Course Unit	Bee Science			Field of study	Animal and Agricultural Productions								
Bachelor in	Zootechnical Engineering			School	School of Agriculture								
Academic Year	2022/2023	Year of study	3	Level	1-3	ECTS credits	5.0						
Type	Semestral	Semester	2	Code	9129-312-3201-00-22								
Workload (hours)	135	Contact hours	T 15	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): Sância Maria Afonso Pires

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
Know the importance of beekeeping and its relation with agrarian activities, species and races of honey bees, beekeeping management, production types and technology of hive products.

Prerequisites

Before the course unit the learner is expected to be able to:
Students should have knowledge of biology, genetic, animal breeding and physiology.

Course contents

General considerations of beekeeping history. Survey of the beekeeping activity at a national and international level. Principles of the honeybees' biology. Principal standards for the management, rearing and production of honeybee colonies: apiary management; beekeeping methods and equipment; honeybees' plant resources and products from the hive, their composition and properties. Technology of the hive products. Diseases and predators of honeybees.

Course contents (extended version)

1. Beekeeping generalities Survey of the beekeeping activity at national and international level
2. Species and races of honeybees Taxonomic position Biogeografy of major european subspecies
3. General principles of honeybee's The colony as a social unit Communication systems
4. Honeybees as individual insects Anatomy, physiology and the basis of behavior
5. Reproduction in honeybees Etiology and fisiology Season cycles Sexual differentiation
6. Management of honeybee colonies Apiary management Hives: features Swarming
7. Stand of hives: methods Swarms management methods Queen rearing
8. Artificial alimentation colonies hibernation natural products collected
9. Honeybees' products from the hive: honey, pollen, royal jelly, bee venon, wax, propolis
10. Definitions, composition and properties Technology of hive products and industry application
11. Honeybees diseases Understanding bee diseases Symptoms and spread
12. Prophylaxis and treatment Main parasits and commensals Major predators
13. Honeybees'plant resources Botanical food resources Bees as a pollinator

Recommended reading

1. JEAN-PROST, PIERRE (2007) APICULTURA. Conocimiento de la abeja. Manejo de la colmena. 7ª Ed. Ediciones Mundi-Prensa. Madrid, 726 pp.
2. CRANE, EVA (1990) Bees and beekeeping: science, pratice and world resources. Heine-mann Newnes. Oxford, U. K. , XVII, 614 pp.
3. WINSTON, M L (1987) The biology of the honey bee. Harvard University Press; London, UK; 267 pp.
4. ALPHANDÉRY, RAOUL (1992) La route du miel: le grand livre des abeilles et d'apiculture. Paris, 260 pp.
5. SQUIRE, DAVID (2011) The bee-kind garden. Apian wisdom for your garden. Editions Green Books , U. K. , 96 pp.

Teaching and learning methods

Teaching classes with practices of laboratory and field work). In no present classes, the students will have to produce a work (attendance of the activities carried out in the apiary of the ESAB and/or in other beekeeper apiaries or industry) handing to a teacher over a final report. The tutorial classes will enable the teacher to monitor and assist students in developing the various activities.

Assessment methods

1. Pratices Tests (40%) + Theorical Tests (60%) - (Regular, Student Worker) (Final)
2. Final Written Exam - 100% - (Student Worker) (Final)
3. Final Written Exam - 100% - (Regular, Student Worker) (Supplementary, Special)

Language of instruction

1. Portuguese
2. Spanish

Electronic validation

Sância Maria Afonso Pires	Vasco Augusto Pilão Cadavez	Marieta Amélia Martins Carvalho	Ramiro Corujeira Valentim
20-12-2022	21-12-2022	21-12-2022	22-12-2022