UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Laboratory of Functional Biodiversity

2223-1-F0601Q109

Aims

Knowledge and understanding: The laboratory course is aimed at providing the students with tools and multidisciplinary knowledge concerning the characterization of biodiversity with a specific focus on the functional aspects driving the main ecosystem services of support and regulation in natural and anthropized environments (e.g. pollination, seed dispersal, pest removal). The vision that is intended to communicate is the one of multilevel interactions among environmental variables and the organisms, which is intrinsic to the concepts of ecological transition and “one health”.

Applied knowledge and understanding: the course will permit to the student to develop a multilevel vision of biodiversity and environmental sustainability, that goes further in considering the classic concepts of bioindication and biodiversity conservation. The proposed field activities will provide a real vision of the ecosystem and will permit to know its dynamics through multidisciplinary tools and approaches. From the applicative point of view, the course will permit to develop specific knowledge in the fields of designing, supporting and critically evaluating the processes of ecological transition (e.g., Nature Based Solutions, mitigation strategies) that could be applied to different territorial contexts in terms of micro and macroscale.

Autonomy of judgment: Learn and interpret the main risk factors for biodiversity and the possible mitigation strategies that can be implemented to increase the functionality and resilience of ecosystems from an ecological transition perspective.

Communication skills: the course aims to provide the student with the skills to evaluate and communicate in an effective, modern way and with specific language, the concepts related to functional biodiversity and the benefits it brings to ecosystems (and therefore to the human), a fundamental aspect in context of the ecological transition.

Ability to learn: 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 industry experts or consult dedicated scientific documentation.

Contents

The laboratory is made up of strictly connected theoretical and practical elements. The first part involves the practical activity of characterization and estimation of biodiversity in natural ecosystems and in environments subject to anthropogenic disturbance. Environmental parameters and disturbing factors that can influence biological complexity will be analyzed in detail. The second part focuses on the analysis of functional interactions and will allow the student to understand which are the main functional groups present and to quantify their interactions, from the perspective of ecosystem services of regulation and support. The last part of the laboratory will be dedicated to interpreting the results obtained from the previous phases in a multidisciplinary and critical way in order to identify which functional components of biodiversity require protection and/or strengthening actions through the planning of territorial requalification/management actions. An important element will also be predictive analysis that will allow to evaluate how any protection or disturbance actions act on the ecosystem and the services associated with them and the repercussions in the field of sustainability and well-being not only for the biodiversity of the ecosystem itself but also for humans.

Detailed program

The course program includes 6 CFU 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 close to these. One of the objectives is in fact to compare how functional biodiversity is influenced by key variables, such as land use, the abundance of water and the abundance of resources. We will study how these elements have an impact on both the qualitative and quantitative aspects of the ecosystem and more generally on the well-being of organisms including humans. To this end, activities will be carried out for the detection of environmental parameters, sampling of organisms, their identification and characterization of the main functional groups (e.g. pollinators, predators, seed dispersers, etc.). These activities will also be accompanied by statistical and computer analysis to provide the student with the necessary skills in interpreting the data collected in order to understand in detail the dynamics of interaction and their relevance in the ecosystem. A final critical phase will also be dedicated to the elaboration of possible solutions for the conservation and restoration of biodiversity and mitigation activities of stress factors.

Prerequisites

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

Teaching form

Lectures in the field and in the classroom, eventual seminar activities by experts and land management operators.

Textbook and teaching resource

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

Semester

Second semester.

Assessment method

The oral exam is aimed at assessing the student's knowledge of the topics of the laboratory.

Office hours

By appointment by writing to the teachers.

Sustainable Development Goals

SUSTAINABLE CITIES AND COMMUNITIES | LIFE ON LAND