

**COURSE DATA****Data Subject**

Code	43254
Name	Marine conservation: Cetaceans, turtles and other large marine vertebrates
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
2148 - M.D. in Biodiversity: Conservation and Evolution	Faculty of Biological Sciences	1	First term

Subject-matter

Degree	Subject-matter	Character
2148 - M.D. in Biodiversity: Conservation and Evolution	5 - Cross-disciplinary optional subject areas 1	Optional

Coordination

Name	Department
TOMAS AGUIRRE, JESUS	355 - Zoology

SUMMARY

Conservation in the marine environment: cetaceans, turtles and other large vertebrates is a subject of the Master: "Biodiversity: Conservation and Evolution", of 3 ECTS credits. This course focuses on the status of the different species of marine vertebrates and on the most important threats to their conservation. Practically all species of marine mammals and sea turtles are considered charismatic species of great attraction for the general public. However, the interest in the conservation of these and other large marine vertebrate species goes beyond emotional or social aspects. In addition to these, there are important ecological, but also economic reasons that motivate the study and conservation of these animal species. Large marine vertebrates are located in the highest positions of the trophic webs in marine ecosystems; therefore, their conservation is essential for the maintenance of these ecosystems. However, many of these species have been and are exploited, in many cases unsustainably, by humans, reaching critical levels of conservation.



Furthermore, many of these species are particularly sensitive to environmental alterations caused directly or indirectly by humans, such as marine pollution (in all its variants) or climate change, elements to be considered in any conservation program. On the other hand, many of the species of large marine vertebrates are migratory species that, throughout their life cycles, cross the territorial waters of different countries and international waters. Therefore, the conservation of many of these species can also have political consequences and may require international agreements. For these reasons, there is a growing interest in the research, management and conservation of these species. This course will provide information on the diversity of large marine vertebrates, their biology and the degree of threat of the different species, as well as updated study techniques, so that the student will be able to face any conservation problem concerning any of these species and to propose, in a critical and reasoned manner, the appropriate conservation measures for each species in its habitat and social-political environment.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

It is recommended, but not essential, to have a basic knowledge of Zoology and Marine Biology.

OUTCOMES

2148 - M.D. in Biodiversity: Conservation and Evolution

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- To acquire basic skills to develop laboratory work in biomedical research.
- Be able to access the information required (databases, scientific articles, etc.) and to interpret and use it sensibly.
- Stimulate the capacity for critical reasoning and for argumentation based on rational criteria.
- Favour intellectual curiosity and encourage responsibility for one's own learning.

LEARNING OUTCOMES

1. To Recognize the different species of marine vertebrates.
2. To know the anatomy of cetaceans and sea turtles, recognize the pathologies associated with threats of human origin.



3. To learn to go deep in the knowledge, life strategies and evolutionary histories of different species of marine vertebrates.
4. To be able to develop management plans for marine vertebrates.
5. Apply the knowledge acquired to the development of research on marine vertebrate conservation.
6. To think, from different points of view and with a critical sense, in the suitability and development of management and conservation plans for endangered species.

DESCRIPTION OF CONTENTS

1. Diversity

Presentation and justification of the course: Why is important the conservation of large marine vertebrates - Biology, diversity and conservation status of marine mammals: cetaceans, pinnipeds, sirenians and other marine mammals - Biology, diversity and conservation status of marine reptiles: sea turtles, iguanas, sea snakes, marine crocodiles - Other large marine vertebrates of conservation interest.
8 hours

2. Techniques of study

Field techniques: studies at sea and on the coast: censuses, tagging and monitoring, new technologies. Laboratory techniques: morphological analysis, genetic analysis, stable isotopes, pollutants.
4 hours

3. Conservation issues

Conservation status of marine vertebrates: level of threat, commercial exploitation, past and present use, legislation aspects. - Interaction with fisheries and other activities of human exploitation of marine resources. - Effect of marine pollution: solid waste, heavy metals, organochlorine compounds, noise pollution.- Other conservation problems: Climate change. Diseases and epizootics and their relationship with threats of human origin.
5 hours

4. Practical sessions

LABORATORY PRACTICAL SESSION (Performing necropsies of cetaceans and sea turtles).
5 hours

FIELD TRIP (Detection and handling of sea turtle nests).
5 hours

**5. Seminars and group work**

Attendance to seminars and preparation and presentation of group works.

