

Course Unit	Aquaculture		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
Type	Semestral	Semester	2	ECTS credits	6.0
Code	9129-312-3202-00-22				
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) Amílcar António Teiga Teixeira

Learning outcomes and competences

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

- Objectives (1): to know the plant and animal species most commonly used in Aquaculture.
- Objectives (2): to learn in different fields like genetics, hygiene and sanity, physiology, anatomy, feeding, reproduction, growth and all the factors related with the life cycle of aquatic organisms.
- Competences (1): capacity to manipulate different production techniques and the main technologies linked to production and transformation and marketing sectors.
- Competences (2): The student will acquire the knowledge that allow the evaluation of technical and economical viability of fishfarms.

Prerequisites

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

Knowledge in biology, anatomy, physiology, sanity, nutrition, genetic improvement.

Course contents

Aquaculture: history, actual status and future perspectives. Hatchery requirements and operations. Aquatic plants and animals. Algae culture: micro and macroalgae; Commonly cultured fish, mollusks and crustaceans in freshwater and seawater environments. Integrated multi-trophic aquaculture. Production techniques. Broodstock, spawning and egg handling. Nutrition and feeding. Fish health management. Biotechnology. Markets: processing and technology. Environmental impact of fishfarms. Legislation.

Course contents (extended version)

- THEORETICAL PROGRAM
 - INTRODUCTION General concepts. History and recent status of aquaculture
 - WATER QUALITY: Physical, chemical and microbiological parameters. Analyses and treatment.
 - CULTURE SYSTEMS: Open, semiclosed and closed systems. Production. Infrastructures.
 - LIVE FISH FOOD: Fitoplankton and zooplankton (rotifera, crustacea)
 - COMMONLY CULTURED FISH: Freshwater and marine species. Biological cycle. Nutrition, reproduction.
 - COMMONLY CULTURED CRUSTACEANS (Shrimp, crawfish species): Biological cycle. Nutrition, reproduction.
 - CULTURED MOLLUSKS (mussels, oysters): Biological cycle. Metabolism, nutrition, reproduction.
 - FEEDING AND DIET DESIGN: Fish feed formulation. Prepared (artificial) diets.
 - PATHOLOGICAL PROCESSES: Diseases, diagnosis and treatment.
 - BIOTECHNOLOGY AND SOCIO-ECONOMICS: Technology, processing, marketing and legislation.
- PRACTICAL PROGRAM
 - Water quality parameters evaluation. Diet analyses. Fish condition evaluation.
 - Investigation work analysis. Visit of different marine and freshwater aquacultures

Recommended reading

- Lekang O.-I. (2020). Aquaculture Engineering, 3rd Ed. Wiley Blackwell. 530 pp.
- Henriques, M. A. (1998). Manual de Aquacultura. Ostra, amêijoia, camarão, truta, salmão, tilápia, enguia, dourada, robalo, pregado. 1ª ed. Projeto Gráfico. 207 pp.
- Lucas, J. S. e Southgate, P. C. (2003). Aquaculture. Farming aquatic animals and plants. Blackwell Publishing Company, Oxford, Reino Unido, 502 pp. .
- Timmons, M.B., Ebeling, J.M. (2013). Recirculating Aquaculture, 3rd Edition, USDA..
- Dinis, M.T. e Rocha R. M. (2021). Introdução à aquacultura. Lidel - Edições Técnicas, Lda, Lisboa, 270 pp.

Teaching and learning methods

Lessons 1) Lectures: sessions will use audiovisual media resources. Laboratory classes- a) field work based on specific methodologies and material applied in fishfarms(e. g. nutrition and reproduction). b) Laboratorial- identification, data treatment and analyses. 2) Tutorial- Practical works started during lectures; Investigation and group works (seminar); library research (B-on).

Assessment methods

- Alternative 1 - (Regular, Student Worker) (Final)
 - Practical Work - 45%
 - Intermediate Written Test - 30%
 - Final Written Exam - 25%
- Alternative 2 - (Regular, Student Worker) (Supplementary)
 - Final Written Exam - 100%
- Alternative 3 - (Regular, Student Worker) (Special)
 - Final Written Exam - 100%

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

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05-12-2022	07-12-2022	07-12-2022	19-12-2022