Information about the subject

Degree: Bachelor of Degree in Marine Sciences

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 272006 **Name:** Marine Microbiology

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

Module: Transversal Knowledge and Techniques in Marine Sciences

Subject Matter: Organisms and Systems **Type:** Compulsory

Department: Oceanography and Environment

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

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Module organization

Transversal Knowledge and Techniques in Marine Sciences

Subject Matter	ECTS	Subject	ECTS	Year/semester
Organisms and Systems	30,00	Marine Botany	6,00	2/2
		Marine Ecology	6,00	3/2
		Marine Microbiology	6,00	2/2
		Marine Zoology	6,00	2/1
		Physiology of Marine Organisms	6,00	2/2
Marine Geology	12,00	Geophysics and Tectonics	6,00	2/1
		Sedimentology	6,00	2/2
Geographic Information Systems and Remote Sensing	6,00	Geographic Information Systems and Remote Sensing	6,00	2/1
Statistics	6,00	Applied Statistics	6,00	2/1

Recommended knowledge

Chemistry and biology knowledge.

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 values the importance of Mediterranean communities and their complexity by showing sensitivity to their conservation and protection.

R2 The student knows and uses basic techniques for the collection of organisms in coastal sampling.

R3 The student is able to work in a laboratory performing correctly the basic operations both in the planning and development of each of the laboratory practices.

R4 The student knows and understands with a critical attitude, the concepts that are included in the subject of microbiology.

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			
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	
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			
CG16	Capacity to apply theoretical knowledge				x
CG18	Sensibility to environmental issues.				x

SPECIFIC		Weighting			
		1	2	3	4
CE2	Knowing basic sampling techniques of water column, organisms, sediment and sea-bottoms as well as basic techniques of dynamic and structural variable measurement			x	
CE7	Collecting, assessing, processing and interpreting oceanographic data, following the most recent theories	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	
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		

Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3, R4	50,00%	Written test with theoretical and practical questions
R1, R4	20,00%	Delivery of guided assignments, whose objectives and contents will be proposed by the teacher
R2, R3, R4	20,00%	Laboratory test
R1, R4	10,00%	Oral presentation

Observations

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: Supervised work will be assessed using a continuous assessment system through deliveries, where the progress of the work will be reviewed.
In addition, spelling mistakes, grammatical inconsistencies and sms language appearing in works, exams or other evaluation instruments will result in a discount on the final score of the evaluation instrument.
In order to apply all the percentages indicated in the previous table, the student will have to obtain in each part a score equal to or greater than 5, except for some work according to the lecturer´s criteria.
Attendance to the laboratory practices is MANDATORY.
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)

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).

IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
ON-CAMPUS CLASS M1	R1, R4	33,00	1,32
PRACTICAL CLASSES M2	R2, R3, R4	7,00	0,28
LABORATORY M3	R2, R3, R4	9,00	0,36
SEMINAR M4	R1, R4	3,00	0,12
GROUP PRESENTATION OF ASSIGNMENTS M5	R1, R4	2,00	0,08
TUTORIAL M6	R1, R2, R3, R4	4,00	0,16
ASSESSMENT M8	R1, R2, R3, R4	2,00	0,08
TOTAL		**60,00**	**2,40**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
GROUP WORK M9	R1, R2, R3, R4	18,00	0,72
INDEPENDENT WORK M10	R1, R4	72,00	2,88
TOTAL		**90,00**	**3,60**

Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
DIDACTIC UNIT 1	CHAPTER 1. Introduction to Microbiology. What is Marine Microbiology?.
	CHAPTER 2. Methods of study of microorganisms. Methods in marine microbiology.
	CHAPTER 3. Structure and function in prokaryotes and eukaryotes.
	CHAPTER 4. Nutrition and microbial metabolism.
	CHAPTER 5. Growth and environment.
DIDACTIC UNIT 2	CHAPTER 6. Major groups of prokaryotes, viruses and fungus.
DIDACTIC UNIT 3	CHAPTER 7. The role of microbes in ocean processes.
	CHAPTER 8. Interactions of microorganisms with other aquatic organisms.
	CHAPTER 9. Diseases caused by marine microorganisms.
	CHAPTER 10. Microbiological contamination of the marine environment.
	CHAPTER 11. Beneficial and harmful effects of marine microorganisms.

DIDACTIC UNIT 4

Practice 1. Laboratory of Microbiology. Preparation of culture media.

Practice 2. Isolation and growth of microorganisms.

Practice 3. Microscopy. Stains.

Practice 4. Determining the microbiological contamination of the marine environment.

Practice 5. Bacterial activities and identification.

Practice 6. Determination of the sensitivity of bacteria to antimicrobial agents. Antibiogram.

Practice 7. Analysis and interpretation of results.

Organization of the practical activities:

	Content	Place	Hours
PR1.	Laboratory of Microbiology. Preparation of culture media.	Laboratory	2,00
PR2.	Isolation and growth of microorganisms.	Laboratory	2,00
PR3.	Microscopy. Stains.	Laboratory	2,00
PR4.	Determining the microbiological contamination of the marine environment.	Laboratory	2,00
PR5.	Bacterial activities and identification.	Laboratory	2,00
PR6.	Determination of the sensitivity of bacteria to antimicrobial agents. Antibiogram.	Laboratory	2,00
PR7.	Analysis and interpretation of results.	Lecture room	4,00

Temporary organization of learning:

Block of content	Number of sessions	Hours
DIDACTIC UNIT 1	9,00	18,00
DIDACTIC UNIT 2	11,00	22,00
DIDACTIC UNIT 3	2,00	4,00
DIDACTIC UNIT 4	8,00	16,00

References

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