

Course Unit	Animal Breeding		Field of study	Animal and Agricultural Productions	
Bachelor in	Zootechnical Engineering		School	School of Agriculture	
Academic Year	2022/2023	Year of study	2	Level	1-2
Type	Semestral	Semester	2	ECTS credits	6.0
		Code		9129-312-2203-00-22	
Workload (hours)	162	Contact hours	T 30	TP -	PL 30
			TC -	S -	E -
			OT 20	O -	

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Vasco Augusto Pilão Cadavez

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. understand that phenotypic traits are influenced by both genetic and environmental effects
2. understand the kindship relationships among individuals and in populations
3. explain how pedigree information can be used to predict animals breeding value
4. explain how farm animal populations can be modified by selection
5. able to predict the genetic merit of the breeding animals and explain the effects of genotype-environment interactions
6. predict the consequences of selection and mating systems on the inbreeding rate of a population
7. explain the negative effects of selection, as well as the strategies to prevent these effects
8. explain the importance of the genetic diversity in farm animals

Prerequisites

Before the course unit the learner is expected to be able to:

1. knowledge concerning the role of the animals in the society: foods, leisure and sport
2. knowledge on cellular biology and genetics
3. knowledge on mathematics and statistics
4. knowledge on animal physiology and reproduction

Course contents

Organization and practical aspects of the animal breeding programs. Steps and principles involved in animal breeding. Selection and mating systems. Applied genetics. Applied statistics. Variation. Estimation of genetic parameters. Breeding value, the precision of the genetic evaluation, ponderation of direct and correlated traits. Response to selection. Crossbreeding. Inbreeding, genetic diversity measurements. Selection programs.

Course contents (extended version)

1. Guidelines for the curricular unit
2. Statistics and their application to genetic improvement
3. Population genetics
4. Quantitative genetics
5. Selection of simply-inherited traits
6. Selection for quantitative traits
7. Heritability and repeatability
8. Factors affecting the rate of genetic improvement
9. Prediction of genetic value
10. Correlated response to selection
11. Large scale genetic evaluation
12. Inbreeding
13. Crossbreeding systems

Recommended reading

1. Bourdon, R. M. , 1999. Understanding animal breeding. 2nd Edition, Prentice hall.
2. Dalton, C. , 1985. An introduction to practical animal breeding. Second Edition, Collins.
3. Falconer, D. S. and T. F. C. Mackay, 1996. Introduction to Quantitative Genetics. Fourth Edition. Longman Group Ltd.
4. Mrode, R. A. , 2005. Linear models for the prediction of animal breeding values. 2nd Edition, Cab International.

Teaching and learning methods

The teaching of this curricular unit is based on presential classes (theoretical and practical). The practical classes include the analysis and interpretation of data, reading, presentation, and discussion of technical and scientific papers. The non-presential component includes the resolution of exercises and the realization of a monograph addressing an animal breeding theme.

Assessment methods

1. Continuous evaluation - (Regular, Student Worker) (Final, Supplementary)
 - Practical Work - 20% (Practical work including the resolution of exercises addressing the subjects taught in classes.)
 - Development Topics - 20% (Literature review on a topic covered in the Curricular Unit.)
 - Final Written Exam - 60% (Final written exam.)
2. Final exam - (Student Worker) (Special)
 - Final Written Exam - 100% (Final written exam addressing the theoretical and practical topics covered by the Curricular Unit.)

Language of instruction

1. Portuguese
2. Spanish
3. English

Electronic validation

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22-12-2022	23-12-2022	03-01-2023	06-01-2023