



Information about the subject

Degree: Bachelor of Degree in Marine Sciences

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 272009 **Name:** Marine Zoology

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

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:

272A

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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

No prerequisites.



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 can distinguish the animal concept from the rest of organisms.
- R2 The student knows the classification criteria and the international codes of biological nomenclature.
- R3 The student knows the general, structural, biological and ecological characteristics of the main Phyla of the marine environment.
- R4 The student knows and uses basic techniques for the collection of organisms in coastal sampling.
- R5 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.
- R6 The student can write an intelligible and well-organized text on diverse zoological aspects.
- R7 The student is able to determine the common marine species in our coast through the use of taxonomic keys.



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
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
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



Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3, R6	50,00%	Written test with theoretical and practical questions
R1, R2, R3, R4, R6	30,00%	Delivery of guided assignments, whose objectives and contents will be proposed by the teacher
R2, R3, R4, R5, R6, R7	20,00%	Laboratory test
R2, R3, R6	0,00%	Oral presentation

Observations

According to the general evaluation and qualification regulations, the preferred evaluation system will be by means of continuous evaluation. Specifically:

Self-assessment questionnaires will be carried out after each block of content, so that the student will be accompanied during the semester to prepare for the final exam. These questionnaires will have a weight of 20% (within the 30% of the item 'Directed work') and the other 10% will correspond to the work proposed by the teacher.

To be able to overcome the subject with 5, all the articles of evaluation will have to be of at least 5, to be able to be weighted for the final qualification.

The assistance to the laboratory practices is OBLIGATORY, in order that it is considered to be the corresponding percentage (20 %).

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, R7	34,00	1,36
PRACTICAL CLASSES M2	R3, R4, R5, R6	6,00	0,24
LABORATORY M3	R1, R2, R5, R7	12,00	0,48
SEMINAR M4	R3, R4, R6	2,00	0,08
TUTORIAL M6	R3, R6, R7	4,00	0,16
ASSESSMENT M8	R1, R2, R3, R4, R5, R6, R7	2,00	0,08
TOTAL		60,00	2,40

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
GROUP WORK M9	R2, R3, R6, R7	18,00	0,72
INDEPENDENT WORK M10	R1, R2, R3, R4, R5, R6, R7	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
LESSON 1	Animal diversity. Taxonomy and systematic. The five kingdoms. "Specie" as classification unit. Concept of specie, types of speciation. The international code of biological nomenclature. Linneo's binomial nomenclature.
LESSON 2	Definition of "animal". Definition and objectives of Zoology. Sciences related to the Zoology: Anatomy, Physiology, Ecology and Embriology. Evolutive history and Phylogeny. Simetry. Development. Segmentation. Gastrulation. General classification of the animal kingdom.
LESSON 3.	Parasitism. Origin and evolution of parasitism. Symbiosis: phoresis, commensalism, parasitism and mutualism. Main Phyla of marine parasites. Plathelminthes: Class Monogenea, Trematoda, Cestoda. Phylum Acantocephala. Subfilo Crustacea.
LESSON 4	Phylum Mesozoa. Phylogenetic relationships. Diblastic Metazoa: Parazoa: Filo Placozoa. Phylum Porifera. Structure, physiology and reproduction. Organization types. Environmental factors that influence their distribution. Evolutive origin. Class of Porifera: Calcarea, Hexactinellida y Desmospongiae. Study of the representative characteristics.
LESSON 5	Diblastic Metazoa: Radiates. Phylum Cnidaria: General caracteres. Structure of polipe and jellyfish. Cellular types. Cnidoblastos: Structure. Class: Hydrozoa, Escifozoa, Cubozoa y Anthozoa. Study of the representative characteristics. Phylum Ctenophora. Structure and general organization. Physiology and reproduction.



LESSON 6

Triblastic Metazoa. Importance and mining of the third embryonic layer. Bilateral Acelomate: Phylum Plathelminthes. General characteristics. Turbellaria: Structure, physiology and reproduction. Trematoda y Cestoda. Phylum Gnathostomulida: External characteristics and internal organization. Phylum Nemertina. Main characteristics and general organization. Reproduction.

LESSON 7

Pseudocoelomates. Phylum Rotifera. General structure. Reproduction system and types of reproduction. Gastrotricha. Phylum Priapulida. Phylum Acantocephala, Phylum Loricifera and Phylum Entoprocta. Main characteristics. Phylum Nematoda: structure, physiology and reproduction. Ecological aspects. Phylum Nematomorpha (Nectonema).

