



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Biofacies

2122-1-F7401Q082

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#### Aims

##### Benthic facies and applied marine paleoecology

To provide technical skills to plan, analyse and interpret the results of the paleontological and paleoecological investigation. To provide the rationale and the methods for the use of palaeoecology in the reconstruction of recent environmental changes in transitional and marine coastal areas, on the basis of the interplay between natural change and history of the anthropogenic impact. Ability to identify and interpret some common macrobenthic facies, and taphofacies. Ability to manage the commonest multivariate methods of statistical analyses for the interpretation of benthic associations.

##### Microfacies: the Pelagic Environment

Knowledge of the microfossil groups which are useful to define a paleoenvironmental and biostratigraphic framework from different oceanographic settings. Taxonomic bases for the identification of the main planktonic species. Application of microfossil assemblage for paleoecological reconstructions. Environmental Micropaleontology. Taphonomy.

#### Contents

##### Benthic facies and applied marine paleoecology

Identifying biofacies as a tool for paleoenvironmental definition. Applications and examples. Introduction to applied marine paleoecology: rationale, sampling strategies, case histories. Multivariate statistics applied to paleoecological analysis. Observations, laboratory analyses and techniques.

## Microfacies: the Pelagic Environment

Recognition of biofacies for the definition of the pelagic paleoenvironment in different oceanographic settings. Bases of plankton taxonomy. Taphonomy. Applications and examples from present-day and past environments.

## **Detailed program**

### Benthic facies and applied marine paleoecology

Lessons: Sampling strategies and techniques for the study of marine and transitional benthic associations, death and fossil assemblages. Taphonomic processes and their effects on macrobenthos. Applied marine paleoecology: rationale, case histories. Multivariate statistics for benthic paleoecology.

Laboratory: Identification of key species within the main macrobenthic groups (mollusks, brachiopods, corals, calcareous algae, bryozoans). Quantification of the sedimentary contribution of the components of the benthic association. Macrobenthic facies analysis and identification of the paleoenvironment. Laboratory techniques and analyses for the study of marine and transitional benthic associations, death and fossil assemblages. Observations of the effects of the biostratigraphic processes on shelled macrobenthos. Preparation, elaboration, and interpretation of multivariate paleobiological data.

Campus: Recognition in the field of significant benthic facies and their paleoecological importance

### Microfacies: the Pelagic Environment

Lessons: Microfossils and oceanic (paleo)environments. Taxonomic bases for the identification of the main plankton groups. Plankton paleoecology and biogeography. Biofacies in the pelagic environment: sedimentary environment and diagenesis. Bases for the definition of a biostratigraphic framework for pelagic sedimentary successions. Examples from the present-day environment and from the geological record.

Laboratory: Identification, through binocular and polarized light microscope, of key species within the main microfossil groups (calcareous nannofossils, diatoms, silicoflagellates, foraminifera). The laboratory classes will be devoted to: a) the recognition of biofacies and the identification of paleoenvironments (coastal zone, continental shelf, continental slope, abyssal plain) in different settings (mid-ocean oligotrophic gyre, upwelling zones, areas with strong continental input, polar zones); b) the identification of biozones through the recognition of biostratigraphic markers for selected time frames.

Campus: Recognition in the field of significant planktonic facies and their paleoecological importance

## **Prerequisites**

Paleontology, Geobiology

## **Teaching form**

Lessons

Laboratories

Campus

*During the COVID-19 restrictions the lessons will be recorded and available online, with some live events that will be planned and communicated on the e-learning page of the course.*

## **Textbook and teaching resource**

Slides and scientific papers provided by the Lecturers

## **Semester**

Second semester

## **Assessment method**

2 self-assessment tests, to be done through the e-learning platform, with multiple choice or true/false questions, to be successfully completed before the oral examination

Written reports on the lab activities

Written reports on the campus activities

Oral examination: two open questions on the themes explained in classes (one on benthic facies, one on planktonic facies)

Grading: weighted average of all grades, in /30.

*During the Covid-19 restrictions the oral exams will be exclusively through the WebEx platform. A public link will be posted on the e-learning page of the course for the access of virtual public.*

## **Office hours**

Monday and Thursday 9:00 AM - 12.00 A.M. upon appointment by email

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