



MODELLO SCHEDA INSEGNAMENTO

Corso di L/LM/LMCU	Scienze Biologiche
Denominazione insegnamento:	Ecologia
Numero di Crediti:	9 CFU
Semestre:	Primo
Docente Titolare:	De Nicola F.
Dottorandi/assegnisti di ricerca che svolgono attività didattica a supporto del corso:	Picariello E.
Orario di ricevimento:	Thursday 13-14
Indirizzo:	

PRESENTATION

The ecology course is based on the study of ecosystems. It also gives importance to the effects of anthropic pressure both on the structure and on the functioning of ecosystems. The course will provide the tools to analyze current issues such as climate change and biodiversity loss. Moreover, some methods to define environmental quality will be described.

THE FORMATIVE OBJECTIVES

The Ecology course aims to provide basic theoretical knowledge and tools to understand and analyse 1) mechanisms that govern ecological processes at different levels of complexity (organism, population, community); 2) the structure and functioning of ecosystems and the effects of anthropic pressure.

At the end of the course, the student should have the following skills:

Understand the hierarchical structure of the different levels of biological organization.

Understand the role of energy in the ecosystem.

Know the functioning of ecosystems.

Know the main biogeochemical cycles.

Understand the structural characteristics and dynamics of populations and communities.

Know and understand how factors affect species distribution and diversity.

Be able to describe the different types of ecosystems.

Use the knowledge acquired as a tool for predicting the consequences of human impacts on ecosystems.

REQUIRED PREREQUISITES

Students are advised to have basic knowledge in Chemistry, Mathematics, Physics, Biology, Botany and Zoology in order to better understand the topics discussed in the course.

FREQUENCY OF LESSONS

Frequency is recommended. Only students who attend the course can access laboratory exercises and guided tours.

COURSE CONTENTS

Introduction

What is ecology? History of Ecology. Ecology, natural selection and evolution. The levels of biological organization. Ecosystem concept. Ecosystem: biotic and abiotic components. The emerging properties of ecosystem: stability, resilience and resistance. Ecosystem homeostasis. Ecosystem processes.

Interaction organism-environment

Environmental factors. Liebig Law and Shelford Law and Tolerance Limits. Definition of conditions and resources. Ecological niche concept. The physical environment: soil, water, nutrients, temperature, light, pH, salinity. Adaptations of organisms to physical environment.

Population and community ecology

Birth, mortality and biotic potential of populations. Population growth dynamics: "r" and "K". Interspecific interactions; predation, herbivory, parasitism, mutualism, competition. Communities and Emerging Properties. Key, dominant and rare species. Biodiversity. Factors affecting biodiversity. Succession: dynamic and evolution of ecosystems. The climax. Ecotones.

Ecosystem ecology

Energy flow and the matter cycle in ecosystems. The energy and the principles of thermodynamics. Energy transfer: primary and secondary productivity. Productivity distribution in the biosphere. Trophic levels: producers, consumers, decomposers. Ecological efficiencies. Energy flow in the trophic chains. Chain of grazing and debris. Decomposition. Trophic networks. Ecological pyramids. The main biogeochemical cycles: water, carbon, nitrogen, phosphorus, sulfur. The anthropogenic alterations of biogeochemical cycles.

Main ecosystems

Terrestrial ecosystems: the effects of climate and biomes. Climatic diagrams and climatic indices. Lakes: the seasonal cycle of lakes; eutrophization. Streamwaters: zoning of a stream; the concept of "river continuum". Marine ecosystems.

DIDACTIC METHODS

72-hour frontal lessons (8 credits) and 9 hours of laboratory exercises (1 credit).

Plant adaptations under different water availability will be studied through an "ecological" didactic itinerary at Naples Botanical Garden, where it is also possible to deepen the theme of invasive species and biodiversity.

Frontal lessons, along with laboratory exercises and direct observation of ecosystems through guided tours, will help to understand the structure and functioning of ecosystems and the main ecological processes.

RECOMMENDED BOOKS

Cain, Bowman, Hacker. Ecologia. Piccin

Smith, Smith. Elementi di ecologia. Pearson

Odum, Barret. Fondamenti di Ecologia. Piccin

Townsend, Harper, Begon. L' essenziale di ecologia. Zanichelli

Ricklefs. L' economia della natura. Zanichelli

Articoli da riviste scientifiche

EXAMS

At the end of the course the students will be evaluated with an oral interview. The congruity of the answers to the questions asked, the degree of knowledge of the acquired concepts, the ability to link the various topics of the program and interdisciplinary knowledge, the ability to bring explanatory examples and contextualize the problems, clarity of expression and exposure, the proper use of a specific language, will be evaluated for the final judgment and vote.

EXAM DATES

Rinvio al link

EXAM RESERVATION

Rinvio al link

SYLLABUS

Issue	Hours	References	Type lessons
Introduction to Ecology	4		Frontal lesson

Interaction organism-environment	18		Frontal lesson
Population and community ecology	20		Frontal lesson
Ecosystem ecology	25		Frontal lesson
Main ecosystems	5		Frontal lesson
Practice exercise	9		Laboratory/ practice exercise