

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

<b>Code</b>	43236
<b>Name</b>	Ichthyology
<b>Cycle</b>	Master's degree
<b>ECTS Credits</b>	3.0
<b>Academic year</b>	2022 - 2023

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
2148 - M.D. in Biodiversity: Conservation and Evolution	Faculty of Biological Sciences	1	Second term

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
2148 - M.D. in Biodiversity: Conservation and Evolution	2 - Biodiversity and conservation of vertebrates	Optional

**Coordination**

<b>Name</b>	<b>Department</b>
MONTERO ROYO, FRANCISCO ESTEBAN	355 - Zoology
PEREZ DEL OLMO, ANA	355 - Zoology

**SUMMARY**

Ichthyology is an elective course in the second year of the Master's degree in Biodiversity: Conservation and Evolution. Ichthyic fauna includes a great diversity of vertebrate groups, with very different structural plans that represent highly divergent evolutionary lines. The main focus of this course is precisely to highlight this great anatomical, biological and ecological diversity. The economic importance of different species exploited in fisheries, both global and local, will also be indicated fisheries, both global and local.

**PREVIOUS KNOWLEDGE**



### Relationship to other subjects of the same degree

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

### Other requirements

Basic knowledge of zoology is required.

## 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 be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- 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 make quick and effective decisions in professional or research practice.
- Be able to access the information required (databases, scientific articles, etc.) and to interpret and use it sensibly.
- To be able to assess the need to complete the scientific, historical, language, informatics, literature, ethics, social and human background in general, attending conferences, courses or doing complementary activities, self-assessing the contribution of these activities towards a comprehensive development.
- Stimulate the capacity for critical reasoning and for argumentation based on rational criteria.
- Awaken interest in the social and economic application of science.
- Favour intellectual curiosity and encourage responsibility for one's own learning.
- Encourage ethical commitment and environmental awareness.
- Be able to communicate and disseminate scientific ideas.

## LEARNING OUTCOMES

To:

- Correctly handling of scientific terminology, being familiarised with the methodology used in the different areas of knowledge that make up this different areas of knowledge that make up this subject and with their sources of information.



- Acquire the essential basic knowledge of current and extinct fish groups.
- Identify and interpret biological features and life cycles of the different groups of fish.
- Identify fish by means of simple keys and appropriate bibliography.
- Acquire synthesis skills in order to be able to bring together, in an organised and coherent way, information or data from different To acquire synthesis skills in order to be able to gather, in an organised and coherent manner, information or data from different sources by means of carrying out proposed work that is supervised and assessed.
- Develop a good capacity for critical thinking, encouraging communication and discussion of the different contents of the subject. of the different contents of the subject in order to stimulate individual creative capacity.

## DESCRIPTION OF CONTENTS

### 1. Introduction to pisciform vertebrates.

General characteristics.

### 2. Superclass Agnathan.

Classification. Fossil and present groups. Interaction with humans.

### 3. Superclass Gnathostomata I: chondrichthyans to teleosts.

Classification. Fossil groups. Placoderms, Chondrichthyans and Acanthodians.

### 4. Superclass Gnathostomata II: general features and minor groups.

Classification of Actinopterygians and Sarcopterygians: Chondrichthyes and Neopterygians. The Cladistids.

### 5. Superclass Gnathostomata III: Teleosts.

Relevant anatomical characters. Subdivisions: Osteoglossomorphs, Elopomorphs, Clupeomorphs and Euteleostomorphs.

**6. Fisheries and aquaculture.**

Large marine fishing areas. Main exploited species. Interaction with the environment.

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theory classes	18,00	100
Laboratory practices	12,00	100
Attendance at events and external activities	2,00	0
Development of individual work	8,00	0
Preparation of evaluation activities	15,00	0
Preparing lectures	12,00	0
Preparation of practical classes and problem	8,00	0
<b>TOTAL</b>	<b>75,00</b>	

**TEACHING METHODOLOGY**

The course consists of a series of theoretical sessions in the classroom where lectures are interspersed with problem-solving sessions in which students will discuss and present their opinions on different aspects of fish. The time needed to teach each of the topics is variable. The theory sessions required for each of them can be 1, 2 or 3 hours.

In the first session, the date of the visit to an external centre will be fixed. In addition, there will be practical laboratory sessions in which functional and anatomical interpretations of fish morphology will be carried out.

If time is available, students will prepare and present in groups a topic proposed by the teachers. The teacher's evaluation of the presentation and intervention in the seminars will be included in the mark.

**EVALUATION**

For the evaluation of the learning process, there will be a written exam in which it will be necessary to prove the knowledge acquired in the theoretical and practical sessions. The different partial contributions of the final grade will be the following:

- 1) Exam (Theoretical and practical content) .....70 %.
- 2) Seminars .....20 %.



3) Participation .....10 %.

## REFERENCES

### Basic

- Bauchot M.L. y Pras A. 1980. Guide des poissons marins d'Europe. Ed. Delachaux et Niestlé. 427pp.
- Bone Q. y Moore R. 2008. Biology of fishes. 3<sup>a</sup> ed. Taylor & Francis. 450pp.
- Castro P. y Huber M.E. 2007. Biología Marina. McGraw-Hill. Interamericana McGraw-Hill. 486 pp.
- Helfman G.S., Collette B.B. y Facey D.E. 1997. The diversity of fishes. Blackwell Science. 528 pp.
- Moyle P.B. y Cech R. 2007. Fishes. An introduction to Ichthyology. Prentice-all. 367 pp.
- Nelson J.S. 2006. Fishes of the World. John Wiley & Sons. 601 pp.
- Pough F.H., Janis C.M. y Heiser JB. 2002. Vertebrate Life. Pearson, Prentice Hall. 467pp.
- Whitehead P.J.P et al. (eds.). 1986. Fishes of the North-eastern Atlantic and the Mediterranean. UNESCO. 3 vols.