



IDENTIFYING DATA

Marine zoology

Subject	Marine zoology			
Code	V10G061V01210			
Study programme	(*)Grao en Ciencias do Mar			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	2nd
Teaching language	#EnglishFriendly Spanish			
Department				
Coordinator	Ramil Blanco, Francisco José			
Lecturers	Paredes Rosendo, Estefanía Pereira Pinto, Estefanía Ramil Blanco, Francisco José Vázquez Otero, María Elsa			
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General description	With this subject intends to give to the student a basic knowledge in Marine Zoology, through the study of the different filos that integrate the marine fauna. It will study, in each case, the general plan of organisation, the external morphology, the internal anatomy, the reproduction and the embryonic development and the ranking. Likewise they will include notions envelope his vital activity, habitat and distribution.			

Competencies

Code	
A2	Students can apply their knowledge and understanding in a manner that indicates a professional approach to their work or vocation, and have competences typically demonstrated through devising and sustaining arguments and solving problems within their field of study
A3	Students have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include reflection on relevant social, scientific or ethical issues
A4	Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences
A5	Students have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy
B1	Know and use vocabulary, concepts, principles and theories related to oceanography and apply everything learned in a professional and/or research environment.
B2	Plan and execute surveys in the field and laboratory work, applying basic tools and techniques for sampling, data acquisition and analysis in the water column, sea bottom and marine substratum.
B4	Manage, process and interpret the data and information obtained both in the field and in the laboratory.
C1	know at a general level the fundamental principles of sciences: Mathematics, Physics, Chemistry, Biology and Geology.
C9	Acquire basic knowledge about the structural and functional organization and the evolution of marine organisms.
C10	Know the biological diversity and functioning of marine ecosystems.
D1	Develop the search, analysis and synthesis of information skills oriented to the identification and resolution of problems.
D2	Acquire the ability to learn autonomously, continuously and collaboratively, organizing and planning tasks over time.

Learning outcomes

Expected results from this subject	Training and Learning Results	
Handle vocabulary, codes and inherent concepts to the marine zoology	A2	C1
Know and comprise the essential facts, concepts, principles and theories related with the marine zoology.	A2	
Know the basic techniques of sampling of the fauna in the column of water, and diverse types of fund	A2 A5	
Basic knowledge of the methodology of investigation in marine zoology	A2	B1 B2

Capacity to identify and understand the problems related with the marine zoology	A3	B1	C1 C9	D1
Know work in campaigns and in laboratory of responsible way and sure, promoting the tasks in team	A2	B2		D1 D2
Transmit information of form written, verbal and graphic for audiences of diverse types	A2 A4			
Capacity of analysis and synthesis	A2 A3	B4		D1
Capacity of organisation and planning		B2 B4		D1 D2
Oral communication and writing in the official tongues of the University	A4			
Capacity to work in one instrument	A5			D2
Capacity to learn of autonomous and continuous form	A5			D2
Capacity to apply the knowledges in practice	A2 A4	B4		D1
Skills of investigation	A2 A3 A4 A5	B1 B2 B4	C1 C9 C10	D1 D2

