Information about the subject

Degree: Bachelor of Degree in Marine Sciences

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 270228 **Name:** Clinical Treatment and Healthcare of Aquatic Animals

Credits: 6,00 **ECTS Year:** 0, 3, 4 **Semester:** 1

Module: Optional Itinerary: Marine Biology

Subject Matter: Clinic and Health of Aquatic Animals **Type:** Elective

Department: Animal Production and Public Health

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

OPM10	Jeronimo Chirivella Martorell **(Responsible Lecturer)**	jeronimo.chirivella@ucv.es
	Elvira Teresa Mayo Hernandez	et.mayo@ucv.es

Module organization

Optional Itinerary: Marine Biology

Subject Matter	ECTS	Subject	ECTS	Year/semester
R+D in Marine Sciences	6,00	R&D in Marine Sciences	6,00	0, 2, 3, 4/1
Biology of Cetaceans	6,00	Cetaceans Biology	6,00	0, 2, 3, 4/1
Ichthyology	6,00	Ichthyology	6,00	0/1
Aquariology	6,00	Aquariology	6,00	0/1
Bioindicators	6,00	Bioindicators	6,00	0, 2, 3, 4/1
Protected Areas and Recovery of Species	6,00	Protected Areas and Recovery of Species	6,00	2, 3, 4/1
Clinic and Health of Aquatic Animals	6,00	Clinical Treatment and Healthcare of Aquatic Animals	6,00	0, 3, 4/1

Recommended knowledge

IT IS HIGHLY RECOMMENDED TO HAVE COURSED THE SUBJECTS OF PHYSIOLOGY OF MARINE ORGANISMS, MARINE MICROBIOLOGY AND AQUACULTURE.

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 understands the influence of the aquatic environment on the health of the animals that inhabit it.

R2 The student knows the etiology, diagnosis, prevention and treatment of the main diseases affecting molluscs, crustaceans and fish in aquaculture farms and aquariums.

R3 The student understands the etiology of disease in wild aquatic animals, in the wild and in captivity.

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	
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
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	
CE16	Proposing management models for endangered species recovery centers	x			
CE19	Deeply understanding operating systems of maritime orientated companies, identifying their problems and proposing solutions				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
R1, R2, R3	40,00%	Written test with theoretical and practical questions
R1, R2, R3	40,00%	Delivery of guided assignments, whose objectives and contents will be proposed by the teacher
R2	10,00%	Laboratory test
R1, R2	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: In the evaluation item 'Laboratory test', the performance of each student will be monitored 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 , together with a practical exam of resolution 'in situ' of a practical case study compendium of all the laboratory practices. **Attendance at the practical sessions is therefore compulsory**. During the practical sessions, the lecturer will monitor the attendance and attitude of each student. Factors such as attention, degree of participation and interest shown during the practical will be taken into account. A favourable result in the evaluation of the practical sessions will be a prerequisite for passing the course.
In the evaluation item 'Delivery of directed assignments, whose objectives and contents will be proposed by the teacher', the performance and progress of each student in completing the exercise worked on in the previous session, and which serves as a starting point in the new session, will be monitored. The final assessment of this item will consist of the delivery of a final report based on their own results and those contrasted with those of the rest of the working groups.
On the other hand, the 'written test' will consist of an exam on theoretical knowledge and will include both multiple choice questions (each question with 4 options, of which only one is correct) as well as questions or resolution of practical cases or problems. Failure to pass the theoretical part will make it impossible to pass the subject as a whole.
For the final grade, the results of the different evaluation activities are weighted. In order to pass the course, it will be necessary to obtain, as a minimum, a grade equal to or higher than 50 points out of 100 in each of the sections marked with an asterisk (*) and in the final grade of the course. If a

final grade of 50 points is not obtained in the sections marked with an asterisk (*) but other assessment items have been passed, these grades will be kept for 2 years, as the required competences have been passed.
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, R2, R3	35,00	1,40
PRACTICAL CLASSES M2	R1, R2, R3	6,00	0,24
LABORATORY M3	R2, R3	8,00	0,32
SEMINAR M4	R1, R2, R3	2,00	0,08
GROUP PRESENTATION OF ASSIGNMENTS M5	R1, R2, R3	4,00	0,16
TUTORIAL M6	R1, R2, R3	3,00	0,12
ASSESSMENT M8	R1, R2, R3	2,00	0,08
TOTAL		**60,00**	**2,40**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
GROUP WORK M9	R1, R2, R3	30,00	1,20
INDEPENDENT WORK M10	R1, R2, R3	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 THE CLINIC AND HEALTH IN AQUATIC ANIMALS	Item 1. The aquatic environment and the health of aquatic animals. Importance of aquatic animal health and welfare.
Unit 2.- STRUCTURE AND FUNCTION IN AQUATIC ANIMALS	Item 2. Anatomy and physiology of fish, crustaceans and shellfish. Item 3. Pathophysiology and systematic pathology in fish, crustaceans and shellfish. Item 4. Immunology in fish, crustaceans and shellfish.
Unit 3.- DISEASES IN FISH, CRUSTACEANS AND SHELLFISH IN CAPTIVITY.	Item 5. Non-infectious diseases: by intrinsic causes, adverse environment, poor nutrition, for physical injury. Item 6. Infectious diseases: viral, bacterial, fungal and parasitic.
Unit 4.- DIAGNOSTIC METHODS IN AQUATIC ANIMAL DISEASES IN CAPTIVITY.	Item 7. Anamnesis, necropsy, sampling and study skills.
UD 5.- BIOSECURITY IN AQUACULTURE: PREVENTION, CONTROL AND ERADICATION DISEASE.	Item 8. Biosecurity monitoring programs in aquaculture facilities: quarantine, hygiene and disinfection, prophylactic measures and curative measures. Recommendation and application of therapeutic treatments.
UD 6.- STUDY AND DIAGNOSIS OF DISEASES IN MARINE MAMMALS OF INTEREST IN VETERINARY.	Item 9. The challenge of the study of wild marine mammals. Major diseases found in the wild population. Main guidelines for the health of marine mammals in captivity.

