UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Biodiversity and Bioprospecting

2223-1-F0601Q099

Aims

Knowledge and understanding: Several drugs, nutraceuticals and materials derive from the plants. Knowing the plant biodiversity and evolution allows us to discover new molecules and phytocomplexes useful to human health. The aim of the course is to provide tools to study about the plant biodiversity, the plant adaptation to the environment considtion and plant competition in the complex ecosystems. The second goal is to study the plant bioactive molecules (bioproscpeting) which act as biological signals and represent an important resource for several productie sectors such as cosmetics, nutraceuticals, and the agri-food sector.

Applied knowledge and understanding: the course will allow the student to learn about biodiversity analysis methods and strategies to perform 'bioprospecting' analysis.

Making judgments: Interpreting information on the biodiversity to propose strategies for protecting and enhancing plants also in relation to the territorial characteristic.

Communication skills: the course aims to provide students with the skills to communicate effectively, appropriately and with specific language, the concepts related to biodiversity, plant conservation and the enhancement of the metabolic richness of the plant world.

Learning skills: at the end of the course the student will have to be able to study in depth the topics covered in the course, also interfacing with experts in the field or consultation of websites and specific bibliography texts.

Contents

The course is dedicated to the study of plant biodiversity starting from the analysis of the main evolutionary stages from the algae to the current flowering plants. The bioprospecting approach will allow us to look at biodiversity also for practical purposes and to to discover new molecules, genes, metabolic pathways and phytocomplexes useful for the human health and industry.

Detailed program

Biodiversity as a source of molecules and bioactive phytocomplexes. Origin of life, organisms' evolution and their metabolic richness. Plant evolution: from algae to land. Fundamental steps of plant evolution and the role of environmental characteristics in selecting biodiversity. Superior plants: origin and diversification. Angiosperms and their evolution. Italian flora: origin and peculiarities. Biomes and conservation actions for biodiversity. Environment, biodiversity and molecular responses.
Evo-Devo and the plant developmental biology of the plant organs. Bioprospecting. The Nagoya Protocol. New approaches for the bioactive molecules study. Bioactive molecules as vegetal communication elements with the ecosystem. Classification and Evolutionary diversification of bioactive molecules.

Prerequisites

General botanics and systematics. Basic knowledge of systematic botany.
The teacher can provide supporting documentation (Slides, texts and individual interviews)

Teaching form

Frontal lessons. Visits to parks and factories producing plant extracts and products

Textbook and teaching resource

Slides showed at lessons are available on the e-learning Platform.
Scientific articles and texts will be suggested in the slides and by the teacher.

Book

- Botanica generale e diversità vegetale. G. Pasqua, G. Abbate, C. Forni. Piccin editore
- Introduzione alla biodiversità del mondo vegetale. di Fabrizio Grassi, Massimo Labra, Francesco Sala. Piccin

Semester

Second semester

Assessment method

The oral exam will evaluate the student's knowledge about the plant biodiversity, ecological restoration and the

used of plant for human aims (bioprospecting).

The exam consists of 3-4 questions. The first is an open question on a general topic of the course to evaluate the study method. The second questions is directed to evaluate the ability of student to have learned the main evolutionary phases of plant and the tools used for their studies. The last two questions are dedicated to plant restoration and plan bioprospecting and the ability of student to analyse these topic on technical and practical point of view

Evaluation criteria: scientific and technical knowledge about plant biodiversity and Bioprospecting, the critical re-elaboration of the acquired knowledge, the ability to communicate as well the scientific language.

Office hours

On appointment; mail to: massimo.labra@unimib.it

Sustainable Development Goals

ZERO HUNGER | CLIMATE ACTION | LIFE ON LAND