



## Information about the subject

**Degree:** Bachelor of Science Degree in Biotechnology

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

**Code:** 1102023 **Name:** Sea Food Technology

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

**Module:** Elective Courses

**Subject Matter:** Sea Food Technology **Type:** Elective

**Department:** -

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

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

**Lecturer/-s:**



## Module organization

### Elective Courses

Subject Matter	ECTS	Subject	ECTS	Year/semester
Marine Biotechnology	6,00	Marine Biotechnology	6,00	3, 4/1
Pharmacology and Toxicology	6,00	Pharmacology and Toxicology	6,00	3/1
R&D in Marine Sciences	6,00	R&D in Marine Sciences	6,00	3, 4/1
Sea Food Technology	6,00	Sea Food Technology	6,00	3, 4/1
Instrumental Techniques of Marine Analysis	6,00	Instrumental Techniques of Marine Analysis	6,00	This elective is not offered in the academic year 24/25
Genetic Techniques Applied to the Marine Environment	6,00	Genetic Techniques Applied to the Marine Environment	6,00	This elective is not offered in the academic year 24/25
Principles of Food Biotechnology	6,00	Food Biotechnology	6,00	3, 4/1
Plant Tissue and Cell Culture	6,00	Plant Tissue and Cell Culture	6,00	This elective is not offered in the academic year 24/25
Molecular Phytopathology	6,00	Molecular Phytopathology	6,00	3, 4/1
Agricultural Plant Breeding	6,00	Agricultural Plant Breeding	6,00	This elective is not offered in the academic year 24/25



Seed Physiology and Molecular Biology	6,00	Seed Physiology and Molecular Biology	6,00	This elective is not offered in the academic year 24/25
Biocontrol for Crop Protection	6,00	Biocontrol for Crop Protection	6,00	This elective is not offered in the academic year 24/25
Agrigenomics	6,00	Agrigenomics	6,00	This elective is not offered in the academic year 24/25
Food Microbiology and Toxicology	6,00	Food Microbiology and Toxicology	6,00	This elective is not offered in the academic year 24/25
Biomolecular Modeling	6,00	Biomolecular Modeling	6,00	This elective is not offered in the academic year 24/25
Pharmaceutical Engineering and Drug Design	6,00	Pharmaceutical Engineering and Drug Design	6,00	4/1
Gene Therapy	6,00	Gene Therapy	6,00	4/1
Molecular Pathology	6,00	Molecular Pathology	6,00	4/1
Clinical Biotechnology	6,00	Clinical Biotechnology	6,00	This elective is not offered in the academic year 24/25
Immunology	6,00	Immunology	6,00	3/1
Principles of Environmental Biotechnology	6,00	Environmental Biotechnology	6,00	This elective is not offered in the academic year 24/25



Biosensors	6,00	Biosensors	6,00	This elective is not offered in the academic year 24/25
Environmental Engineering	6,00	Environmental Engineering	6,00	This elective is not offered in the academic year 24/25
Bioremediation	6,00	Bioremediation	6,00	This elective is not offered in the academic year 24/25
Environmental Toxicology	6,00	Environmental Toxicology	6,00	This elective is not offered in the academic year 24/25
Bioindicadores	6,00	Bioindicators	6,00	3, 4/1

### Recommended knowledge

No specific prior knowledge is required



## 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 has understood and assimilated the contents of the subject.
- R2      The student is able to solve problems or case studies related to the subject contents, by using different resources (bibliographic, IT, etc.)
- R3      The student is able to work in a laboratory, carrying out basic operations correctly and taking into account the corresponding safety standards. He/she understands the planning, development and purpose of the experience, and is able to contrast and validate the obtained results.
- R4      The student is able to write an intelligible and organized text on different aspects of the subject.
- R5      The student is able to present and defend his/her work adequately.
- R6      The student seeks bibliographic information from different sources and can analyze it with a critical and constructive spirit.
- R7      The student collaborates with the teacher and his/her peers throughout the learning process; he/she works in a team; treats everyone with respects, is proactive and fulfills the organization rules of the course.



## 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
CB1	Students acquire and understand knowledge in their field of study based on general secondary education but usually reaching a level that, although supported on advanced text books, also includes aspects involving state-of-the-art knowledge specific to their area.		X		
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	
CB4	Students can communicate information, ideas, problems and solutions to a specialized or non-specialized audience.				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
CG01	Capacity to analyze and synthesize.				X
SPECIFIC		Weighting			
		1	2	3	4
CE22	Knowing and understanding contents, principles and theories related to biotechnology.		X		