Contents

Topic	
LESSON 1: INTRODUCTION	Definition and objectives of the subject. General characteristics of the metazoa: definition and models of organisation
LESSON 2: PHYLUM PORIFERA. PHYLUM PLACOZOA.	PORIFERA: general characteristics, cell types and skeleton. Types of organisation. Reproduction and development. Systematic summary. PLACOZOA: Form and function.
LESSON 3: PHYLUM CNIDARIA	General characteristics. Polymorphism: The polyp and the medusa. Cell types. Reproduction. Systematic summary. Hydrozoa, Scyphozoa, Staurozoa, Cubozoa and Anthozoa: form and function.
LESSON 4: PHYLUM CTENOPHORA	General characteristics. (Corporal organisation) Form and function. Reproduction. Systematic summary
LESSON 5: The BILATERIA: INTRODUCTION. PHYLUM ACOELOMORPHA, PLATYHELMINTHES, MESOZOA and NEMERTEA	Introduction to Bilateria. Phylum Acoelomorpha: Form and function. Phylum Platyhelminthes: General characteristics and classification; Turbellaria: form and function. Phylum Mesozoa: General characteristics and classification. Phylum Nemertea: General characteristics; (corporal organisation) form and function; reproduction and development; systematic summary.
LESSON 6. LOPHOTROCHOZOOA: THE LOWER PHYLA	Phyla Gnathostomulida, Rotifera, Acanthocephala, Cyclophora, Gastrotricha and Entoprocta: form and function.
LESSON 7: The LOPHOPHORATES.	General characteristics. Phylum Bryozoa: Form and function; reproduction and development; systematic summary. Phylum Brachiopoda: Form and function; reproduction and development; systematic summary. Phylum Phoronida: Form and function; reproduction and development.
LESSON 8: PHYLUM MOLLUSCA (I)	General characteristics. (Corporal organisation) Form and function. Classification. Synopses of the lower class (Caudofoveata, Solenogastera, Polyplacophora, Monoplacophora and Scaphopoda)
LESSON 9: PHYLUM MOLLUSCA (II)	Class Gastropoda: general characteristics; coiling; torsion; (corporal organisation) form and function; reproduction and development; systematic summary
LESSON 10: PHYLUM MOLLUSCA (III)	Class Bivalvia: general characteristics; (corporal organisation): form and function; reproduction and development; systematic summary
LESSON 11: PHYLUM MOLLUSCA (IV)	Class Cephalopoda: general characteristics; (corporal organisation): form and function; reproduction and development; systematic summary
LESSON 12: PHYLUM ANNELIDA (I)	General characteristics; metamerism; classification. Class Polychaeta: general characteristics; (corporal organisation): form and function; reproduction and development.
LESSON 13: PHYLUM ANNELIDA (II): The SIBOGLINIDAE. PHYLA ECHIURA and SIPUNCULA	The Siboglinidae: general characteristics; form and function; reproduction and development. Phylum Echiura: Form and function. Phylum Sipuncula: Form and function.

LESSON 14: ECDISOZOA: INTRODUCTION and LOWER PHYLA	Definition and systematic summary . Phyla Nematoda, Kinorhyncha, Priapulida, Loricifera and Tardigrada: form and function.
LESSON 15: PHYLUM ARTHROPODA	General characteristics. (Corporal organisation) Form and function. Classification. Subphylum Cheliceriformes: General characteristics; Classification. Merostomata and Pycnogonida: form and function.
LESSON 16: PHYLUM ARTHROPODA: SUBPHYLUM CRUSTACEA (I)	General characteristics. Classification. Class Malacostraca: (corporal organisation) form and function, life forms and classification (Phyllocarida, Hoplocarida and Eumalacostraca).
LESSON 17: PHYLUM ARTHROPODA: SUBPHYLUM CRUSTACEA (II)	Class Remipedia, Cephalocarida, Branchiopoda and Ostracoda: external anatomy and life forms.
LESSON 19: THE DEUTEROSTOMES. PHYLUM CHAETOGNATHA. PHYLUM ECHINODERMATA	Phylum Chaetognatha: General characteristics. Form and function. Reproduction and development. Phylum Echinodermata: General characteristics. (Corporal organisation) Form and function. Endoskeleton. Water vascular system.
LESSON 18: PHYLUM ARTHROPODA: SUBPHYLUM CRUSTACEA (III)	Class Maxillopoda: General characteristics and classification; Mistacocarida, Copepoda, Tantulocarida and Branchiura: a external anatomy and life forms; Cirripedia: general characteristics; form and function; classification.
LESSON 20: PHYLUM ECHINODERMATA (II)	Class Crinoidea, Asteroidea and Ophiuroidea: General characteristics; (corporal organisation:) form and function; reproduction and development. Systematic summary
LESSON 21: PHYLUM ECHINODERMATA (III)	Class Echinoidea and Holothuroidea: General characteristics; (corporal organisation:) form and function; reproduction and development. Systematic summary
LESSON 22: PHYLUM HEMICHORDATA	General characteristics and classification. Class Enteropneusta and Pterobranchia: general characteristics; form and function; reproduction and development.
LESSON 23: PHYLUM CHORDATA (I)	General characteristics and classification. Subphyla Tunicata and Cephalochordata: general characteristics; form and function; reproduction and development.
LESSON 24: PHYLUM CHORDATA (II)	The Agnatha: general characteristics and classification. Class Myxini and Cephalaspidomorphi: form and function. The Chondrichthyes: general characteristics; (corporal organisation:) form and function; reproduction and development; systematic summary.
LESSON 25: PHYLUM CHORDATA (III)	The Osteichthyes: general characteristics; (corporal organisation:) form and function; functional adaptations; migrations; reproduction and development; systematic summary.
LESSON 26: PHYLUM CHORDATA (IV)	The Marine Tetrapoda: main groups; adaptations of the reptilia, birds and mammalian to the marine environment; systematic summary and general characteristics of the orders

