



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali		
ACADEMIC YEAR	2024/2025		
BACHELOR'S DEGREE (BSC)	MEDITERRANEAN AGRICULTURAL SYSTEMS		
INTEGRATED COURSE	ZOOTECHNICS - INTEGRATED COURSE		
CODE	22851		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	AGR/17, AGR/18		
HEAD PROFESSOR(S)	PORTOLANO BALDASSARE	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)	PORTOLANO BALDASSARE TODARO MASSIMO	Professore Ordinario Professore Associato	Univ. di PALERMO Univ. di PALERMO
CREDITS	12		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	3		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>PORTOLANO BALDASSARE</p> <p>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</p> <p>TODARO MASSIMO</p> <p>Monday 10:00 12:00 Edificio 4 Ingresso G stanza n.18 Thursday 10:00 12:00 Edificio 4 Ingresso G stanza n.18 Friday 08:00 18:00 Al di fuori degli orari indicati tutti gli studenti possono inviare una mail per concordare un incontro</p>		

DOCENTE: Prof. BALDASSARE PORTOLANO

PREREQUISITES	Principles of biology: Knowledge of the structure and function of DNA and RNA: Genes, Genetic Code and genetic variation. Knowledge of Mendelian genetics and principles of population genetics: Gene and Genotypic Frequencies. Knowledge of biology.
LEARNING OUTCOMES	Knowledge and ability to understand: The aims of the course is to provide the students with the necessary tools for the acquisition of basic knowledge of programming and management of animal breeding and genetic selection. 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 of livestock production systems of small and large ruminants according to the types of breeding systems. 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. 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 and reproductive management of livestock farms. 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 animal genetics.
ASSESSMENT METHODS	Oral exam on 5 topics of the program, vote will be in thirty of thirty. Evaluation will be insufficient if the student demonstrates difficulty in focusing on the arguments required. As the degree of detail of the proven knowledge increases, the vote will gradually increase from 18 to 30. The excellent mastery of the topics known and the high capacity of language will determine the maximum vote: 30 cum laude.
TEACHING METHODS	The course consists of lessons and exercises in the classroom. The lessons are aimed to make easier and faster the acquisition of all theoretical information needed for understanding animal nutrition, reproduction and milk production physiology, the new breeding strategies. During the course will be studied the ovine, caprine and bovine breeds and populations. Also they will be studied the rearing techniques and management of small and large ruminants. The exercises of population and quantitative genetic (Hardy-Weinberg law, Statistics and their application to quantitative traits, values and construction of relationships matrix) will take place in the classroom. Compensatory tools and dispensatory measures will be guaranteed by the Disability and Neurodiversity Center - University of Palermo (Ce.N.Dis.) to students with disabilities and neurodiversity, based on specific needs and in implementation of current legislation.

MODULE
GENERAL ZOOTECHNICS AND ANIMAL BIODIVERSITY MANAGEMENT

Prof. BALDASSARE PORTOLANO

SUGGESTED BIBLIOGRAPHY

Genetica Animale: Applicazioni zootecniche e veterinarie - Giulio Pagnacco - Casa Editrice Ambrosiana - Terza Edizione (2020) - ISBN: 978-88-08-52017-3

Fondamenti di Zootecnica - Bittante G., Andrighetto I., Ramanzin M. - Editore Liviana Scolastica- ISBN: 8849470835

AMBIT	50118-Discipline delle scienze animali
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

The aim of the course is to provide the student with the basic knowledge of animal genetics with reference to conventional and innovative strategies of selection, genetic management of populations, including small populations and genetic improvement of animals.

The course also provides the student with the basic knowledge of the territorial organization of the system of selection and genetic improvement in Italy also in light of recent developments in genomic selection and the new regulatory framework governing the genetic management of breeds and livestock populations in Italy.

The acquisition of adequate knowledge on the breeds and populations of bovine, ovine and caprine present on the regional, national and European territory is a further objective that the course aims at in the context of the problem of safeguarding and enhancing livestock biodiversity.