LESSON 8

Phylum Mollusca. General characteristics. Shell structure. Study of Classes: Caudofoveata, Solenogastres, Polyplacophora and Monoplacophora. Structures and systems. Class Gastropoda. General anatomy organization and symmetry analysis. Systematic. Study of Classes: Scaphopoda and Bivalvia. General structure and systems. Class Cephalopoda. General characteristics and anatomy. Reproduction. Systematic.

LESSON 9

Phylum Annelida. General characteristics. Systematic synopsis. Class Polychaeta. Structures and systems. Reproduction and Trochophora larvae formation. Class Oligochaeta and Hirudinea.

LESSON 10

Phylum Arthropoda. General aspects. Structures and systems. Systematic synopsis. SubPhylum Trilobitomorpha. SubPhylum Chelicerata: Study of the classes Merostomata and Pycnogonida. SubPhylum Crustacea. General aspects. External morphology, types of appendages. Anatomy. Biology. Systematic.

LESSON 11

Lophophorata. Study of the Phylum Phoronida. Phylum Ectoprocta (Bryozoa), and Phylum Braquiopoda. General characteristics, structure, physiology and reproduction.



LESSON 12

Phylum Equinodermata. Crinoidea: general organization. Asteroidea: general organization and anatomy. Classes: Ofiuroides and Echinoidea. Structures and general organization. Anatomy. Reproduction and embryonic development. Class Holothuroidea. Main Characters and general organization.

LESSON 13

Phylum Chordata. General characters. Systematic Synopsis. SubPhylum Tunicata o Urochordata. Main Characters. Classes: Appendiculariacea and Thaliacea. External Morphology and Anatomy. Class Ascidiacea. External Morphology and anatomy of the larvae and adult. Biology. SubPhylum Cephalochordata. General structure. Biology. Systematic.

LESSON 14

SubPhylum Vertebrata. General Characters. Superclass Agnatha. General Characters. Morphology and anatomy. Principal current and fossil groups.

LESSON 15

The fish. Generalities. Compared study of the different types of fins. Types of forms. Types of scales and importance of his study. Structure of the skeleton of the Fish. Class Chondrichthyes and Class Osteichthyes. Important. Anatomy. Biology and habits of life. Migrations. Importance of the study of the fisheries: types of studies. Systematic of Fish.

LESSON 16

The marine tetrapod. Class Reptiles: Generalities on Morphology, anatomy, biology, ecology and systematic. Principal species of serpents and marine tortoises. Class Aves: Generalities on Morphology, anatomy, biology, ecology and systematic. adaptation to the marine life. Marine birds. Class Mammalia: Origin and evolution. Generalities on Morphology, anatomy, biology, ecology and systematic. Principal families of marine mammals.



Organization of the practical activities:

	Content	Place	Hours
PR1.	Talk about BDB of the Generalitat Valenciana.	Computer	2,00
PR2.	Pobla Farnals. Collection of benthonic samples.	Boat	2,00
PR3.	Calpe. Collection of planktonic samples.	Boat	4,00
PR4.	Parasitic flatworms observation.	Laboratory	2,00
PR5.	Diploblastic observation organizations.	Laboratory	2,00
PR6.	Zooplankton observation.	Laboratory	2,00
PR7.	Observation of molluscs and polychaete annelids.	Laboratory	2,00
PR8.	Theoretical and practical seminar on Mediterranean Crustacea.	Laboratory	2,00
PR9.	Theoretical and practical seminar on Echinoderms.	Laboratory	2,00



Temporary organization of learning:

Block of content	Number of sessions	Hours
LESSON 1	1,00	2,00
LESSON 2	1,00	2,00
LESSON 3.	2,00	4,00
LESSON 4	1,00	2,00
LESSON 5	3,00	6,00
LESSON 6	1,00	2,00
LESSON 7	1,00	2,00
LESSON 8	3,00	6,00
LESSON 9	2,00	4,00
LESSON 10	3,00	6,00
LESSON 11	1,00	2,00
LESSON 12	2,00	4,00
LESSON 13	2,00	4,00
LESSON 14	2,00	4,00