Organization of the practical activities:

	Content	Place	Hours
PR1.	STRUCTURE AND FUNCTION IN AQUATIC ANIMALS	Laboratory	2,00
PR2.	DIAGNOSTIC METHODS IN AQUATIC ANIMAL DISEASES IN CAPTIVITY.	Laboratory	10,00

Temporary organization of learning:

Block of content	Number of sessions	Hours
Unit 1.- INTRODUCTION TO THE CLINIC AND HEALTH IN AQUATIC ANIMALS	2,00	4,00
Unit 2.- STRUCTURE AND FUNCTION IN AQUATIC ANIMALS	4,00	8,00
Unit 3.- DISEASES IN FISH, CRUSTACEANS AND SHELLFISH IN CAPTIVITY.	12,00	24,00
Unit 4.- DIAGNOSTIC METHODS IN AQUATIC ANIMAL DISEASES IN CAPTIVITY.	5,00	10,00
UD 5.- BIOSECURITY IN AQUACULTURE: PREVENTION, CONTROL AND ERADICATION DISEASE.	6,00	12,00
UD 6.- STUDY AND DIAGNOSIS OF DISEASES IN MARINE MAMMALS OF INTEREST IN VETERINARY.	1,00	2,00

References

BROWN, L. ACUICULTURA PARA VETERINARIOS. ACRIBIA 2000
CARRILLO ESTEVEZ, MANUEL ADRIAN. LA REPRODUCCIÓN EN PECES: ASPECTOS BÁSICOS Y SUS APLICACIONES EN PISCICULTURA. MUNDI-PRENSA LIBROS, S.A. 2012
DAVID SCARFE A., CHENG-SHENG LEE, PATRICIA J. O'BRYEN. AQUACULTURE BIOSECURITY: PREVENTION, CONTROL, AND ERADICATION OF AQUATIC ANIMAL DISEASE. Wiley-Blackwell 2006
DIERAUF, L.A. & GULLAND, M.D.. CRC HANDBOOK OF MARINE MAMMAL MEDICINE., 2nd edition, CRC PRESS, 2001.
FELICITY HUNTINGFORD, MALCOLM JOBLING, SUNIL KADRI.(EDITORS). AQUACULTURE AND BEHAVIOR. Wiley-Blackwell 2012.
FIGUERAS HUERTA A. (Coord.), B. NOVOA GARCÍA (Coord.) FUNDACION ACUICULTURA. ENFERMEDADES DE MOLUSCOS BIVALVOS DE INTERÉS EN ACUICULTURA. MUNDI-PRENSA LIBROS, S.A. 2012.
LINDSAY G. ROSS, BARBARA ROSS. ANAESTHETIC AND SEDATIVE TECHNIQUES FOR AQUATIC ANIMALS, 3rd Edition. Wiley-Blackwell 2008.
MERRIFIELD D., RINGO E. (EDITORES). AQUACULTURE NUTRITION: GUT HEALTH, PROBIOTECS AND PREBIOTCS. Wiley-Blackwell, 2014
MICHALIS PAVLIDIS (EDITOR), CONSTANTINOS MYLONAS (EDITOR). SPARIDAE: BIOLOGY AND AQUACULTURE OF GILTHEAD SEA BREAM AND OTHER SPECIES. Wiley-Blackwell 2011.
NOGA, E.J.. FISH DISEASE: DIAGNOSIS AND TREATMENT. Iowa State University Press, 2000.
ROAR GUDDING (Editor), ATLE LILLEHAUG (Editor), OYSTEIN EVENSEN (Editor). FISH VACCINATION. Wiley-Blackwell 2014.
ROBERTS, R.J.. FISH PATHOLOGY, 4th Edition, Wiley-Blackwell April 2012.
SCARFE, A.D., LEE, C., O'BRYEN, P.J.. AQUACULTURE BIOSECURITY: PREVENTION, CONTROL, AND ERADICATION OF AQUATIC ANIMAL DISEASE. Wiley-Blackwell 2006.
SINDERMAN, C.J.. PRINCIPAL DISEASES OF MARINE FISH AND SHELLFISH, VOL I-II. Academic Press, 1989.
VOLLMANN-SCHIPPER, F. TRANSPORTE DE PECES VIVOS. ACRIBIA 1978