UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Botany

2021-1-E3201Q069

Aims

The main aim of the course is to understand the organization, functioning, evolution and current diversity of plants. In particular the aim of the first part of the course is to complete the general biology information providing a basic knowledge of plant biology. The knowledge will be needed in the second part of the course to understand: (a) the evolution of plant structures and functions related the adaptation to land and water environments (b) the current plant biodiversity.

1. Knowledge and understanding
The student will gain knowledge about the organization of plant bodies, how they works and their evolutionary origins.

2. Applying knowledge and understanding
The student will be able to identify the main plant groups and to know the basic of their functions.

3. Making judgements
The student will be able to process the acquired knowledge in the recognition and functioning of plants.

4. Communication skills
Use of an appropriate scientific vocabulary in oral exams.

5. Learning skills
Skills in facing the subsequent studies when the prerequisite is the knowledge of plants (plant organism functioning and the plant diversity).

Contents

1th part

- Structure and function of the plant cell with particular respect to cell wall, plastids and vacuole
- Algae and terrestrial plants photosynthesis and photosynthesis pigments;
- Sexual and asexual reproduction in plants;
- Plant tissues
- Developmental biology of seed plants and introduction to plant anatomy

2nd part

- Plant taxonomy
- Plant species concepts
- Plant nomenclature (identification terminology)
- Plant evolution
- Structural and functional characteristics of the reproductive and vegetative organization of the following taxa: Cyanobacteria, Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms
- The main Angiosperm families of the Italian flora

Detailed program

1th part

- Autotrophic (photoautotrophic and chemoautotrophic) and heterotrophic organisms
- Plant cells and their peculiarities:
  - the vacuole: origin, structure, chemical composition and functions;
  - the cell wall: origin, chemical composition, structure and functions;
  - the plastids: origin, chemical composition, structure and functions;
- The biochemical process of photosynthesis and photosynthesis pigments in algae and land plants;
- Plant cell cycle and cytokinesis
- The importance of meiosis for plant reproduction

- Sexual and asexual reproduction in plants
- Metagenetic life cycles
- Plant tissues
- Developmental biology of seed plants and introduction to plant anatomy

2nd part

- Plant taxonomy (natural and artificial systems, the cladistic)
- Plant species concepts
- Plant nomenclature (identification terminology)
- Plant evolution
- The Cyanobacteria and their role in evolution and ecology
- The algae: classification, organization, reproduction and ecology. Characteristic of green algae with respect to land plants.
- The conquest of land by plants. Problems faced by pioneer plants and their adaptation strategies.
- The ancestors of land plants
- The Bryophytes: structure, sexual and asexual reproduction, life cycle, divisions and ecology
- The structural organization of vascular plants
- The Pteridophytes: structure, life cycle, divisions and ecology
- The Gymnosperms and Angiosperms: morphology, anatomy, life cycle, divisions and ecology.
- The main Angiosperm families of the Italian flora

Field activities:

Observation and identification of the main plant systematic groups and of their anatomic structures.

Prerequisites

Cell biology

Teaching form

- Lessons tutorials, 44 h (5.5 credits) (if needed due to health restrictions, synchronous and asynchronous registrations)

- Field activities, 5 h (0.5 credits) (if needed due to health restrictions, synchronous and asynchronous registrations)

Textbook and teaching resource

Textbooks:

- Pasqua G et al. “Botanica generale e diversità vegetale” Piccin
- Mauseth JD “Botanica” Idelson Gnocchi
- Gerola et al.: Biologia e diversità dei vegetali. UTET
- Ray: Botanica. Zanichelli
- Raven: Biologia delle piante. Zanichelli

Teaching resources:

- slides available by elearning

Semester

second semester

Assessment method

Written exam just to be admitted to the oral (the score is not used in the final result) and oral test.

Written test consists of 30 short questions as informatics test. The student are admitted to the oral with a score of at least 45/60. Questions relates to the main basic contents of lessons.

The oral exam consists of questions about the lesson contents aimed at verifying the acquired knowledge, the appropriate language, and the ability to process the acquired knowledge in the recognition and functioning of plants.

During the course, two "in itinere" assessments consisting of 3/4 open questions are planned. Overcoming the two assessments replaces the exam at the end of the course

In the period of Covid emergency exams will be written (open questions) by Esamionline platform

Office hours

by appointment via email