PRACTICAL LESSONS

Lesson 1.- PORIFERA. The skeleton of Sponges: methods of extraction and preparation of spicules; microscopical study.

Lesson 2.- CNIDARIA. The polyp and the medusa: morphology. Observation of representatives of Hydrozoa, Scyphozoa and Anthozoa.

Lesson 3.- MOLLUSCA I. External morphology of the main groups: Polyplacophora, Scaphopoda, Bivalvia, Gastropoda and Cephalopoda; identification with keys of several species.

Lesson 4.- MOLLUSCA II. Internal anatomy: dissection of a Bivalvia: *Mytilus galloprovincialis*.

Lesson 5.- POLYCHAETA. External morphology: Errantia and Sedentaria polychaetes; identification with keys of some species.

Lesson 6.- ARTHROPODA I. Crustacea: External morphology; internal anatomy: and dissection of a Malacostraca: *Nephrops norvegicus*; observation and identification of brachiurans.

Lesson 7.- ARTHROPODA II. Crustacea: observation of Amphipoda, Isopoda, Cirripedia and Copepoda; identification with keys of some species. Pycnogonida And Xiphosura: observation of some exemplars.

Lesson 8.- ECHINODERMATA I. External morphology of the main groups. Identification with keys of several species.

Lesson 8.- ECHINODERMATA II. External morphology and internal anatomy: dissection of a Echinoidea: *Paracentrotus lividus*.

Lesson 10.- Chordata. Observation of Tunicata and Cephalochordata; external morphology, identification and dissection of a Osteichthyes.

Planning

	Class hours	Hours outside the classroom	Total hours
Laboratory practical	20	20	40
Seminars	2	2	4
Collaborative Learning	3	30	33
Lecturing	27	40.5	67.5
Objective questions exam	0.5	0	0.5
Problem and/or exercise solving	2	0	2
Laboratory practice	1	0	1
Essay	2	0	2

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Laboratory practical	Study of the external and internal anatomy of the main groups using common microscopical techniques in Zoology
Seminars	During the first seminar there will be an exposition of a topic considered of relevance in the training in Marine Zoology and directly related to the practical work that must be done. Also, the methodology to do the collaborative work will be explained. Possible doubts will be solved. In the second seminar, the students will present the results achieved in the collaborative work.
Collaborative Learning	Collaborative learning through a mainly practical work in small groups. The works will include the following phases: sampling through photographic transects, identification of the fauna in the photographs and their adaptations to their habitat, and writing the results.
Lecturing	This method refers to the explanation of the topics to the students. The teacher clarifies the syllabus content to the students. Although teachers are more active than students the teacher will ask questions to keep the students attentive. Also, kahoots at the end of each topic will be carried out by the students with the most important contents.