SYLLABUS

Hrs	Frontal teaching
4	Principles of animal genetic. Principles of population genetics. The quantitative traits. Outline on the basic distributions: Binomial, Normal and Standardized Normal. Elements of matrix calculus
2	The Stud Books. The system of the productive controls and the selection in sheep, goat and cows. The new legislation on animal reproduction (Legislative Decree no. 52/2018)
4	The additive relationships. Definition and calculus of the relationships and inbreeding coefficients: the wright and tabular methods. The relationship matrix estimated with Henderson rules.
4	The genetic models of quantitative traits: The phenotype, the base genetic model, the variance of effects. The model with only one gene. The breeding values and the individual genetic merit.
5	The genetic index: General rules for calculating the selection index. Pedigree index. Index with multiple sources of information
4	The genetic progress in animal breeding
2	The molecular markers. Molecular markers useful in animal breeding (SNP's and Microsatellites). Introduction to genomic selection and to Marker Assisted Selection
2	The sheep dairy breed: Comisana, Pinzirita, Valle del Belice, Sarda, Massese, Leccese. The sheep meat breed: Appenninnica, Biellese, Barbaresca, Bergamasca. The Merino sheep breed.
2	The autochthonous sicilian goat breeds: Argentata dell'Etna, Derivata di Siria, Girgentana, Maltese, Messinese. The other oat breeds.
2	The reproduction of the sheep and goat. Natural and artificial insemination. The synchronization of oestrus and deseasonalization. Pregnancy, lactating and weaning.
2	The Italian bovine dairy breed: Frisona, Bruna, Pezzata Rossa e Jersey. The selection scheme of Frisona and Bruna breeds. The Sicilian autochthonous bovine breed: Modicana e Cinisara. The Italian bovine meat breed. The muscle hypertrophy. The meat quality.
3	The milk: the milk secretion. The lactation curve in sheep, goat and cows. The factors affecting the milk production: Endogenous and Exogenous factors. The Milking. The chemical composition of milk. Genetic Polymorphisms at the casein loci. The milk quality and the test-day. The sub-clinical and clinical mastitis (acute and chronic). The Somatic cells.
2	The meat production: the crossing for meat production. The heterosis. Categories of cattle for slaughter. Characteristics of carcasses and note on the meat quality. The SEUROP grid. The slaughtering yield
4	Genetic management of small populations
Hrs	Practice
6	Construction of relationships matrix with Wright, tabular and Henderson method. Construction of inverse relationships matrix with Excel.
6	Estimate breeding value (genetic index) with different free software
6	The DNA amplification by PCR and amplification control on electrophoresis gel

**MODULE
ANIMAL PHYSIOLOGY AND ALIMENTATION**

Prof. MASSIMO TODARO

SUGGESTED BIBLIOGRAPHY

1) Bortolami R., Callegari E., Clavenzani P., Beghelli V. - Anatomia e Fisiologia degli animali domestici. Edagricole. ISBN: 9788850653119

AMBIT	10689-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

Educational Objective is to provide knowledge of anatomy and physiology of major organ systems of domestic animals: the digestive tract, the male and female reproductive tract, the urinary system, the endocrine system and those tied to milk production. They are also in-depth topics related to animal nutrition with particular reference to animal feeds and their evaluation. Discipline is structured so as to provide students, who do not yet possess livestock notions, the foundation for learning technical and management aspects of the breeding animals in livestock production. Such basic knowledge can then be subsequently used by the students for the possible deepening of livestock disciplines in the Magisterial Degree.

SYLLABUS

Hrs	Frontal teaching
1	Presentation of the course
2	Digestive system anatomy in monogastrics and ruminants
3	Physiology of digestion in monogastric
3	Physiology of digestion in ruminant
2	Chemical analysis of animal feeds
2	Urinary tract
3	Male reproductive system
2	Female reproductive system
4	Mammary gland anatomy and physiology of lactation
6	Milk yield and composition
4	Reproductive physiology
2	Endocrine system
8	Feed: forage and concentrate
Hrs	Workshops
4	Chemical analysis of animal feeds
Hrs	Others
14	Visit to a slaughterhouse and/or a dairy farm