



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Plant Molecular Physiology

2122-1-F0601Q051

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#### Aims

This course will focus on the relationship between plants and environment and how this relates to practical applications that based on green plants can be useful to improve the environment. [By the end of the term, students will be able to:](#)

1. Describe the main processes involved in plant growth and development and on the interaction between plants and environment;
  2. Explain how mechanisms controlling plant growth and development can be used for different applications (agriculture, energy, environmental protection, etc.);
  3. Apply the learned concepts to other courses or toward work in the field of plant biology and environmental sciences;
  4. Critically consider the implications of using and manipulating plant growth to meet current human needs;
  5. Communicate their understanding of the presented topics using accurate scientific language and technical terminology.
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## Contents

This course will describe the main processes involved in plant growth and development as well as the responses of plants to different environmental stresses. The use of plants to improve the quality of the environment will be explored, including their potential to develop new technologies (phytoremediation, bioenergy, biorefinery, etc.) to reduce pollution and alleviate our dependence on non-renewable energy sources.

## Detailed program

Course Introduction: Detailed description of course components: lecture schedule, final exam assignment, grading, reading and studying material, field trip and lab activities.

Part I: plant growth and development; embryogenesis; root, shoot and leaf organogenesis; phyllotaxy; the tree: structure and species determination.

Technical focus I: In vitro culture technology.

Technical focus II: Phyllotaxis and wood structure in plant identification.

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Part II: plant response to environmental stress (light, water, temperature, salinity)

Technical focus III: Plants and environmental pollution: phytoremediation.

Technical focus IV: Plants biomass and bioenergy.

Technical focus V: Plant as bio-factories.

Field trips: Two field trips are planned. The first field trip will be to an urban park in Milan and will acquaint the students with the most common plant species in an urban space. The trip will include the practical use of keys for the identification of the most common trees. The second trip will be a joint excursion along with students from other courses and will be held at Maremma Regional Park in Tuscany.

## Prerequisites

None

## Teaching form

Lecture (6 credits)

## **Textbook and teaching resource**

L. Taiz, E. Zeiger, "Fisiologia Vegetale", quarta Edizione italiana sulla quinta di lingua inglese, a cura di M. Maffei, Piccin Editore.

M. M. Altamura, S. Biondi, L.Colombo, F. Guzzo. "Elementi di biologia dello sviluppo delle piante" Edises, 2007.

A.M. Smith, G. Coupland, L. Dolan, N. Harberd, J. Jones, C. Martin, R. Sablowski, A. Amey. "Biologia delle piante". Vol. 2: Interazioni con l'ambiente Domesticazione. Edizione italiana a cura di Donato Chiatante Zanichelli 2012.

Reading material provided by the teacher.

## **Semester**

Second

## **Assessment method**

Oral

For the exam, students will discuss a topic of their choice and a question posed by the instructor. The accurate use of scientific language to explain the topics and the ability to relate them will also be evaluated.

## **Office hours**

By appointment ([werther.guidinissim@unimib.it](mailto:werther.guidinissim@unimib.it))

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