Personalized assistance

Methodologies	Description
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Lecturing	Students willing so could attend personal tutorials to solve doubts and/or uncertainties, which will mainly take place during the timetables indicated. To better optimise the procedure, the student is requested to previously contact his/her teacher with reasonable anticipation
Laboratory practical	Students willing so could attend personal tutorials to solve doubts and/or uncertainties, which will mainly take place during the timetables indicated. To better optimise the procedure, the student is requested to previously contact his/her teacher with reasonable anticipation
Seminars	Students willing so could attend personal tutorials to solve doubts and/or uncertainties, which will mainly take place during the timetables indicated. To better optimise the procedure, the student is requested to previously contact his/her teacher with reasonable anticipation
Collaborative Learning	Students willing so could attend personal tutorials to solve doubts and/or uncertainties, which will mainly take place during the timetables indicated. To better optimise the procedure, the student is requested to previously contact his/her teacher with reasonable anticipation

Assessment

	Description	Qualification	Training and Learning Results			
Laboratory practical	The attendance and the work done by the students during the realization of the practices in the laboratory (1 point) A practical exam in the laboratory at the end of the course (1,5 points). To pass this methodology, students have to get a minimum mark of 0,6 points in the practical exam.	25	A2 A5	B1 C9 C10	D1	
Seminars	Assistance and participation of the students in the two seminars and the presentation of the works done by students will be evaluated. Also their participation in the subsequent discussion will be evaluated.	5	A2 A3 A4 A5	B1 B2 B4	D1 D2	
Collaborative Learning	The ability to work together autonomously as well as the contribution of each student to the final work will be evaluated by the cualification of the rest of the students of the group with a rubric (0,5 points). The writing document of the results obtained in the laboratory will be also evaluated (1,5 point).	20	A2 A3 A4 A5	B1 B2 B4	D1 D2	
Lecturing	Four mid term multiple choice tests (10 minutes) will be done during the semester. These tests will not get rid of themes. Each one will be score up to 0.5 points (2 points in total) A major written exam will be done with multiple choice questions and short answer questions (3 points) Both results will be added. To pass this methodology, students have to get a minimum mark of 2 points.	50	A2 A5	B1 C9 C10	C1	

Other comments on the Evaluation

The update oficial calendar of the final exams can be found

at: <http://mar.uvigo.es/index.php/en/alumnado-actual-2/examenes-3>

The final qualification of the subject is the sum of the mark obtained in each of the proposed methodologies, provided that the rating of each one of them exceed 40% of the mark.

In the July session the student must present only those methodologies not passed.

NOT EVALUATED qualification will be applicated to students who will not present or the final exam of theory or the practical exam.

The marks obtained in seminars and tutorized works will be kept for the next course.

Students are strongly requested to fulfill a honest and responsible behaviour. It is considered completely unacceptable any alteration or fraud (i.e., copy or plagiarism) contributing to modify the level of knowledge and abilities acquired in exams, evaluations, reports or any kind of teacher's proposed work. Fraudulent behaviour may cause failing the course for a whole academic year. An internal dossier of these activities will be built and, when reoffending, the university rectorate will be asked to open a disciplinary record.

Sources of information

Basic Bibliography

HICKMAN, C. P.; ROBERTS, L. S., KEEN, S. L., LARSON, A., IANSON, H. & EISENHOUR, D. J., **PRINCIPIOS INTEGRALES DE ZOOLOGIA.**, 14ª EDICION, INTERAMERICANA - MCGRAW HILL, 2009

BRUSCA, R. C. Y BRUSCA, G. J., **INVERTEBRADOS.**, 2ª EDICIÓN, MCGRAW HILL-INTERAMERICANA, 2005

BARNES, RUPPERT, E. E. Y BARNES, R. D., **ZOOLOGIA DE LOS INVERTEBRADOS.**, 6ª EDICION, INTERAMERICANA - MCGRAW HILL, 1996

