



## Information about the subject

**Degree:** Bachelor of Degree in Marine Sciences

**Faculty:** Faculty of Veterinary Medicine and Experimental Sciences

**Code:** 273001 **Name:** Aquaculture

**Credits:** 6,00 **ECTS Year:** 3 **Semester:** 2

**Module:** Professional

**Subject Matter:** Marine living resources **Type:** Compulsory

**Department:** Oceanography and Environment

**Type of learning:** Classroom-based learning

**Languages in which it is taught:** Spanish

### Lecturer/-s:

273A Pablo Jose Sanchis Benlloch **(Responsible Lecturer)**

[pj.sanchis@ucv.es](mailto:pj.sanchis@ucv.es)

Jeronimo Chirivella Martorell

[jeronimo.chirivella@ucv.es](mailto:jeronimo.chirivella@ucv.es)



## Module organization

### Professional

Subject Matter	ECTS	Subject	ECTS	Year/semester
Oceanography	36,00	Chemical Oceanography	6,00	3/1
		Geological Oceanography	6,00	3/1
		Marine Biology and Biological Oceanography	6,00	3/1
		Methods in Oceanography I: Physical and Geological	6,00	3/2
		Methods in Oceanography II: Chemical and Biological	6,00	3/2
		Physical Oceanography	6,00	3/1
Marine living resources	12,00	Aquaculture	6,00	3/2
		Fisheries	6,00	3/2
Marine and Coastal Management	18,00	Coastal Planning and Management	6,00	4/1
		Legislation and Economy	6,00	4/1
		Marine Pollution	6,00	4/1



## Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

- R1      The student identifies the main aquaculture productions.
- R2      The student knows the zootechnical fundamentals of captive production of aquatic organisms.
- R3      The student knows and applies the fundamentals of aquaculture engineering to the design and operation of aquaculture facilities.
- R4      The student recognizes the environmental and socioeconomic implications of aquaculture.
- R5      The student develops breeding plans for aquaculture facilities.
- R6      The student manages small-scale marine crops.
- R7      The student understands conceptually and values the importance of the study of aquaculture in the context of today's science and society, and of oceanography in particular.
- R8      The student prepares reports and makes valid judgements on various aspects of the study of living marine resources.
- R9      The student relates the theoretical and practical contents through works and assigned tasks.



## Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

BASIC		Weighting			
		1	2	3	4
CB2	Students are able to apply knowledge to their work in a professional way and have the competences enabling them to state and defend views and opinions as well as perform problem-solving tasks in their field of study.				X
CB4	Command of a foreign language			X	
CB5	Students develop the necessary learning skills to undertake further studies with a high level of autonomy.				X

GENERAL		Weighting			
		1	2	3	4
CG1	Capacity to analyze and synthesize				X
CG2	Capacity to organize and plan				X
CG3	Mastering Spanish oral and written communication			X	
CG5	Knowing and applying Basic ITC skills related to marine science			X	
CG6	Capacity to manage information (capacity to look for and analyze information coming from different types of sources)				X
CG7	Decision making			X	
CG8	Capacity to work in interdisciplinary and multidisciplinary team			X	
CG9	Interpersonal skills			X	
CG10	Critical and self-critical capacity			X	



CG11	Capacity to learn				X
CG12	Capacity to adapt to new situations			X	
CG13	Capacity to produce new ideas (creativity)		X		
CG14	Leadership abilities.	X			
CG16	Capacity to apply theoretical knowledge			X	
CG17	Research skills			X	
CG18	Sensibility to environmental issues.			X	

SPECIFIC		Weighting			
		1	2	3	4
CE3	Knowing basic market economy techniques related to marine resources			X	
CE4	Understanding laws regulating use of marine resources and environment		X		
CE5	Applying marine environment use planning techniques as well as resource sustainable management				X
CE8	Identifying and analyzing new problems and proposing solution strategies			X	
CE9	Knowing how to carry out experiments and measurements both in the laboratory and during sample collection			X	
CE10	Knowing how to use planning, designing and implementing research tools while surveying and assessing results		X		
CE11	Knowing how to do fieldwork and laboratory experiments in a safe and responsible way, promoting teamwork			X	
CE13	Looking for and assessing different kinds of marine resources			X	
CE17	Developing training programs for marine and coastal areas		X		



