



Marine & Coastal Ecology

Course Details

Course Designator & Number: SCLY3207

Number of Credits: 4

Language of Instruction: English

Contact Hours: 60 (30 contact hours of lab/field work)

Instructor: Dr. Alexia Massa-Gallucci

Course Description

This course invites students to critically examine the intricate ecological processes of Mediterranean marine environments. With its extensive coastlines and diverse marine ecosystems, Sicily offers a living laboratory where theoretical concepts are brought to life through empirical observation and study. Students will engage in rigorous scientific investigations, combining fieldwork with scholarly research, to deepen their understanding of marine systems. This course not only emphasizes the biological aspects but also integrates the long-standing human interaction with the sea, fostering a holistic understanding of marine ecology in the context of Sicily's historical and cultural milieu.

Students will explore the unique characteristics of the Mediterranean Sea, its diverse ecosystems, and the interplay between organisms and their environment. Through a combination of lectures, fieldwork, and laboratory exercises, participants will gain a solid understanding of the ecological processes, species interactions, and conservation challenges specific to this region.

The provinces of Catania and Siracusa, and in particular the island of Ortigia, are perfectly situated for studying the marine environment. Easy access to the shoreline is within walking distance of the study center, and the Plemmirio Marine Protected Area (MPA) monitoring and research facilities ([Area Marina Protetta Plemmirio](#) | [Area Marina Protetta del Plemmirio](#)) are a stone's throw away. The coastline varies from sandy beaches to limestone cliffs with a great variety of flora and fauna.

Course Objectives

Upon completion of this course students will be able to:

- Recognize and identify the main fauna and flora as well as the main biotopes of the marine ecosystems in the Mediterranean Sea.
- Compare the diverse characteristics of some representative marine ecosystems of the Mediterranean Sea.
- Discuss the protection and conservation of marine biodiversity of marine ecosystems and, particularly related to the protection of *Posidonia oceanica* meadows through the intervention of environmental recovery.
- Gain scientific skills to conduct research in the sciences and environmental protection and conservation.

Methodology

Through a combination of lectures, fieldwork, and laboratory exercises, students will gain a solid understanding of the ecological processes, species interactions, and conservation challenges specific to the Mediterranean region.

Experiential Learning & Field Visits

Field and laboratory activities include:

- Visit to traditional fish market, interviewing local fishermen community
- Visit to Plemmirio MPA consortium laboratories and monitoring facilities
- Sampling of benthos/plankton within different zones of MPA and outside boundaries of MPA
- Coastal patrolling activities with MPA/environmental NGO staff
- Sorting and analysis of non-MPA, outer-MPA, and inner-MPA zone samples
- Comparative analysis with benthic samples and historical MPA datasets

Course Prerequisites

Introductory Biology or Introductory Ecology

Required Reading / Materials

- Blondel J & Aronson J., 2010: The Mediterranean region: Biological Diversity in Space and Time. 2nd Ed. Oxford University Press, New York. ISBN: 978-0-19-955799-8;
- Tait R.V. & Dipper F.A., 1998: Elements of Marine Ecology. Butterworth-Heinemann, Oxford. ISBN: 0750620889;
- Norse E.A. & Crowder L.B. (Ed.), 2005: Marine Conservation Biology. Island Press, Washington. ISBN: 1559636610;
- Methods for the Study of Marine Benthos, 4th edition Publisher: John Wiley & Sons Ltd
Editor: Anastasios Eleftheriou,

Articles and PowerPoint lecture slides are available from the instructor

Grading

Grading Rubric

Letter Grade	Score or Percentage	Description
A	93–100	Achievement that is outstanding relative to the level necessary to meet course requirements.
A-	90–92	Achievement that is significantly above the level necessary to meet course requirements.
B+	87–89	
B	83–86	
B-	80–82	Achievement that meets the course requirements in every respect.
C+	77–79	
C	73–76	
C-	70–72	Achievement that is worthy of credit even though it fails to fully meet the course requirements.
D+	67–69	
D	60–66	
F	0–59	Represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.

Summary of How Grades Are Weighted

Assignments	Percentage of Grade
Participation and attendance in class	10%
Field reports	30%
Mid-term exam	20%
Final presentation	40%
Overall grade	100%

Assessment Details

Students will be assessed via the following.

