UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# SYLLABUS DEL CORSO

# Analisi e Gestione della Biodiversità Animale

**2324-1-F0601Q112**

## Aims

This course examines the definitions, patterns, estimates and conservation of animal biodiversity. Topics include planning a biodiversity research, techniques and analyses to be used to study animal biodiversity, conservation biology and genetics, threats to biodiversity, instruments to manage, preserve and restore animal biodiversity.

## Contents

Definitions and estimates of biodiversity, instruments and techniques to study and preserve animal biodiversity, conservation biology and genetics.

## Detailed program

**What is the biological diversity.**
Introduction and structure of the course. Definitions of biodiversity from genes to ecosystems and functional biodiversity. Measuring biodiversity.

**Patterns of biodiversity.**
The magnitude of the known animal biodiversity. Temporal and spatial patterns of animal biodiversity. Biodiversity hotspots.

**Threats to animal biodiversity.**
Human impacts and their effect on animal biodiversity. Habitat degradation, loss, and fragmentation. Pollution. Overexploitation. Invasive species and diseases. Global climate change.

**Biodiversity, ecosystem functioning and services.**
Contribution of animal biodiversity to ecosystem functioning and ecosystem services. The value of biodiversity and ecosystem services.

**Planning a biodiversity research and sampling.**
Planning a biodiversity research. Sampling strategies. Monitoring and sampling techniques.

**Phenotypic and genetic variation.**
Phenotypic diversity. Genetic diversity from chromosomes to single nucleotide polymorphisms.

**Nucleic acid sequencing.**
Nucleic acid extraction. Sequencing technologies from first to third generation sequencing. Sequencing methodologies including whole genome sequencing, reduced representation sequencing, transcriptomics and other 'omics'.

**Phylogenetic inference.**
Theory and definitions. Methods for reconstructing phylogenies. Application of phylogenetics in animal biodiversity studies.

**Population-level variation.**
Introduction to population genetics. The Hardy-Weinberg principle and deviations from its assumptions. Genetic drift. Effective population size. Natural selection. Population subdivision. Gametic disequilibrium.

**Evolutionary responses to impacts.**
Hybridization, invasive species, exploited populations, and climate change.

**Conservation genetics.**
Inbreeding depression. Demography and extinction. Population connectivity. Conservation breeding and restoration. Genetic identification and monitoring. Conservation units.

**Conservation planning and prioritization.**
Species level conservation and the IUCN Red List. Site level conservation and protected areas. Ecosystem management. Animal conservation in urban landscapes. Restoration.

**Legal framework of conservation biology.**
Environmental laws and policies at the International and national level.

**Seminars and case studies.**

## Prerequisites

None

## Teaching form

Frontal lessons

## Textbook and teaching resource

PowerPoint Slides

Scientific Papers

Conservation Biology: Foundations, Concepts, Applications (3rd Edition). Fred Van Dyke, Rachel L. Lamb. Springer

Conservation and the Genomics of Populations (3rd Edition). Fred W. Allendorf et al. Oxford University Press

## Semester

First semester

## Assessment method

Oral examination on the topics treated during lessons + presentation of a case study (scientific paper) about the topics of the course (to be agreed with the lecturer).

Mark range: 18-30/30

## Office hours

By appointment by sending an email to the lecturer (davide.maggioni@unimib.it)

## Sustainable Development Goals

CLIMATE ACTION | LIFE BELOW WATER | LIFE ON LAND