Information about the subject

Degree: Bachelor of Degree in Marine Sciences

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 270227 **Name:** Marine Biotechnology

Credits: 6,00 **ECTS Year:** 2, 3, 4 **Semester:** 1

Module: Optional Itinerary: Marine Biotechnology

Subject Matter: Marine Biotechnology **Type:** Elective

Department: Oceanography and Environment

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

OPM11	Pablo Jose Sanchis Benlloch **(Responsible Lecturer)**	pj.sanchis@ucv.es
OPM7	Pablo Jose Sanchis Benlloch **(English Responsible Lecturer)**	pj.sanchis@ucv.es

Module organization

Optional Itinerary: Marine Biotechnology

Subject Matter	ECTS	Subject	ECTS	Year/semester
Marine Biotechnology	6,00	Marine Biotechnology	6,00	2, 3, 4/1
Instrumental Techniques	6,00	Instrumental techniques	6,00	This elective is not offered in the academic year 24/25
Sea Food Technology	6,00	Sea Food Technology	6,00	2, 3, 4/1
Genetic Engineering	6,00	Gene Techniques	6,00	This elective is not offered in the academic year 24/25
Food Technology	6,00	Food Technology II	6,00	This elective is not offered in the academic year 24/25
Food Hygiene and Safety	6,00	Food Hygiene and Safety	6,00	This elective is not offered in the academic year 24/25

Recommended knowledge

Knowledge adquired in subjects such as Biology, Chemistry and Biochemistry.

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 is qualified to make a bibliographical revision and can analyze it with a critical and constructive spirit.

R2 The student is able to exercise his/her professional activity with an awareness of its impact and social and scientific responsibility.

R3 The student has an overview of the techniques and methodologies in Marine Sciences.

R4 The student is able to draw up a report and a research paper.

R5 The student is able to choose a research objective and draw up a work plan.

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		
CB3	Students are able to collect and interpret relevant data (generally in their field of study) and give opinions that involve reflection on relevant social, scientific or ethical issues.			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	
CG16	Capacity to apply theoretical knowledge			x	
CG17	Research skills				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		
CE5	Applying marine environment use planning techniques as well as resource sustainable management			x	
CE6	Applying marine instrument techniques				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	
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
CE22	Practical experience of methods of marine environmental impact assessment		x		

Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R2, R3, R5	50,00%	Written test with theoretical and practical questions
R1, R4, R5	30,00%	Delivery of guided assignments, whose objectives and contents will be proposed by the teacher
R1, R5	10,00%	Problem-solving and issues related to the use of specific software
R4, R5	10,00%	Oral presentation

Observations

According to the general evaluation and qualification regulations, the preferred evaluation system will be by means of continuous evaluation. Specifically:
The evaluation item “Delivery of guided assignments, whose objectives and contents will be proposed by the professor” will be evaluated following a continuous evaluation system by means of deliveries in which the evolution of the work will be reviewed.
A minimum of 5 over 10 must have been obtained in each of the different evaluation systems in order to obtain a passing grade.

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, M6	R1, R2, R3, R5	30,00	1,20
PRACTICAL CLASSES M2	R2, R3, R5	18,00	0,72
SEMINAR M4	R1, R4	3,00	0,12
GROUP PRESENTATION OF ASSIGNMENTS M5	R3, R4, R5	4,00	0,16
TUTORIAL M6	R2, R5	3,00	0,12
ASSESSMENT M8	R1, R2, R3, R4, R5	2,00	0,08
TOTAL		**60,00**	**2,40**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
GROUP WORK M9	R2, R3, R5	30,00	1,20
INDEPENDENT WORK M10	R1, R2, R3, R4	60,00	2,40
TOTAL		**90,00**	**3,60**

Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
UNIT 1. Introduction to Marine Biotechnology	1.1. Marine organisms VS Terrestrial organisms 1.2. Definition of secondary metabolite and characteristics 1.3. Bioprospecting techniques and characterization of secondary metabolites
UNIT 2. Biotechnological applications in marine animals.	2.1.Sponges 2.2. Cnidarians 2.3. Annelids 2.4. Mollusks 2.5. Lofophore 2.6. Crustaceans 2.7. Echinoderms 2.8. Tunicates 2.9. Fishes
UNIT 3. Environmental biotechnological applications	3.1. Treatment technology 3.2. Bioremediation 3.3. On-site technologies 3.4. Ex situ technologies
UNIT 4. Biotechnological applications to food security. Applications in aquaculture	4.1. Importance of aquaculture 4.2. Biotechnology and aquaculture 4.3. Manipulation of reproduction 4.4. Recombinant hormones 4.5 Chromosome manipulation 4.6. Molecular genetics and diagnostic 4.7.Selection breeding programs

UNIT 5. Biotechnological applications in animal and human health	5.1. Case study: biotechnological applications in animal and human health. 5.1. Importance of biomaterials 5.2. Types of biomaterials 5.3. Biomaterials of marine origin 5.4. Chitosan and alginate for oral delivery of drugs in marine species
UNIT 6. Biotechnological applications of macro and microalgae	6.1 Macro and microalgae cultivation techniques 6.2 Biotechnological applications of macro and microalgae
UNIT 7. The marine biotechnology research field	7.1. Marine biotechnology as a discipline 7.2. Expansion of biotechnological applications 7.3. Marine biotechnology and public policy

Organization of the practical activities:

	Content	Place	Hours
PR1.	UNIT 2	Laboratory	1,50
PR2.	UNIT 3	Laboratory	2,00
PR3.	UNIT 4	Laboratory	2,00
PR4.	UNIT 5	Laboratory	1,50
PR5.	UNIT 6	Laboratory	2,00

Temporary organization of learning:

Block of content	Number of sessions	Hours
UNIT 1. Introduction to Marine Biotechnology	3,00	6,00
UNIT 2. Biotechnological applications in marine animals.	5,00	10,00
UNIT 3. Environmental biotechnological applications	4,00	8,00
UNIT 4. Biotechnological applications to food security. Applications in aquaculture	5,00	10,00
UNIT 5. Biotechnological applications in animal and human health	5,00	10,00
UNIT 6. Biotechnological applications of macro and microalgae	5,00	10,00
UNIT 7. The marine biotechnology research field	3,00	6,00

References

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