UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Applied Ecology

2425-2-E3201Q076-E3201Q085M

Aims

The course provides basic knowledge of applied ecology. The main objective of the course is the knowledge of human interactions with natural ecosystems, given the value of the impact that our species has on the ecosphere. A laboratory of applied ecology is foreseen during the course (attendance to the laboratory is compulsory for at least 75% of the lessons)

Particularly the following educational objectives are planned

**Knowledge and understanding
Knowledge of the impacts of human activities on natural ecosystems.

**Knowledge and applied understanding
Knowledge, understanding, and application of the main methodologies useful to assess the quality status of ecosystems.

Autonomy of judgment
Through the acquisition of the concepts of applied ecology, the student will increase his judgment and choice autonomy in the selection of strategies for environmental protection.

**Communication skills
During the lessons, the student will be invited to take an active part in the lesson by discussing the topics covered in class. This will improve communication skills in public.

**Ability to learn
The course will improve the student's learning skills in the interpretation of natural phenomena, disturbance and stress of natural or anthropic origin.

Contents

Contents:

Applied ecology: Human activities and environmental damage. Environmental quality criterion. Organic pollution of surface water. Eutrophication of lakes and marine coastal water. Changes of river hydrology. Effects of toxic chemicals on ecosystems. Ecological effects of soil and air pollution. Greenhouse gas emissions. Acid rain. Ozone layer depletion. Ecological parameters and quality indices. Global contamination. Chemical and biological monitoring.

Detailed program

Syllabus:

Applied ecology:

Human activities and environmental damages.

Macro and microcontaminants. Ecological effects of urban and industrial settlements, agriculture, animal farms, energy production.

The concept of admissible load.

Examples of environmental problems at the local and global scale and effects on aquatic and terrestrial ecosystems.

Organic pollution: BOD and COD. Eutrophication of lakes and marine coastal waters. The mass balance model for eutrophication management.

Morphoedafic indices. The control of eutrophicatin. Measure and estimation of nutrient loads.

Hydromorphological changes of rivers.

Effects of oil pollution.

Atmospheric pollution. Effects of greenhouse gases, acid rain, ozone layer reduction.

Effects of soil pollution.

Global pollution from persistent organic pollutants.

Environmental quality criteria in international regulations.

Chemical and biological monitoring for environmental quality assessment.

Bioindicators. Biological indices. The Extended Biotic Index (EBI) and the river macrozoobenthos. Biological monitoring planning. Quality maps. Field studies.

Sustainability and Ecological footprint.

The concept of “Planetary Boundaries” for global environmental changes.

Prerequisites

Basic knowledge of general ecology, mathematics, chemistry, physics and statistics, as well as of botanical and zoological subjects.

Teaching form

- 16 lectures (two hours each), in person, Delivered Didactics;
- 5 practical classes (two hours each) in person, Interactive Teaching;
- 10 hours of field activities, in person, Interactive Teaching

Textbook and teaching resource

slide

Semester

second

Assessment method

oral examination

oral examination at the end of the course. The evaluation criteria will consist in the verification of the student's knowledge of the program presented during the course of general and applied ecology, as well as on the experiences made during the attendance of the laboratory of ecology (the presence is compulsory for at least 75% of the lectures). The exam will aim to ascertain the acquisition of basic skills and to evaluate the understanding of the concepts, the ability to connect the various topics covered. It is underlined that, at the end of the laboratory activities, an oral exam with a vote expressed out of thirty is foreseen. Consequently, the final vote will be calculated using the weighted average of the credits of the three parts of the course (General Ecology, Applied Ecology and Applied Ecology Laboratory).

mark range 18-30/30

Office hours

by arrangement writing an email to antonio.finizio@unimib.it

Sustainable Development Goals

LIFE BELOW WATER | LIFE ON LAND