UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Coastal and Marine Botany

2223-2-F7502Q017

Aims

Knowledge and understanding:

- Knowledge of the diversity of species and structures of costal vegetation and marine algae and plants.

- Understanding the role of costal vegetation and marine algae and plants in their own ecosystems.

Applying Knowledge and understanding:

- Acquiring skills in identifying costal plants and marine algae and seagrasses

- Providing basic concepts about the applications of marine algae and plants

Making judgements:

- Favouring group sessions, debate and discussions (for instance after watching videos or reading scientific articles)

Communication and learning skills:

- Conducting interactive lessons with a learner-centred approach: students will present thematic seminars

Contents

This subject will focus on algae and plants of both marine submerged and emerged environments and particularly on marine microalgae, macroalgae and seagrasses and on terrestrial plants belonging to costal vegetation, with a

special emphasis on those typical of Mediterranean and tropical regions. In the introductory part of the course attention will be paid in analysing the main evolutionary stages which have led to the actual biodiversity of marine algae and plants and in deeping in the knowledge on the major taxonomic groups of algae and plants that can be found in Mediterranean and tropical marine and costal environments. The following lessons will focus on the systematics of marine algae and seagrasses; a taxonomic classification will be conducted in an evolutionary key, based on the different kinds of photosynthetic pigments. Furthermore, the main morphological, biological and ecological features will also be described for the most important groups, as well as their environmental importance. The second part of the course, instead, will focus on costal vegetation of Mediterranean and tropical regions. Initially, a general characterization will be conducted, considering the main taxonomic groups of coastal plants, prior to describe in detail the vegetation of the most particular habitats (cliffs, estuaries, mangrove forests, etc.).

The third part of the course will be dedicated to analyse the main environmental and human problems related to marine algae, such as biological invasions and harmful algal blooms. Finally, the last lessons will be organized as workshops, during which small groups of students will be asked to deep in their knowledge on the main uses of marine algae and plants and to share them with their mates.

Detailed program

INTRODUCTION TO COSTAL AND MARINE BOTANY

- Plant evolution and biodiversity (from Cyanobacteria to Angiosperms).

- Main taxonomic groups of algae and plants living in costal and marine environments.

SYSTEMATICS OF MARINE ALGAE AND PLANTS IN TERMS OF EVOLUTION

- Microalgae: Chrysophyceae, Dinoflagellata, Bacillariophyceae, Chlorophiceae, Pelagophiceae.

- Macroalgae: Rhodophyta, Ulvophyceae, Phaeophyceae.

- Tracheophyta.

COASTAL VEGETATION AND FLORA

- Salt and brackish marshes.

- Sand dunes.

- Mangrove swamps and forests.

- Coastal cliffs.

PROBLEMS RELATED TO MARINE ALGAE AND PLANTS (Main topics)

- Alien species and biological invasions.

- Harmful algal blooms.

- Toxic algae.

USES OF MARINE PLANTS (Students' workshops)

- Bio-indicators.

- Phytoremediation.

- Biofuel.

- Fertilizers.

- Food/pharmacy.

Prerequisites

None

Teaching form

- Lessons: 5 credits

- Tutorials: 1 credit

Textbook and teaching resource

- Slides

- Textbooks and References:

“Marine Botany”, by Dawes C.J., John Wiley & Sons, Inc.

“Diatoms: Biology and Morphology of the Genera”, by Round et al., Cambridge

“Marine Benthic Dinoflagellates: Unveiling Their Worldwide Biodiversity”, by Horiguchi et al., Schweizerbart

“Chrysophyte algae: ecology, phylogeny and development”, by Sandgren et al., Cambridge “An Introduction to Phytoplanktons: Diversity and Ecology”, by Pal & Choudhury, Springer “Seaweed Ecology and Physiology”, by Hurd et al., Cambridge “Global Seagrass Research Methods”, by Short & Coles, Elsevier

“Alghe e Fanerogame del Mediterráneo”, by Rodríguez-Prieto et al., Il Castello (edizione italiana); “Algaebase”, Guiry & Guiry,www.algaebase.org

“Mangrove Ecosystems: A Global Biogeographic Perspective. Structure, Function and Ecosystem Services.”, by Rivera-Monroy V.H., Springer

“Coastal dunes, ecology and conservation” by.Martínez M.L and Psuty N.P., Springer

Semester

First semester

Assessment method

The examination is oral (normal mode) includes a presentation of a scientific article.

During the exam the candidate must demonstrate his ability to address and critically discuss the topics.

The examination consists of three parts:
A) 2 open questions of which 1 on coastal vegetation and 1 on seaweed / seagrasses.
B) 3 closed questions (test-like) for which students have to choose the right answer out of three options
C) a PowerPoint presentation of a scientific article (to be agreed with the teacher)
Article selection. Once you have chosen the article, please send it to the teacher for approval. The rules (timing) and suggestions for the presentation are uploaded on the e-learning of the course. As a general rule, the following aspectes are evaluated: (a) graphical aspects, (b) insights into the article, and (c) clarity of the presentation.

Mark range: 18-30/30

Office hours

Monday 14.00-15.00 (to be requested by email)

Sustainable Development Goals

CLIMATE ACTION