- Participation and attendance in class:
 - The course requires students to attend classes, as well as to participate in class discussions, seminars, interviews and study visits. Students should read the assigned material and be actively engaged in terms of critical reflection.
- Field reports:
 - By employing field reports as an assessment tool, the course aims to foster a deep understanding of materials, promote hands-on learning, and develop students' ability to think critically and analytically in practical settings.
 - When undertaking laboratory and field activities, students are expected to observe, document, and reflect on their experiences, integrating their findings with classroom learning. Grading criteria for field reports are based on students addressing each of the following key components:

- **Observation and Data Collection:** Students should record detailed observations, measurements, and any relevant data gathered during field activities.
 - **Integration with Theory:** In the report, students are expected to relate their observations and findings to the theoretical concepts discussed in class.
 - **Analysis and Interpretation:** Beyond mere observation, students should analyze the data, identify patterns, and draw conclusions based on their findings.
 - **Reflection:** Students should include a section that reflects on their experiences, challenges faced, and lessons learned during field activities.
 - **Presentation:** Reports should be clear, organized, and well-written, with appropriate use of figures, tables, and references, where necessary.
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- Mid-term exam: multiple choice quiz and short answer questions
 - Final presentation: slide submission and presentation on a topic of choice among selected ones pertinent with the program course

Course Content

Unit 1

The Mediterranean Sea

- Geological events, hydrological conditions in the Mediterranean
- Biodiversity estimates and patterns in the Mediterranean basin; data deficiency
- Human-induced modifications to the marine environment; pollution; coastal urbanization

Field activities:

- Visit to Ortigia fish market

Readings:

- Blondel & Aronson, 2010 (selection)
- Tait & Dipper, 1998 (selection)

Unit 2

Marine ecosystems structure & dynamics

- Hydrography of the Mediterranean basin
- Abiotic and biotic factors
- Tides, currents, and marginal seas in the Mediterranean basin
- Introduction to measuring and sampling techniques and tools in marine ecological research: water sampling

Field activities:

- Visit to Plemmirio MPA consortium laboratories and monitoring facilities

Readings:

- Blondel & Aronson, 2010 (selection)
- Tait & Dipper, 1998 (selection)

Unit 3

Marine habitats & associated flora

- Primary production, grazing chain and detritus chain
- Characteristics of biological systems
- Evolution and taxonomy
- Seaweeds and seagrasses; the ecological role of *Posidonia oceanica*
- Marine plankton and its ecological role
- Introduction to measuring and sampling techniques and tools in marine ecological research: biological sampling

Field and laboratory activities:

- Sampling of benthos/plankton within different zones of MPA and outside boundaries of MPA

Readings:

- Tait & Dipper, 1998 (selection)
- Eleftheriou, 2013 (selection)

Field Report #1 due

Unit 4

Marine habitats & associated fauna

- Porifera; Cnidaria; Ctenophora
- Platyhelminthes; Kinorhyncha; Nematoda; Mollusca; Anellida
- Arthropoda and Crustacea; Sipuncula; Echiura and Pogonophora
- Phoronida, Ectoprocta, and Brachiopoda
- Echinodermata; Chaetognatha and Hemicordata
- Fishes: Chondrichthyes and Osteichthyes
- Cetaceans
- Introduction to measuring and sampling techniques and tools in marine ecological research: underwater observations

Field and laboratory activities:

- Coastal patrolling activities with MPA / NGO staff

Unit 5

Ecosystems of the Mediterranean Sea

- Open water ecosystems: Plankton, nekton, and oceanic processes
- Deep-sea biodiversity and adaptations to extreme conditions
- Rocky shores and intertidal zones: Species adaptations and zonation patterns
- Seagrass beds and their ecological importance
- Measuring and sampling techniques and tools in marine ecological research: assessment and monitoring techniques

- Field and laboratory activities

Field and laboratory activities:

- Benthic sorting and analysis (non-MPA and outer MPA zone samples)

Field Report #2 due

Mid-Term Exam

Unit 6

Human impacts on the marine environment

- Biological consequences of the sprawl of non-native species
- Climate change and ocean acidification
- Sustainable fisheries practices and aquaculture in the Mediterranean

Field and laboratory activities:

- Benthic sorting and analysis (inner MPA zone samples)

Readings:

- Norse & Crowder, 2005 (selection)

Unit 7

Conservation of marine biodiversity

- Marine Protected Areas

- Habitat restoration

Field and laboratory activities:

- Comparative analysis with benthic samples and historical MPA datasets

Readings:

- Norse & Crowder, 2005 (selection)

Field Report #3 due

Final Presentation slide submission due

Policies

Attendance Policy

Students are expected to be on time and attend all classes while abroad. Many instructors assess both attendance and participation when assigning a final course grade. Attendance alone does not guarantee a positive participation grade; the student should be prepared for class and engage in class discussion. See the on-site syllabus for specific class requirements.

University of Minnesota Policies & Procedures

Academic integrity is essential to a positive teaching and learning environment. All students enrolled in University courses are expected to complete coursework responsibilities with fairness and honesty. Failure to do so by seeking unfair advantage over others or misrepresenting someone else's work as your own can result in disciplinary action. The University Student Conduct Code defines scholastic dishonesty as follows:

Scholastic Dishonesty

Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis.

Within this course, a student responsible for scholastic dishonesty can be assigned a penalty up to and including an “F” or “N” for the course. If you have any questions regarding the expectations for a specific assignment or exam, ask.

Student Conduct

The University of Minnesota has specific policies concerning student conduct. This information can be found [on the Learning Abroad Center website](#).