



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Introduzione alla Geografia degli Oceani

2627-3-E3401Q053

Aims

Acquire basic knowledge of the functioning of biotic and abiotic components in marine systems in order to understand the functioning of the Earth system.

D1 – Knowledge and understanding

Students will learn about the physiography of the marine environment and geological and geomorphological survey techniques at sea. They will acquire the basic principles of physical, chemical, and biological oceanography.

D2 – Applying knowledge and understanding

Students will be able to apply the acquired knowledge to the interpretation of bathymetric and bathymorphological maps. They will be able to interpret marine sediments in terms of palaeoenvironmental conditions based on information about the present-day environment.

D3 – Making judgements

Students will be able to integrate different sources of information and critically evaluate the different case studies analysed.

D4 – Communication skills

Students will be able to communicate the acquired knowledge by presenting information clearly and using appropriate scientific terminology. During written mid-term assessments, they will be able to effectively summarise information when answering open-ended questions.

D5 – Learning skills

Students will be able to independently expand their knowledge through research and critical reading of scientific papers related to the topics covered during classes.

Contents

Introduction to the marine environment in its various components.

Main physical, chemical and biological characteristics of water masses; techniques of observation, measurement and sampling of water masses.

Marine sediments: nature, composition and origin of terrigenous, volcanoclastic, neritic, pelagic, hydrothermal and authigenic sediments.

The seafloor: physiography, geomorphology and processes: analysis and sampling techniques.

Detailed program

Physical, chemical and biological characteristics of the water masses: insolation, temperature, salinity, density, horizontal and vertical circulation, waves, tides, dissolved gases (O₂ and CO₂), nutrients, primary production. Organic matter in the marine environment and the C cycle. Measuring and sampling the water column and assessing biogeochemical fluxes (CTDs, rosettes with sampling bottles, sediment traps).

Nature and origin of marine sediments: lithogenic, volcanogenic, neritic, pelagic, hydrothermal, authigenic sediments.

Seafloor sampling techniques: grabs, box-corers, multi-corers, gravity and piston corers; ocean drilling for scientific research.

Geology and oceanographic explorations. Fundamentals of submarine geomorphology. Marine physiographic provinces and their large morpho-structural units. Continental margins and ocean basins. Drivers of seafloor and coastal geomorphic changes.

Technologies of observation and sampling of the marine system. Ship positioning and navigation. Acoustic seafloor mapping.

Bases of paleoceanography

Prerequisites

All exams of the first year and the foreign language proficiency test

Teaching form

24 two-hour Lectures in person, Delivered Didactics (6 ETCS, 48 hours)

Textbook and teaching resource

Recommended text: Trujillo and Thurman, 2011. Essentials of Oceanography. 10th Edition. Prentice Hall

Slides of lessons provided by the teacher on e-learning

Semester

second semester

Assessment method

The assessment of students' achievement will be **based on**:

- 4 mid-term tests on the different topics presented during lectures, to be carried out in the classroom during the semester.
- alternatively, an oral examination.

Each mid-term tests will consist of 20 multiple-choice and/or true-false questions, designed to assess the theoretical knowledge acquired by the student and their ability to link different concepts and information, as well as 2 open-ended questions aimed at evaluating the student's ability to summarise knowledge using appropriate scientific terminology and to represent concepts graphically.

Passing all four tests, each with a grade of at least 18/30, allows students to be exempted from the oral examination.

The oral examination consists of two open-ended questions related to the topics covered during lectures. During the oral examination, the lecturers will assess the knowledge and skills acquired, the ability to integrate information, the appropriateness of scientific terminology, and the student's mastery of the course topics.

The final grade, expressed on a 30-point scale, will be calculated either as the average of the grades obtained in the four tests or as the grade obtained in the oral examination, 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 the acquired knowledge.

D3: The student processes information inaccurately and incompletely and does not demonstrate critical thinking skills.

D4: In the open-ended questions 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, but in an incomplete way.

D3: The student is able to discuss concepts critically at a basic level, with some inaccuracies.

D4: In the open-ended questions 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 the acquired knowledge.

D3: The student is able to critically and coherently discuss concepts, showing good ability to elaborate information.

D4: In the open-ended questions 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 concepts acquired.

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.

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: In the open-ended questions 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 concepts acquired in an effective, coherent, and rigorous way.

Office hours

Any time, upon request by e-mail followed by confirmation by the professor

Sustainable Development Goals

AFFORDABLE AND CLEAN ENERGY | LIFE BELOW WATER
