



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Environmental Lab

2627-2-F7504Q025-F7504Q02502

Aims

The overall aim of the course is to transfer the theoretical knowledge acquired from previous course into practical research activities on the field aimed at monitoring and investigating different Mediterranean marine habitats with a multidisciplinary approach combining the analysis of both living and dead assemblages with the assessment of abiotic parameters controlling the distribution of the organisms (and in particular carbonate producing organisms). In detail, the Environmental Lab aims at equipping the students with monitoring techniques for the marine environments based on the analysis of the benthic invertebrate fauna and the benthic flora and their relationship with environmental parameters. The analysis will include both living and dead assemblages, in order to track the paleoenvironmental evolution of the environment.

D1 – Knowledge and understanding:

During lectures, students will learn to interpret technical documents and data regarding the conditions and distribution of marine environments. Field activities will then introduce them to monitoring techniques for analyzing benthic organisms and environmental parameters.

D2 – Applying knowledge and understanding:

Course activities aim to enable students to draft experimental protocols for assessing the status of marine benthic environments and providing institutional stakeholders with data-driven solutions to environmental challenges. Additionally, the 'environmental' module will provide students with the framework to understand and assess marine environments from a geological perspective.

D3 – Making judgements:

Field activities will enable students to independently interpret their findings by benchmarking collected data against current scientific literature. Additionally, compiling the fieldwork report will strengthen their critical thinking skills.

D4 – Communication skills:

During fieldwork, students will collaboratively conduct monitoring and process the collected data. At the end of these activities, they will present their findings through both a written report and an oral presentation. By focusing on the ability to organize and deliver scientific data, the final assessment aims to strengthen students'

communication skills.

D5 – Learning skills:

Students will develop their learning skills throughout all phases of the course, gaining the ability to expand their knowledge independently through the analysis of the collected data.

Contents

Basic elements of sedimentology, geology and coastal geomorphology, reading of geological maps and habitat maps, sampling techniques for benthic communities, monitoring techniques for coastal environments, identification of benthic assemblages, analysis and processing of data on benthic assemblages.

Detailed program

Pre-field work lesson (a 3-hours asynchronous remote teaching activity, interactive mode, 3h, DI):

Refresher on the effects of the various environmental and geological parameters on benthic communities; analysis of geological and habitat maps; environmental and geological overview of the area of field activities. This activity will be followed by an e-learning test that will help the student to self-assess his knowledge and his comprehension of these contents.

Campus abroad (field activities, in person, interactive mode 24 h, DI):

1. Analysis of the study area with the help of geological and geomorphological maps; exploration of the study area with a focus on coastal sedimentary processes, coastal erosion, human activities and their effect on the environment.
2. Monitoring of the main environmental parameters (temperature; water turbidity; currents) and of the sea-floor (mapping of the habitats).
3. Preparation of the sampling protocol and sampling activities of the benthic community of selected habitats.
4. Sample preparation and preliminary analysis of the various samples.
5. Integrative sampling.
6. Preliminary analysis of the data with a focus on the relationship between benthic communities and environmental parameters.

Post-field work lessons (Two 2-hours asynchronous remote teaching activities, 4h, DE):

1. Analysis of the samples and detailed taxonomic analysis of certain groups of benthic carbonate producing organisms of the benthic community.
 2. Quantification of the abundance of the various groups of organisms.
 3. Data analysis and data processing
- The first lesson will show the students the result of the analysis of the collected samples. The second lesson will be the discussion of the results of the analysis.

Prerequisites

Basic knowledge of geology, paleontology, sedimentology and marine geomorphology (Geobiology course is highly recommended)

Overall, regarding the field activities (Campus Abroad activities), each student must have the possibility to independently reach the Campus Abroad location and a small contribution from the students, in order to cover accommodation expenses, might be required. The attendance of the field activities is mandatory

Teaching form

One 3-hours asynchronous remote lecture activity, interactive mode

24h of in person mandatory field activities (3 days, Campus abroad) (Attendance of field activities is mandatory)

Two 2-hours asynchronous remote lecture activity, delivered didactic

Textbook and teaching resource

Slides and self-assessment test on the e-learning page of the course

Semester

Second semester

Assessment method

The self-assessment test following the pre-field work laboratory, will be mandatory and it will contribute to the final score of the module by adding up to 2 points. It will consist of thirty questions. The questions will be related to the content of the pre-field work activity. The aim of the test will be essentially to verify the basic understanding of the principles of the geological approach to environmental monitoring.

During fieldwork, students must maintain a field notebook to document activity details, sampling procedures, and protocols. Following these activities, they will draft a report based on a structured framework provided during post-fieldwork sessions.

This report will be graded on a 30-point scale, evaluating the students' ability to synthesize and organize the information gathered in the field.

Subsequently, students will deliver an initial presentation based on their report. After receiving feedback and reviews, they will revise and re-present their data for a final evaluation (also graded 0 to 30). This final assessment aims to test: 1) the ability to connect information and explain it clearly using appropriate technical terminology; 2) proficiency in processing and displaying data; and 3) the capacity to incorporate corrections and refine a technical document.

The final course grade will be determined by the average score of the report and the presentation, plus up to 2 additional points for the self-assessment test.

The final grade is expressed on a 30-point scale and will be based on the following criteria:

D1 – Knowledge and understanding

- D2 – Applying knowledge and understanding
- D3 – Making judgements
- D4 – Communication skills
- D5 – Learning skills

Assessment below 18/30

- D1: The student demonstrates fragmented theoretical knowledge.
- D2: The student is unable to integrate knowledge into a complete analysis of case studies.
- D3: The student processes information inaccurately and incompletely and is unable to critically elaborate on the concepts.
- D4: During the presentation and/or oral examination, the student does not use appropriate scientific terminology and communicates in an unclear and ineffective way.
- D5: The student does not demonstrate awareness of their learning process and is unable to identify the essential connections among the topics addressed.

Assessment 18–22/30

- D1: The student demonstrates fairly complete theoretical knowledge, although with some inaccuracies.
- D2: The student integrates knowledge into the analysis of case studies, but in an incomplete way.
- D3: The student is able to discuss concepts critically at a basic level, with some inaccuracies.
- D4: During the presentation and/or oral examination, the student uses appropriate scientific terminology, although with some inaccuracies, and communicates in a reasonably clear way.
- D5: The student demonstrates a basic awareness of their learning process and is able to identify some essential connections among the topics addressed.

Assessment 23–27/30

- D1: The student demonstrates complete and in-depth theoretical knowledge.
- D2: The student satisfactorily integrates knowledge into the analysis of case studies.
- D3: The student is able to critically and coherently discuss concepts, showing good ability to elaborate information.
- D4: During the presentation and/or oral examination, the student demonstrates good command of scientific terminology and communicates clearly and effectively.
- D5: The student demonstrates good awareness of their learning process and is able to highlight the connections among the different components analysed.

Assessment 28–30/30

- D1: The student demonstrates complete, in-depth, and rigorous theoretical knowledge.
- D2: The student demonstrates an advanced ability to integrate knowledge for the analysis of case studies and the interpretation of the analysed data.
- D3: The student is able to critically and coherently discuss concepts, elaborating information in a solid and articulated way, with a well-structured logical approach.
- D4: During the presentation and/or oral examination, the student demonstrates excellent command of scientific terminology and communicates clearly and effectively.
- D5: The student demonstrates advanced awareness of their learning process and is able to connect the different components analysed in an effective, coherent, and rigorous way.

Office hours

Upon appointment by e-mail to the professors

Sustainable Development Goals

LIFE BELOW WATER
