UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Ecosystem Services (regulating)

2425-1-F0601Q109-F0601Q111M

Aims

Knowledge and understanding: To provide tools and multidisciplinary knowledge on the regulatory ecosystem services mediated by biodiversity in natural and anthropogenic environments (e.g. pollination, dispersal of seeds, removal of pests, water and air purification) carried out by animals and microrganisms. The teaching will examine the biodiversity-environment interface and the interactions between organisms, which are intrinsic aspects of the concepts of ecological transition and "One Health". In addition, management and mitigation issues will be addressed to increase the functionality and resilience of ecosystems.

Applied knowledge and understanding: The student will acquire a multilevel vision of the environmental sustainability and the role of biodiversity in the regulation of natural and non-natural ecosystems. The field and laboratory activities will allow a practical knowledge of the subject, and the multidisciplinary techniques will be immediately applicable in other professional contexts based on biological and environmental nature. The module will allow the development of skills towards the critical assessment of regulatory ecosystem services and also of ecological transition processes (e.g. Nature Based Solutions, strategies for mitigating environmental and anthropogenic effects) applicable to micro and macroscale territorial contexts.

Making judgment: The student will acquire the ability to critically and autonomously assess the regulatory ecosystem services in relation to biodiversity and to interpret the environment in an ecological transition perspective. The student will also be able to plan actions for the restoration of ecosystem functions in order to mitigate the ongoing impacts.

Communication skills: the course aims to provide the student with the skills to evaluate and communicate effectively, modernly and with specific language the concepts relating to functional biodiversity and the benefits it brings to ecosystems and to humans.

Learning skills: at the end of the course, the student should be able to independently investigate the topics covered, have a multidisciplinary vision and develop the ability to interface with experts or consult dedicated scientific documentation.

Contents

The module focuses on the practical activity of characterization and estimation of the biotic components that contribute to the regulation ecosystem services, in natural environments and in those subjected to anthropic disturbance. The teaching focuses on the analysis of biotic interactions to understand the main functional groups and quantify their interactions, from the point of view of regulatory ecosystem services. Actions will also be planned to mitigate human disturbance and strengthen the ecosystem service through land requalification/management actions.

Detailed program

The module program includes 2 CFUs of practical activities in the field lasting several days, alternating with intermediate frontal teaching activities. These activities will be carried out in different ecosystems of natural areas of regional and national interest (parks, reserves) but also in anthropized areas (urban green areas). This will set the scenario for comparing how the functional biodiversity is affected by landscape modification such as land use or the alteration of basal resources. The following topics will be addressed: i) regulatory services mediated by interactions between species (pollination, microbiome); ii) how sampling can be structured to evaluate regulatory ecosystem services mediated by species; iii) what techniques can be applied for sampling; iv) field and computer surveys of environmental parameters, and v) the characterization of interactions between the main functional groups (pollinators, predators, seed dispersers, environmental microbial communities). These activities will also be accompanied by data analysis to provide the skills of interpretation and understanding of the ecosystem regulatory service. An important phase will also be dedicated to elaborating possible solutions for the mitigation of anthropogenic disturbance.

Prerequisites

Basic knowledge of biology (zoology, ecology, botany, microbiology) and statistics.

Teaching form

Lectures in the field and in the classroom, seminars by ecosystem services experts.

- 1 4-hour laboratory lesson carried out in interactive mode in person;
- 1 4-hour laboratory lesson carried out in explanatory mode in person;
- 2 total exercises. 12 hours carried out in interactive mode in person;

Textbook and teaching resource

The teaching material (presentations and in-depth scientific articles) will be made available on the University e-learning platform.

Semester

Spring semester (May/June).

Assessment method

The oral exam in the form of an interview on the topics covered in class is aimed at assessing the student's knowledge of the laboratory topics. No ongoing tests are foreseen.

Evaluation criteria: evaluation of scientific and technical knowledge regarding the issues of qualitative and quantitative characterization of functional biodiversity, critical ability and individual re-elaboration of experimental problems assigned by teachers, communication skills and correct use of technical language.

Office hours

By appointment by writing to the lecturer by e-mail: paolo.biella@unimib.it; antonia.bruno@unimib.it

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | SUSTAINABLE CITIES AND COMMUNITIES | LIFE ON LAND