

Degree programme	Type	Course
Plant Biology, Genomics and Biotechnology	OB	1

Contact lecturer

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Teaching staff

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Group languages

You can consult this information at the [end](#) of the document.

Prerequisites

Basic knowledge of Plant Physiology, Genetics and Molecular Biology.

Objectives

To transmit the knowledge necessary to understand the main processes of plant adaptation to different environmental conditions, including responses to stress. To know the molecular mechanisms and genetic networks regulating these processes.

Learning outcomes

- CA13 (Develop a scientific project in Plant Biology, Genomics and Biotechnology with respect for human and fundamental rights, diversity and democratic values, as well as the principles of universal accessibility and design for all.) Develop a scientific project in Plant Biology, Genomics and Biotechnology with respect for human and fundamental rights, diversity and democratic values, as well as the principles of universal accessibility and design for all.
- CA14 (Work in a multidisciplinary team while respecting universal accessibility for all in the field of climate change.) Work in a multidisciplinary team while respecting universal accessibility for all in the field of climate change.
- KA11 (Describe the functional mechanisms of plants at different organisational levels and characterise responses to abiotic and biotic stress and their interaction.) Describe the functional mechanisms of plants at different organisational levels and characterise responses to abiotic and biotic stress and their interaction.
- KA12 (Recognise the most appropriate processes for obtaining genetically modified plants resistant to different types of stresses.) Recognise the most appropriate processes for obtaining genetically modified plants resistant to different types of stresses.
- SA20 (Manage bibliographic information and computer resources in the field of plant-environment interaction.) Manage bibliographic information and computer resources in the field of plant-environment interaction.
- SA21 (Apply knowledge of plant defence strategies against climate change to improve productivity.) Apply knowledge of plant defence strategies against climate change to improve productivity.
- SA22 (Apply the most appropriate methodology to the study of signalling pathways and hormonal interactions in plant responses to biotic and abiotic stress.) Apply the most appropriate methodology to the study of signalling pathways and hormonal interactions in plant responses to biotic and abiotic stress.
- SA23 (Develop a project aimed at obtaining plants with adaptive advantages in their natural habitat.) Develop a project aimed at obtaining plants with adaptive advantages in their natural habitat.

Contents

Plants are frequently exposed to environmental stress conditions (biotic and abiotic) that adversely affect growth and development, or productivity. These adverse conditions trigger a wide range of plant responses, from alterations in gene expression and cellular metabolism to changes in growth rate and crop yield, which are conditioned by the duration, severity and rate at which a stress is imposed, as well as by the combined action of several of them. Moreover, resistance and sensitivity to stress vary according to species, genotype, developmental stage, and organ or tissue type. This module will describe how the different environmental cues affect plants at different levels, as well as the molecular mechanisms evolved by these sessile organisms to defend against stress conditions.

Abiotic stress:

- Oxidative stress
- Salinity and drought
- Ionic stress
- Floods
- Temperature

Biotic Interactions:

- Cell death
- Pathogenic microorganisms

- Beneficial microorganisms
- Microbiome

Biotic and abiotic stress interactions.

Climate change.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Tutorials	4	0.16	
Seminars preparation	12	0.48	
Lectures	30	1.2	
Study	90	3.6	
Seminars	8	0.32	

Theoretical lectures:

Within this module, master or expository lectures represent the main activity to be performed in the classroom and allow basic concepts to be transmitted to students in a relatively short time. They will be complemented with Powerpoint presentations, thus the methodology is mainly based on verbal communication, accompanied by visual schemes. Teacher's direct questions to students during the class are indicative of the student's degree of follow-up. Bibliographical references and other sources of information are given to foster self-study.

Seminars:

They are work sessions, based on work proposed by the teachers that the students will work autonomously. The main purpose of the seminars in this subject is to promote the knowledge of the general and transversal competences of the students. The teaching methodology is based on the exposition and discussion of a scientific article in the classroom. Students have to search for and select an adequate article according to the quality criteria explained by the teacher.

The use of Artificial Intelligence (AI) technologies is permitted in this course exclusively for support tasks, such as literature or information searches, text editing, or translation. Students must clearly identify any parts of their work generated using AI, specify the tools used, and include a critical reflection on how these tools influenced both the process and the final outcome of the assignment.

Failure to disclose the use of AI in an assessed activity will be considered a breach of academic integrity and may result in a partial or total reduction of the activity grade, or more severe disciplinary measures in cases of serious misconduct.

Tutoring:

In tutorials in groups or individually, the professor tries to help the students to solve their doubts about the concepts of the subject and guide them in their studies.

Annotation: within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Seminars	40%	4	0.16	CA13, CA14, SA20, SA21, SA22, SA23
Written exam	60%	2	0.08	KA11, KA12, SA22

Assessment is based on the following components:

- Multiple-choice written examination, designed to assess the content covered in the lectures, accounting for 60% of the final grade.
- Seminars: Attendance at seminars is mandatory and accounts for 40% of the final grade. Assessment activities carried out during the seminars cannot be retaken. Absences that are duly justified in accordance with UAB regulations will not result in any penalty. In the case of an unjustified absence, the seminar grade will be reduced according to the following criteria:

1 absence: 20% reduction of the seminar grade.

2 absences: 40% reduction of the seminar grade.

3 absences: 80% reduction of the seminar grade.

More than 3 unjustified absences: the course will be considered failed.

To pass the course, students must obtain a minimum grade of 5.0 in the written examination and an overall final grade of 5.0 or higher.

This course does not offer the single assessment option.

Students who do not sit the written examination will receive a grade of "Not Assessable", as they will not have provided sufficient evidence for assessment.

Any irregularity committed during an assessment activity (including academic fraud, plagiarism, or the improper use of Artificial Intelligence (AI), unless such use is explicitly authorised in the course guide) that may lead to a significant alteration of the assessment outcome will result in a grade of 0 for that assessment activity. If the course guide establishes that obtaining a minimum grade in that assessment activity is an essential requirement for passing the course, or if multiple irregularities are committed in the assessment activities of the same course, the final grade for the course will be 0. In addition, students who commit any of these irregularities may be subject to disciplinary proceedings in accordance with the University's regulations.

Bibliography

Plant hormones: physiology, biochemistry and molecular biology (book) Davies, P. 2013. Springer Science & Business Media. ISBN 9401104735, 9789401104739. doi: 10.1007/978-94-011-0473-9

FITTER, A.H., HAY, R.K.M.: *Environmental Physiology of Plants*, 3rd edition. Academic Press, London, 2001

LAMBERS H., CHAPIN III, F.S., PONS, T.L.: *Plant Physiological Ecology*. 2nd ed. Springer Verlag, New York, 2008

Software

Power Point or similar

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TEm) Theory (master)	1	English	first semester	morning-mixed
(SEMm) Seminars (master)	1	English	first semester	morning-mixed