Marine Ecology

Synopsis:

This course provides a comprehensive introduction to marine ecology, exploring the structure, functioning, and diversity of marine ecosystems across spatial and temporal scales. Students examine the interactions between organisms and their physical and biological environment, from coastal to deep-sea systems, with a focus on ecological processes, biogeochemical cycles, and ecosystem dynamics. The course includes one-day field excursions to the Zwin Nature Park and Pairi Daiza, as well as a multi-day field training at STARESO (Corsica).

Students are also invited to attend guest lectures and seminars organised by the coordinator on the One Health concept, offering complementary interdisciplinary perspectives.

Aims

• Provide students with an introduction to ecological principles, focusing on key concepts relevant to marine environments.
• Develop understanding of ecological processes, species–environment interactions, and ecosystem functioning in a range of marine habitats.
• Highlight the complexity, importance, and vulnerability of marine ecosystems within a **One Health** framework linking environmental, ecosystem, and human well-being.

Learning Objectives

At the end of the Unit, students should be able to:

1. Demonstrate sound foundational knowledge in ecology and apply ecological reasoning to marine systems.
2. Explain how biotic and abiotic factors shape the spatial and temporal distribution and abundance of marine populations and communities.
3. Apply ecological principles to analyse the functioning of marine ecosystems.
4. Use appropriate tools and methods to carry out ecological surveys in representative marine environments.

Key Skills Acquired

Upon completion, students will be able to:

1. Conduct ecological sampling in marine environments and identify major taxonomic groups.
2. Collect, organise, analyse, and interpret marine ecological data.
3. Work effectively both independently and collaboratively, and communicate ecological issues clearly to scientific and non-scientific audiences.

Learning & Teaching
- Marine Ecology (15h face-to-face and tutorials)
- Marine Ecology field trip (6 days of field work)

Teaching staff: Prof. Sylvie Gobert (Coordinator), Prof. Krishna Das

Semester: 1

ECTS: 6

Status: Compulsory

Programme

1. **General Introduction and Marine Ecological Systems** (K. Das)
   Basic ecological concepts, Species–environment interactions across populations, communities, and ecosystems, Large-scale oceanographic drivers and biomes.

1.1. Estuarine systems

1.2. Rocky and sandy shores

1.3. Pelagic ecosystems

1.4. Continental shelf ecosystems

1.5. Deep-sea ecosystems

1.6. Mangrove ecosystems

2. Mediterranean Ecosystems (S. Gobert)

- *Posidonia oceanica* seagrass meadows: structure, diversity, ecological functioning, and sensitivity to environmental change.
- Mediterranean coastal, pelagic and benthic habitats
- Comparative case studies including coral reefs and abyssal Mediterranean habitats.

3. Field Activities and Applications

One-day field excursions:

- Zwin Nature Park: estuarine gradients, bird ecology, coastal dynamics.
- Pairi Daiza: applied biodiversity observations and conservation case studies.

Field training at STARESO (Corsica):

Multi-day training including snorkelling (scuba optional), species identification, ecological survey methods, underwater observations, and data acquisition within Mediterranean habitats.

Learning & Teaching Methods

• Lectures and interactive sessions (including reverse-class activities)
• Tutorials and practical workshops
• One-day field excursions (Zwin, Pairi Daiza)
• Multi-day field course at STARESO (Calvi, Corsica) with practical ecological work and observations
• Participation in guest seminars related to **One Health**

Bibliography

• PowerPoint lecture materials provided to students
• Recommended textbooks:

1. *Marine Ecology : Processes, Systems, and Impacts* (Third edition)
2. *Ocean Ecology : Marine life in the Age of Humans* (First edition)

Assessment

- Oral presentation following the field trip: **30**%
- Oral examination (open book, two questions) evaluated by both teachers: **70%**

Course Evaluation

Evalens is the evaluation tool implemented at the University of Liège to collect students' feedback objectively, with the aim of continuously improving the quality of teaching.