UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Sedimentology

2627-2-E3402Q013

Aims

By the end of the course, students will possess the theoretical and practical knowledge in Sedimentology required to understand the structure and surface evolution of planet Earth.
Students will have consolidated the technical and practical skills specific to Sedimentology, such as:

- Understanding different transport and sedimentation processes;
- Knowledge of the various types of sediments and sedimentary rocks;
- Knowledge of terrestrial and marine sedimentary environments;
- Recognition of sedimentary structures and their related depositional environments;
- Sedimentological interpretation of a sedimentary succession (facies analysis);
- Knowledge of the sedimentary succession of the Southern Alps.

Students will therefore be able to independently apply the acquired knowledge to:

- Describe, recognize, classify, and analyze different sedimentary environments, both in the laboratory and in the field;
- Independently evaluate the complexity of sedimentary systems, adequately plan geological investigations, collect necessary data, and assess the quality and reliability of the acquired data;
- Evaluate the role and responsibilities of Sedimentology in hydrogeological risk management (floods);
- Correctly communicate information and issues related to Sedimentology in both oral and written forms to specialist and non-specialist audiences (engaging in dialogue within multidisciplinary groups on environmental sedimentary topics of global interest);
- Learn independently through the use of texts and databases to deepen and update their knowledge over time. This skill is acquired during group activities in the field and laboratory.

Contents

The facies concept and Walther's Law. Different types of sediments and sedimentary rocks. Characteristics of sediments and sedimentary rocks. Particles, textures, cements, and porosity. Sedimentary structures. Different types of sedimentary environments. The Southern Alps sedimentary succession.

Detailed program

The facies concept and Walther's Law. Sedimentation: processes and products. Textures and statistical parameters. Shape, roundness. Porosity. Cohesive and frictional sediments. Description of sediments and sedimentary rocks: particles, textures, cements, and porosity. Intra-basinal and extra-basinal grains. Carbonate sediments and carbonate rocks. Classification and environmental analysis. Terrigenous sediments and clastic rocks: classification and provenance analysis. Diagenesis. Sediment transport: bed load and suspended load. Tractional processes and flow regimes (e.g., Hjulström diagram). Bedforms. Gravity-driven processes and mass sedimentation. Formation and recognition of sedimentary structures: tractional structures from unidirectional and oscillatory currents, settling and traction/settling structures. Erosional and deformational structures. Depositional environments: Alluvial fans and braided rivers. Alluvial plains and large meandering rivers. Deltas, tidal flats, and beaches. The continental shelf. Pelagic environments. Turbidity currents and turbidites. Carbonate platforms. Dolomitizing and evaporitic environments. Anoxic basins. The Southern Alps sedimentary succession.

Prerequisites

Students have to followed and taken the:

Principles of Geology

and followed the:
Corso di Sicurezza sul Terreno

Teaching form

- 16 in-person lectures (2 hours each) alternating between direct instruction and interactive learning (4 CFU).
- 9 in-person laboratory practicals (2 hours each) focusing on real case studies through individual and group work. Interactive learning (1.5 CFU).
- 1 field trip (6 hours in person) on the sedimentary succession of the Southern Alps Domain. Interactive learning (0.5 CFU).
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The course also features a Disciplinary Tutor (24 hours) who will support students, particularly during laboratory practicals. The tutor will assist students in consistently and regularly following the course development to ensure better preparation for the exam.

Textbook and teaching resource

- Textbook: Sedimentologia vol.3 Ambienti sedimentari e facies by Ricci Lucchi Franco. Pages: 548.

- Lecture slides and educational materials provided by the instructor.

Semester

Semester 1.

Assessment method

Skills acquired during lectures will be assessed through a written exam followed by an oral exam.
Grading will generally evaluate the application of specific principles to analyze and describe a sedimentological process, as well as the ability to connect the topics covered during the course.
The written exam questions will involve simple exercises, such as plotting grain-size curves and calculating textural parameters of a sediment, or drawing and describing a simple stratigraphic log related to a specific depositional environment.
Upon passing the written exam, students will take a short oral exam covering all course topics.
If the oral exam is failed, the written exam must be taken again.

Office hours

To schedule an appointment, please contact email alberto.resentini@unimib.it

Sustainable Development Goals

CLIMATE ACTION