3 hours

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	20,00	100
Laboratory practices	10,00	100
Development of group work	20,00	0
Study and independent work	25,00	0
TOTAL	75,00	

TEACHING METHODOLOGY

Lectures

Practical laboratory sessions, including cetacean and sea turtle necropsies

Seminars

Collective tutorials

Group work: oral presentation of the work

Conferences and other voluntary activities

EVALUATION

The evaluation of the course will be carried out through the following procedures:

1. Attendance and use of the classes. Attendance to the practical classes will be mandatory, and a record of attendance to this activity will be kept.
2. Completion of a written test on the contents of the syllabus (**60% of the overall grade**). This test may include questions related to the practical sessions carried out.
3. Oral presentation of the group work on a conservation problem of a marine vertebrate species (**40% of the overall grade**). In this presentation the order, clarity and precision in the exposition of the work will be valued, as well as the answers given to the questions that are formulated.



REFERENCES

Basic

- Eckert, K. L., Bjørndal, K. A., Abreu-Grobois, F. A. & Donnelly, M. (eds.) 1999. Research and Management Techniques for the Conservation of Sea Turtles. IUCN/SSC Marine Turtle Specialist Group Publication No. 4. Washington, DC: 235 pp.
- Evans, P.G.H. & Raga, J.A. (eds.). (2001). Marine Mammals: Biology and Conservation. Kluwer Academic/Plenum Publishers, New York.
- Lutz P.L. & J.A. Musick (eds). (1997). The Biology of Sea Turtles, CRC Press, Boca Raton, Florida.
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- National Research Council (1990). Decline of the Sea Turtles: Causes and Preventions. National Academy Press, Washington.
- Perrin W.F., B. Würsig, & J.G.M. Thewissen (eds.). (2008). Encyclopedia of Marine Mammals. Second edition. Academic Press, San Diego, California.
- Reeves, R. R., Smith, B. D., Crespo, E. A. & Notarbartolo di Sciara, G. (eds) 2003 Dolphins, whales and porpoises: 2002-2010 conservation action plan for the world's cetaceans. Gland, Switzerland; Cambridge, UK: IUCN/SSC Cetacean Specialist Group.
- Twiss Jr. J.R. & Reeves R. R. (eds) (1999) Conservation and Management of Marine Mammals. Smithsonian Institution Press, Washington, pp.: 342-366.
- Boyd IL, Bowen WD, Iverson SJ. 2010. Marine Mammal Ecology and Conservation: A Handbook of Techniques. Oxford University Press, 450 pp.

Additional

- Casale, P. & Margaritoulis, D. (eds.). Sea Turtles in the Mediterranean: Distribution, Threats and Conservation Priorities. Gland, Switzerland: IUCN
- Hazen EL, Maxwell SM, Bailey H, Bograd S, Hamann M, Gaspar P, Godley BJ, Shillinger GL (2012) Ontogeny in marine tagging and tracking science: technologies and data gaps. Marine Ecology Progress Series 457:221-240
- Norse, E. A., and L. B. Crowder (eds.) (2005). Marine Conservation Biology: The science of maintaining the sea's biodiversity. Island Press, Washington.
- Raga, J.A. y J. Pantoja, (eds.) (2004). Proyecto Mediterráneo. Zonas de especial interés para la conservación de los cetáceos en el Mediterráneo español. Ministerio de Medio Ambiente. Naturaleza y Parques Nacionales. Serie Técnica, Madrid, 219 pp. + DVD.
- Reading, P. (2000). Endangered animals: a reference guide to conflicting issues. Greenwood Publishing Group, Westport, CT, USA.



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- Casale P, Broderick AC, Camiñas JA, Cardona L, Carreras C, Demetropoulos A, Fuller WJ, Godley BJ, Hochscheid S, Kaska Y, Lazar B, Margaritoulis D, Panagopoulou A, Rees AF, Tomás J, Turkozan O. 2018. REVIEW: Mediterranean sea turtles: current knowledge and priorities for conservation and research (Review). *Endangered Species Research* 36: 229-267.