



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Biodiversità e Conservazione

2627-1-F7503Q009

Aims

The contents of the Biodiversity and Conservation course aim to provide the student with a solid awareness of the ongoing biodiversity crisis. Specifically, it aims to:

- list the factors of direct or indirect threat, general and specific, for animal species, deriving from the exploitation of natural resources by humans
- highlight the effects of the loss of Biodiversity, Natural Capital and related Ecosystem Services (instrumental value of natural resources)
- illustrate the ethical reasons for the conserving Biodiversity (intrinsic value of Biodiversity)
- provide the tools to analyze the trends of animal populations through monitoring programs (topic particularly detailed during the practical part / field trips)
- indicate possible management actions and strategies (eg ecological networks), by applying the Island Biogeography Theory and Metapopulation Theory, aiming at the protection and restoration of fragmented landscapes.

According to the Dublin Descriptors, the course aims to achieve the following learning outcomes:

Knowledge and understanding. By the end of the course, students will have acquired knowledge of the main drivers of biodiversity loss, the ecological and socio-economic consequences of biodiversity decline, and the theoretical foundations of conservation biology, with particular emphasis on wildlife monitoring, conservation biogeography, and metapopulation dynamics.

Applying knowledge and understanding. Students will be able to apply the main wildlife monitoring techniques, analyze data collected during field activities, and interpret the results to support biodiversity conservation and management.

Making judgements. Students will be able to critically evaluate the main threats to biodiversity and discuss appropriate conservation strategies based on the available scientific evidence.

Communication skills. Students will be able to communicate the main issues related to biodiversity conservation and discuss the results of monitoring activities using appropriate scientific terminology.

Learning skills. Students will be able to independently deepen their knowledge by consulting the scientific literature and apply the acquired knowledge to the study of related disciplines.

The course includes practical activities such as field trips and data processing activities, which will allow to familiarize with the practice of conservation. Specifically, in the field, wildlife census programs will be simulated and, subsequently, in the laboratory, analyzes of the data collected will be carried out.

Contents

Threats to biodiversity. Destruction, fragmentation and degradation of habitats, introduction of alien species, climate change. Conservation status of fauna. Wildlife monitoring methods. Regulatory aspects relating to the protection of fauna. Demographic models, Theory of island biogeography, Meta-populations, Minimum Viable Population and Extinction vortex. Ecological networks and models of environmental suitability.

Detailed program

In the first part of the course will discuss the threatening factors to biological diversity and, in particular, the problems related to (a) the destruction, fragmentation, degradation of habitats, (b) the introduction of alien species, (c) the effect of xenobiotic, (d) the effect of climate change.

In the second part, the conservation status of the fauna will be assessed from the global to the local scale. The regulatory aspects (Directives, Conventions, national and regional laws) concerning the protection of fauna will be treated. For wildlife groups of greater conservation interest or for which there are specific legal obligations for their protection, the monitoring methods will be illustrated.

In the third part of the course, the demographic models, the principles of the theories of Island Biogeography and Meta-populations and the concept of Minimum Viable Population will be analyzed from a quantitative point of view, as bases for addressing issues related to sustainable management of the landscape and therefore, the planning of the Territorial Ecological Network, as a tool to limit the effects produced by the aforementioned threats to biodiversity. A mathematical-statistical approach will be used for the development of environmental suitability models for indicator species used for the objective identification of ecological networks and the principles for their validation will also be illustrated, using molecular markers or ecological approaches. Finally, the main ecological restoration techniques for the reconstruction of ecological connectivity in fragmented landscapes will be explained.

The course includes practical activities aimed at deepening the topics covered during the lectures.

Prerequisites

Basic knowledge of zoology, botany, ecology, mathematics and statistics

Teaching form

Two-hour lectures, in person, Delivered Didactics

- Frontal lesson, 4 credits, 32 h.

eight-hour field activities, in person, Interactive Teaching

- Field activities, 1.6 credits, 16 h. (delivered in two days)

four-hour lab activities, in person, Interactive Teaching

- Activities in wired classroom, 0.4 credits, 4 h. (delivered in one day)

Textbook and teaching resource

Primack R. Essential of Conservation Biology

Santini et al. 2026. Biologia della Conservazione. Hoepli.

Material provided by the teacher.

Semester

First year, second semester

Assessment method

Oral exam. There are 7 ordinary exam sessions during the teaching breaks.

Interview on the topics covered in class and on a topic to be explored in depth of the student's choice.

The oral exam is aimed at ascertaining the level of knowledge set by the objectives of the course, as well as the skills, evaluated in terms of clarity and exposition correctness, and the student's ability to critically analyze the contents, synthesise and re-elaborate concepts illustrated both during the frontal lessons and in the practical ones.

Office hours

By appointment upon request at the e-mail address: luciano.bani@unimib.it

Sustainable Development Goals

LIFE BELOW WATER | LIFE ON LAND