LESSON 15

3,00

6,00

LESSON 16

2,00

4,00



References

BARNES, R.S.K., CALOW, P. , OLIVE, P.J.W., GOLDING, D.W. & SPICE, J.I. (2001). The Invertebrates a new synthesis. 3ª Edición. Blackwell Scientific Publications. BRUSCA, R.C. & BRUSCA, G.J., (2005). Invertebrados. (2ª edición). McGraw-Hill / Interamericana. COMISIÓN INTERNACIONAL DE NOMENCLATURA ZOOLOGICA. (2000). Código Internacional de Nomenclatura Zoológica. 4ª Edición .CSIC. CONNOR, R.C., PETERSON, D.M. (1994). The lives of whales and dolphins. New York. Henry Holt Co. DEVILLERS, Ch. & CLAIRAMBAULT, P. (1977). Vertebrados Anatomía comparada. Tomo II. Toray Masson. DORIT, R.L., WALKER, WF & BARNES, R.D. (1991). Zoology. Philadelphia. Saunders College Publishing. FISHER, W., SFINEIDER, M. & M. L. BAUCHOT. (1987). Fiches FAO d'identification des especes pour besoins de la Pêche: Mediterranec et Mer Noire, Vol. 1 Végétaux et Invertebrés y Vol. 11 Vertebres, FAO. GILBERT, P.W., MATHEWSON, R.F. & RALL, D.P. (Eds.). (1986). Sharks, skates and rays. Baltimore, Johns Hopkins Press. GÓMEZ, M. (2000). Manual de Prácticas de Zoología Marina. Las Palmas. Servicio de Publicaciones de la Universidad de Las Palmas de Gran Canaria. GRASSE, P.P. (1978). Vertebrados. Reproducción, Biología, Evolución y Sistemática. Tomo III. Toray Masson. GRASSE, P.P. (1980). Vertebrados. Reproducción, Biología, Evolución y Sistemática. Tomo IV. Toray Masson. GRASSE, P.P.; POISSON, R.A. & TUZET, O. (1976). Zoología de Invertebrados. Tomo I. Toray Masson. HAISTON, N.G. (1994). Vertebrate Zoology an experimental field approach. Cambridge University Press. HICKMAN, C.P., KEEN, S.L., EISENHOUR, D.J., LARSON A., L'ANSON, H. (2021). Principios Integrales de Zoología. (18ª Edición). McGraw-Hill / Interamericana. KARDONG K.V. (2007). Vertebrados. Anatomía comparada, función, evolución. Mcgraw-Hill. LINDNER, G. (1977). Moluscos y caracoles de los mares del mundo. Barcelona. Omega. MARGULIS L. & K. SCHWARTZ. (1985). Cinco Reinos. Guía Ilustrada de los phyla de la vida en la Tierra. Ed. Labor. MARSHALL, A.J., WILLIAMS, W.D. (1985). Tratado de Zoología. Vol. 1 Invertebrados. Ed. Reverte. MEGLITSH, P.A. (1986). Zoología de Invertebrados. Ediciones Pirámide, S.A. España. NADAL, J. (2001). Vertebrados. Origen, Organización, Diversidad y Biología. Ediciones Omega. Barcelona. OCAÑA, A., SÁNCHEZ, L., LÓPEZ, S. & J.F. VIVIANA. (1999). Guía Submarina de Invertebrados no Artrópodos. Comares S.L. Granada. RIEDL, R. (1986). Fauna y Flora del Mar Mediterráneo. Omega, S.A. Barcelona. RUPPERT, E.E. Y BARNES R.D. (1996). Zoología de los Invertebrados (6ª Edición). McGraw-Hill Interamericana Editores. RUPPERT E., FOX R. & BARNES R. (2004). Invertebrate Zoology. A Functional Evolutionary Approach. 7th Edition. Thompson. Brooks/Cole. USA. STORCH, V. & WELSCH, U. (2001). Curso Práctico de Zoología de Kükenthal. Barcelona. Ariel. STORER, T. I.; USINGER, R. L.; STEBBINS, R. C. & NYBAKKEN, J. W. (1986) Zoología General. Editorial Omega. TUDGE, C. (2001). La variedad de la Vida. Historia de todas las criaturas de la Tierra. Editorial Crítica-Drakontos. VILLEE, C.A., WALKER, W.F. & BARNES, R.D. (1987). Zoología. México. D.F. Interamericana. WEISZ, P.B. (1985). La ciencia de la Zoología. Omega.

LINKS OF INTEREST:



- Animal Database: <http://www.animalbase.org/>- European fauna: <http://www.faunaeur.org/>- Iberian fauna: <http://www.fauna-iberica.mncn.csic.es/>- GBIF (Global Biodiversity Information Facility): <http://www.gbif.org/>- Species 2000: <http://www.sp2000.org/>- UICN (Unión Internacional para la Conservación de la Naturaleza): <http://www.iucn.org/>- World Biodiversity Database : <http://www.eti.uva.nl/tools/wbd.php>- Zoology. Interpretation of architectural models. U.C.M.: https://www.ucm.es/innovacion_zoologia/apuntes-practicas- Virtual Museums of Biology: <http://biologicas.ucm.es/museos>