurial activity, and the productive, reproductive and genetic management of livestock farms.</p> <p>Capacity of Learning: The aims of the course is to provide to the students to acquire the ability to connect and evaluate different factors of production by consulting the latest scientific literature in the field of genetics and genetic improvement of animals.</p>
ASSESSMENT METHODS	The learning is assessed through an interview. In this oral examination the students must answer to at least three questions on the topics of the course, and they have to show an adequate knowledge, acquisition of interpretative skills, capacity of connecting and processing the arguments, as well as a relevant presentation capacity. The final grade will be expressed in thirtieth and will be judged insufficient when the student will demonstrate: difficulty to focus on the proposed topics, a shallow knowledge of the arguments and extreme limited exposure ability. As the degree of details of the proven knowledge increase will proportionally increase the positivity of the grade. The maximum score is obtained in case of excellent mastery and critical-interpretative jurisdiction of the subject content of the course and a good exposition proved by the use of proper scientific terminology.
EDUCATIONAL OBJECTIVES	The aim of the course is to implement the knowledge about selection genetic and genomic management systems of populations and genetic improvement of farm animals.
TEACHING METHODS	The course consists of lessons and exercises in the classroom and in the laboratory. The lessons are aimed to make easier and faster the acquisition of all theoretical information needed for understanding the new breeding strategies. During the course will be studied genetic and genomic selection schemes. The exercises of quantitative genetic (Statistics and their application to quantitative traits, prediction of breeding values and construction of relationships matrix) will take place in the classroom, while exercises for learning of the "Next Generation Sequencing techniques" will take place in the genomic laboratory.
SUGGESTED BIBLIOGRAPHY	Genetica Animale: Applicazioni zootecniche e veterinarie - Giulio Pagnacco - Casa Editrice Ambrosiana - Terza Edizione (2020) - ISBN: 978-88-08-52017-3 Genetics of populations - Philip W. Hedrick Second Edition (2000) - Jones and Bartlett Publishers - ISBN: 0-7637-1076-8

SYLLABUS

Hrs	Frontal teaching
6	Genetic of the quantitative traits: The phenotypes, The genetic model: Effects, Variances and heritability. The parts of infinitesimal genetic model. The genetic model of repeated performances.
6	The genetic index; General rules to estimate selection index, Index Accuracy. The correlated traits, the multiple traits index. Aggregate Economic Genetic Index. From selection index to mixed models.
8	Selection: theory and practice. Breeding goal, Accuracy, Selection intensity and generation interval.
8	Artificial insemination in selection schemes, progeny testing and demography. Expected and Observed Response. Correlated Response. The Breeding Organisation in Italy.
6	Biodiversity and animal genetic resources - The loss of biodiversity: The risk of extinction and genetic erosion, Conservation strategies, conservation objectives, conservation techniques.
11	Genetic management of small populations: Genetic variability within and between breeds, selection and effective number of population, genetic management strategies of small populations.
Hrs	Practice
6	Estimate breeding value (genetic index) with different free software.

Hrs	Practice
6	Estimate relationships matrix with tabular method and inverse of relationships matrix with Henderson rules
3	The DNA amplification by PCR and amplification control on electrophoresis gel.