CE23	Knowing how to use laboratory equipment and to carry out basic operations for each discipline including: safety measures, handling, waste disposal and activity register.				X
CE24	Knowing basic and instrument laboratory techniques in the different areas of biotechnology.			X	
CE25	Knowing how to analyze and understand scientific data related to biotechnology.		X		
CE26	To understand and identify the mechanisms that influence genetic inheritance	X			
CE27	Knowing and applying action plans and assessment criteria of biotechnology processes.			X	
CE28	Integrating life science and Engineering into processes of development of biotechnological products and applications.			X	
CE29	Contrasting and checking results of biotechnological experimentation.		X		
CE30	Solving and analyzing problems posed by biotechnology.				X
CE31	Describing and calculating important variables of processes and experiments.			X	
CE32	Knowing how to use different specific operating systems and software packages designed for Biotechnology.	X			
CE33	Knowing and complying with legislation and ethics of biotechnological processes and applications.				X
CE34	Knowing main characteristics of Molecular biosciences and biotechnology communication.	X			

## TRANSVERSAL

## Weighting

	1	2	3	4
CT02 Capacity to organize and plan.				X
CT03 Mastering Spanish oral and written communication.				X
CT05 Knowing and applying Basic ITC skills related to Biotechnology.		X		
CT06 Capacity to manage information (capacity to look for and analyze information coming from different types of sources).			X	



CT07	Problem solving.				X
CT08	Decision making				X
CT09	Capacity to work in interdisciplinary and multidisciplinary team.				X
CT10	Interpersonal skills.				X
CT11	Understanding multicultural and diverse environment	X			
CT12	Critical and self-critical capacity.				X
CT13	Ethics.		X		
CT14	Capacity to learn				X
CT15	Capacity to adapt to new situations				X
CT16	Capacity to produce new ideas (creativity)				X
CT19	Capacity to apply theoretical knowledge				X
CT20	Research skills		X		
CT21	Sensitivity to environmental issues			X	





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

Assessed learning outcomes	Granted percentage	Assessment method
R1, R4, R5	50,00%	Written test
R2, R4, R5, R6, R7	40,00%	Submission of papers
R1, R3, R4, R5, R6, R7	10,00%	Laboratory test

### Observations

Forms of evaluation:

The written test will consist of a multiple choice test, only one of the answers is true (wrong answers will subtract) and short questions that will include both aspects seen in class, as well as possible seminars and visits.

The different works, whose objectives and contents will be proposed by the teacher will consist of a serie of group or individual work activities and rapid classroom tests that will be developed throughout the practical classroom classes that are carried out. Recovery will only be allowed in case of excused absence to class, otherwise it will count as not delivered and will be 0 in it.

Classroom practical classes have no possibility of recovery in exams. In the group work exhibition, the content of the presentation and the exhibition will be assessed both individually and collectively.

The practical laboratory test will be carried out in the laboratory or in the classroom after finishing it. Not going to de practice session proposal will prevent the student from doing the exam. Within this assessment, the student's attitude in the laboratory will also be taken into account. If it were suspended it would be recovered in the second examination session.

### MENTION OF DISTINCTION:

According to Article 22 of the Regulations governing the Evaluation and Qualification of UCV Courses, the mention of "Distinction of Honor" may be awarded by the professor responsible for the course to students who have obtained, at least, the qualification of 9 over 10 ("Sobresaliente"). The number of "Distinction of Honor" mentions that may be awarded may not exceed five percent of the number of students included in the same official record, unless this number is lower than 20, in which case only one "Distinction of Honor" may be awarded.



## 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.
- M7 Set of oral and/or written tests used in initial, formative or additive assessment of the student
- M8 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.
- M9 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.



## IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
ON-CAMPUS CLASS M1	R1, R2, R3, R4, R5, R6, R7	30,00	1,20
PRACTICAL CLASSES M2	R1, R2, R4, R5, R6, R7	11,50	0,46
LABORATORY M3	R1, R3, R7	3,00	0,12
SEMINAR M4	R1	2,30	0,09
GROUP PRESENTATION OF ASSIGNMENTS M5	R1, R2, R4, R5, R6, R7	8,20	0,33
TUTORIAL M6	R1, R2, R4, R5, R6, R7	3,00	0,12
ASSESSMENT M7	R1, R2, R3, R4, R5, R6, R7	2,00	0,08
<b>TOTAL</b>		<b>60,00</b>	<b>2,40</b>

## LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
AUTONOMOUS GROUP WORK M8	R1, R2, R4, R5, R6, R7	18,30	0,73
AUTONOMOUS INDIVIDUAL WORK M9	R1, R2, R4, R5, R6	71,70	2,87
<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
I.- INTRODUCTION: FOOD TECHNOLOGY OF MARINE ORIGIN. LEGISLATION AND FOOD SECURITY	<p>Unit 1. Food technology. Live marine resources that can be used as food. Production techniques: extractive fishing and aquaculture. Industries derived from fishing</p> <p>Unit 2 Legislation related to the marine food industry</p> <p>Unit 3 Food security in foods of marine origin: design of HACCP plans.</p> <p>Unit 4. Chemical and nutritional properties of foods of marine origin. Post-capture and sacrifice manipulation, biochemistry and microbiology.</p>



## II.- PROCESSING TECHNOLOGY OF MARINE ORIGIN FOODS.

Unit 5. Basic concepts of food technology. Final consumer, requirements of processed foods. Sensory evaluation of marine foods

Unit 6. Introduction to the forms of conservation and presentation to consumption. Labeled

Unit 7. Main techniques of food analysis: nutritional composition (determination of humidity, ashes, proteins, fat) and food safety (microbiological analysis)

Unit 8. Conservation techniques by cold: fresh, chilled and frozen foods.