CE19 Deeply understanding operating systems of maritime orientated companies, identifying their problems and proposing solutions

X

CE20 Mastering practical use of models, including new data for validation, improvement and development of models

X

## Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3, R4, R5, R7	50,00%	Written test with theoretical and practical questions
R1, R5, R6	30,00%	Delivery of guided assignments, whose objectives and contents will be proposed by the teacher
R6	10,00%	Laboratory test
R5, R7	10,00%	Oral presentation

### Observations

\* It is necessary to obtain a grade greater than or equal to 5 in all tests in order to average. This course is not eligible for single evaluation. According to the general evaluation and qualification regulations, the preferred evaluation system will be by means of continuous evaluation. Specifically:

In the evaluation item 'Laboratory test' the performance of each student will be monitored with an experiment that extends throughout all the practical sessions, analysing the results obtained at the end of each one. The final assessment of this item will also consist of the delivery of an individual report reflecting and interpreting the results obtained throughout the different practical sessions. Therefore, **attendance at practical sessions is mandatory**.

In the assessment item 'Delivery of guided assignments, whose objectives and contents will be proposed by the teacher', the performance of each student will be monitored at the beginning of each practical computer class in the completion of the exercise worked on in the previous session. The final assessment of this item will consist of the delivery of the exercises carried out in the practical computer sessions and a final report based on their own results and those contrasted with those of the rest of the working groups.

The use of artificial intelligence (AI)-based tools is subject to the discretion of the teacher, who may establish specific limits or conditions depending on the training or assessment activity.



## MENTION OF DISTINCTION:

In accordance with the regulations governing the assessment and grading of subjects in force at UCV, the distinction of "Matrícula de Honor" (Honours with Distinction) may be awarded to students who have achieved a grade of 9.0 or higher. The number of "Matrículas de Honor" (Honours with Distinction) may not exceed five percent of the students enrolled in the group for the corresponding academic year, unless the number of enrolled students is fewer than 20, in which case a single "Matrícula de Honor" (Honours with 9 Distinction) may be awarded. Exceptionally, these distinctions may be assigned globally across different groups of the same subject. Nevertheless, the total number of distinctions awarded will be the same as if they were assigned by group, but they may be distributed among all students based on a common criterion, regardless of the group to which they belong. The criteria for awarding "Matrícula de Honor" (Honours with Distinction) will be determined according to the guidelines stipulated by the professor responsible for the course, as detailed in the "Observations" section of the evaluation system in the course guide.

## Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

- M1 Teacher presentation of contents, analysis of competences, explanation and in-class display of skills, abilities and knowledge.
- M2 Group work sessions supervised by the professor. Case studies, diagnostic tests, problems, field work, computer room, visits, data search, libraries, on-line, Internet, etc. Meaningful construction of knowledge through interaction and student activity.
- M3 Activities carried out in spaces with specialized equipment.
- M4 Supervised monographic sessions with shared participation.
- M5 Application of multidisciplinary knowledge.
- M6 Personalized and small group attention. Period of instruction and/or guidance carried out by a tutor to review and discuss materials and topics presented in classes, seminars, readings, papers, etc.
- M8 Set of oral and/or written tests used in initial, formative or additive assessment of the student.



- M9 Group preparation of readings, essays, problem-solving, seminars, papers, reports, etc. to be presented or submitted in theoretical , practical and/or small-group tutoring sessions. Work done on the university e-learning platform ([www.plataforma.ucv.es](http://www.plataforma.ucv.es) )
- M10 Student's study: Individual preparation of readings, essays, problem-solving, seminars, papers, reports, etc. to be presented or submitted in theoretical, practical and/or small-group tutoring sessions. Work done on the university e-learning platform ( [www.plataforma.ucv.es](http://www.plataforma.ucv.es) ).





## IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
ON-CAMPUS CLASS M1	R1, R2, R3, R4, R7, R8	28,00	1,12
PRACTICAL CLASSES M2	R5, R7, R8, R9	16,00	0,64
LABORATORY M3	R6, R7, R8, R9	8,00	0,32
SEMINAR M4	R1, R2, R3, R4, R7, R8	2,00	0,08
GROUP PRESENTATION OF ASSIGNMENTS M5	R1, R2, R5, R7, R8, R9	2,00	0,08
TUTORIAL M6	R1, R2, R3, R4, R5, R6, R8, R9	2,00	0,08
ASSESSMENT M8	R1, R2, R3, R4, R7, R8	2,00	0,08
<b>TOTAL</b>		<b>60,00</b>	<b>2,40</b>

## LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
GROUP WORK M9	R5, R7, R8, R9	40,00	1,60
INDEPENDENT WORK M10	R1, R2, R3, R4, R5, R6, R7, R8, R9	50,00	2,00
<b>TOTAL</b>		<b>90,00</b>	<b>3,60</b>



## Description of the contents

Description of the necessary contents to acquire the learning outcomes.

### Theoretical contents:

Content block	Contents
DIDACTIC UNIT I: INTRODUCING AQUACULTURE	Chapter 1. Introduction: definition and concept; goals; production systems; state-of-art and prospects.
DIDACTIC UNIT II: BIOLOGICAL AND ZOO-TECHNICAL PRINCIPLES FOR FINFISH AQUACULTURE	Chapter 2: Aquaculture nutrition: feeding behavior; nutritional and energetic requirements. Chapter 3: Aquaculture feeding I: assistant cultures: microalgae. Chapter 4: Aquaculture feeding II: assistant cultures: rotifer. Chapter 5: Aquaculture feeding III: assistant cultures: brine shrimp. Chapter 6: Aquaculture feeding IV: artificial diets. Chapter 7: Finfish reproduction in aquaculture. Chapter 8: Larval rearing in finfish. Chapter 9: Farming finfish: pre-on-growing and on-growing
DIDACTIC UNIT III: AQUACULTURE ENGINEERING PRINCIPLES	Chapter 10: Water as living support for aquaculture. Chapter 11: Design and management of land-based fish farms; requirements, supplying and treatment of water. Chapter 12: Design and management of sea cages.
DIDACTIC UNIT IV: AQUACULTURE AS SUSTAINABLE ECONOMIC ACTIVITY	Chapter 13: Aquaculture an environment interaction.



## Organization of the practical activities:

	Content	Place	Hours
PR1.	Manages laboratory marine cultures.	Laboratory	8,00
PR2.	Elaborates production models for aquaculture farms.	Computer	12,00
PR3.	Technical visit to land based fish farm	Technical visit	2,00
PR4.	Technical visit to sea cages fish farm	Technical visit	2,00

## Temporary organization of learning:

Block of content	Number of sessions	Hours
DIDACTIC UNIT I: INTRODUCING AQUACULTURE	2,00	4,00
DIDACTIC UNIT II: BIOLOGICAL AND ZOO-TECHNICAL PRINCIPLES FOR FINFISH AQUACULTURE	17,00	34,00
DIDACTIC UNIT III: AQUACULTURE ENGINEERING PRINCIPLES	10,00	20,00
DIDACTIC UNIT IV: AQUACULTURE AS SUSTAINABLE ECONOMIC ACTIVITY	1,00	2,00



## References

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BROWN, L. ACUICULTURA PARA VETERINARIOS. ACRIBIA 2000  
JOHN S. LUCAS, PAUL C. SOUTHGATE. AQUACULTURE: FARMING AQUATIC ANIMALS AND PLANTS, 2nd Edition, Wiley-Blackwell January 2012.

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