DE LA FUENTE, J. A., **ZOOLOGIA DE ARTROPODOS.**, 1ª EDICION, INTERAMERICANA - MCGRAW HILL, 1994

HELFMAN, G.S.; COLLETTE, B.B.; FACEY, D.E.; BOWEN, B.W., **THE DIVERSITY OF FISHES: BIOLOGY, EVOLUTION AND ECOLOGY**, 2ª EDICIÓN, WILEY-BLACKWELL, 2009

KARDONG, K. V., **VERTEBRADOS. ANATOMÍA COMPARADA, FUNCIÓN, EVOLUCIÓN.**, 3ª EDICION, MCGRAW HILL-INTERAMERICANA, 2007

Recommendations

Subjects that continue the syllabus

Fish and shellfish biology/V10G060V01902

Contingency plan

Description

=== EXCEPTIONAL PLANNING ===

Given the uncertain and unpredictable evolution of the health alert caused by COVID-19, the University of Vigo establishes an extraordinary planning that will be activated when the administrations and the institution itself determine it, considering safety, health and responsibility criteria both in distance and blended learning. These already planned measures guarantee, at the required time, the development of teaching in a more agile and effective way, as it is known in advance (or well in advance) by the students and teachers through the standardized tool.

=== ADAPTATION OF THE METHODOLOGIES ===

* Teaching methodologies maintained

-For blended and virtual modality:

Lectures will be taught through the Virtual Classrooms of the Remote Campus, following the official syllabus of the subject. The didactic materials will be adapted by complementing them with clarification documents that will be uploaded to TEMA, whenever necessary. Discussion forums for each thematic blocks will also be enabled through the TEMA platform. In addition, any question or doubt can be posed and solved by e-mail or by personalized assistance through the Virtual Office. Lectures will be recorded to facilitate the teaching of students that could have connectivity problems.

Seminars will be taught through the Virtual Classrooms of the Remote Campus, following the official syllabus of the subject. Discussion forums for two seminars will also be enabled through the TEMA platform. In addition, any question or doubt can be posed and solved by e-mail or by personalized assistance through the Virtual Office. Seminars will be recorded to facilitate the teaching of students that could have connectivity problems.

* Teaching methodologies modified

LABORATORY PRACTICAL

- For a blended modality:

If the totality of practical courses can not be taught due to limitations of capacity, dissections will be carried out in the laboratory while the remaining practices, focused on the identification of different zoological groups, will be replaced by field work.

- For a virtual modality:

If laboratory practical can't be run in the laboratory, they will be taught through the Virtual Classrooms at the scheduled times, using adapted teaching materials (infographics, photographs and videos). As in the laboratory, record of the attendance will be done. The practices will be recorded to facilitate the teaching of students that could have connectivity problems.

COLLABORATIVE LEARNING

- For a blended modality:

Field photographic transect in a rocky intertidal will be done by students. Then virtual groups will be created to work that material to carry out the collaborative work.

- For a virtual modality:

If the field work can't be done, a virtual photographic transect will be provided to carry out the collaborative learning.

* Non-attendance mechanisms for student attention (tutoring)

If personalized assistance is not possible, it will be carried out by email or by using the virtual offices. Also, discussion forums will be created for each thematic block to pose doubts or questions.

* Modifications (if applicable) of the contents

Already explained above

=== ADAPTATION OF THE TESTS ===

The percentages of each methodology will be maintained in both blended and virtual modalities. A modification of the type

of test can be done.

Four mid term multiple choice tests (10 minutes) will be done using the Moodle platform. For the final assessment a written test of test responses will be carried out through Moodle.

For a final assessment of the practicals if it cannot be carried out in a laboratory, a series of exercises that the student must solve using Moodle will be proposed.