Unit 9. Conservation techniques through salting and drying.

Unit 10. Conservation techniques through smoking.

Unit 11. Conservation techniques through heat treatments: pasteurization, sterilization. Preparation of semi-preserves and preserves

Unit 12. Development of products based on fish muscle. Precooked and cooked foods. By-products

Topic 13. Biotechnology applied to the food industry

## III.- PRACTICAL BLOCK

### **Laboratory practices:**

Analysis of water retention capacity (CRA), moisture, ash and protein

Sensory analysis Determination of fat percentage and enzymatic browning

Development of a product of marine origin

### **Classroom practices:**

Analysis of ingredients of marine origin

Preparation of product technical sheet

Elaboration of flow diagrams



## Organization of the practical activities:

	Content	Place	Hours
PR1.	Analysis of water retention capacity (CRA), moisture, ash and protein	Laboratory	2,00
PR2.	Sensory analysis	Laboratory	2,00
PR3.	Determination of fat percentage and enzymatic browning. Part I	Laboratory	2,00
PR4.	Determination of fat percentage and enzymatic browning. Part II	Laboratory	2,00
PR5.	Development of a product of marine origin	Laboratory	2,00
PR6.	Analysis of ingredients of marine origin	Lecture room	1,50
PR7.	Preparation of product technical sheet	Lecture room	1,50
PR8.	Elaboration of flow diagrams	Lecture room	1,50

## Temporary organization of learning:

Block of content	Number of sessions	Hours
I.- INTRODUCTION: FOOD TECHNOLOGY OF MARINE ORIGIN. LEGISLATION AND FOOD SECURITY	2,00	4,00
II.- PROCESSING TECHNOLOGY OF MARINE ORIGIN FOODS.	20,75	41,50
III.- PRACTICAL BLOCK	7,25	14,50



## References

### BIBLIOGRAPHY:

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- BENITEZ M. 2013. Tecnología del pescado. IC.
- BONET M. 2013. Elaboración de congelados de productos de la pesca. IC.
- CAMPOS R. 2013. Acondicionado del pescado y marisco. IC.
- CANOURA J. 2013. Elaboración de masas, pastas, precocinados y cocinados de pescado. IC
- EVANS, JUDITH A. 2018. Ciencia y Tecnología de los alimentos congelados. ACRIBIA
- FELLOWS, PETER. 2018. Tecnología del procesado de los alimentos: principios y práctica. ACRIBIA
- HAARD N. 2000. Seafood enzymes. CRC PRESS.
- HALL G. 2001. Tecnología del procesado del pescado. ACRIBIA
- HALL G. 2011. Fish processing: sustainability and new opportunities. WILEY-BLACKWELL.
- HORST-DIETER T. 2001. Fundamentos de la tecnología de los alimentos. ACRIBIA
- LUTEN J.B. 2003. Quality of fish from catch to consumer. WANENINGEN.
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- MARQUEZ A. 2013. Recepción, almacenaje, y expedición de productos de la pesca. IC.
- MATEOS-APARICIO, I. 2017. Aditivos alimentarios. DEXTRA
- MORCILLO, G., CORTÉS, E., GARCÍA, J. 2013. Biotecnología y alimentación. UNED
- NOLLET L. 2010. Handbook of seafood and seafood product analysis. CRC PRESS,
- NOLLET L. 2000. Food analysis by HPLC. CRC PRESS.
- SANTANA I.M. 2013. Elaboración de conservas de pescado y marisco. IC.
- SEN D.P. 2005. Advances in fish processing technology. ALLIED PUBLISHERS
- SHAHIDI F. 2004. Seafood quality and safety. SCIENCE TECH PUBLISHING.
- SHAHIDI F. 2006. Maximizing the value of marine by-products. WOODHEAD
- VV.AA. 2006. APPCC aplicado a la comercialización de la pesca. IDEAS PROPIAS.

### WEBS OF INTEREST:

- AESAN: [http://www.aecosan.msssi.gob.es/AECOSAN/web/home/aecosan\\_inicio.htm](http://www.aecosan.msssi.gob.es/AECOSAN/web/home/aecosan_inicio.htm)
- FAO: <http://www.fao.org/home/en/>
- OMS: <https://www.who.int/es>
- EFSA: <https://www.efsa.europa.eu/en>
- ANFACO-CECOPECA: <http://www.anfaco.es/es/index.php>
- MAPA: <https://www.mapa.gob.es/es/pesca/temas/default.aspx>