UAB
Universitat Autònoma de Barcelona

Applied Plant Physiology

2026/2027

Code: 100954
Credits: 6

Degree programme	Type	Course
Biotechnology	OP	4

Contact lecturer

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Teaching staff

Albert Gargallo Garriga

Group languages

You can consult this information at the end of the document.

Prerequisites

It is recommended to review the basic concepts of Plant Physiology

Objectives

The general objective of this subject is to introduce the students into the functional mechanisms and techniques that will improve the yield of the crop plants and their agricultural and industrial applications.

The specific training objectives are:

- Identify the processes that determine the yield of plants of agricultural and industrial interest and their regulation by internal and environmental factors.
- Acquire an advanced vision of reproduction techniques for plants with a practical purpose.
- Introduce the students to the basic techniques of agricultural biotechnology.
- Introduce the students to the basics of phytochemistry and its application in medicine and industry.

Learning outcomes

- CM31 (Work collaboratively in teams to solve problems and case studies in the field of applied biology.) Work collaboratively in teams to solve problems and case studies in the field of applied biology.
- KM33 (Determine biological entities in the regulation of natural services essential for human and environmental health.) Determine biological entities in the regulation of natural services essential for human and environmental health.
- SM29 (Culture plant specimens.) Culture plant specimens.
- SM30 (Perform functional tests for the characterisation of vital parameters in plants.) Perform functional tests for the characterisation of vital parameters in plants.

Contents

Lectures

- Applied Plant Physiology: field of study; Scientific and social interest
- Plant productivity and yield: Assessment parameters; Conditioning factors
- Sustainable plant production and integrative plant production
- Genetic potential and its regulation by internal and external factors
- Internal factors
- Reproduction and regulation of development
- Genetics of reproduction: Sexual reproduction and seed technology
- Asexual reproduction
- *In vitro* reproduction
- Post-harvest physiology
- Secondary metabolism of plants
- Regulation of growth, use of phytoregulators
- External factors:
- Biotic
- Negative plant-microorganism interaction: pathogenesis of bacterial, viral and fungal diseases
- Positive plant-microorganism interaction: plant growth promoting bacteria
- Molecular bases of plant defense
- Environmental
- Essential nutrients and soil fertility.
- Water needs of plants and increased efficiency in water sources.
- Temperature needs of the plants. Greenhouses and hydroponics.

Seminars

Different projects that will be developed by groups

Laboratory practices

- In vitro culture techniques
- Assessment of ascorbic acid in fruits
- Nutricional deficiencies
- Germination assay
- Effect of the osmotic potential on the seed germination

Field trip

Visit an agrotechnological research center

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Tutorials	5	0.2	KM33
Field trip	4	0.16	CM31
Preparation of homework and/or seminars	11	0.44	CM31, KM33
Lab practice	16	0.64	CM31, SM29, SM30
Preparation of lab practice report	5	0.2	CM31
Lectures	28	1.12	KM33

Seminars	6	0.24	CM31, KM33
Personal study	70	2.8	KM33

Lectures

During the lectures, the professor explains the functional mechanisms and techniques that allow to improve the yield of crop plants and their agricultural and industrial applications, establishing the functional and mechanistic relationships clarifying the basic concepts necessary for their understanding. The methodology is mainly lecture-based, accompanied by visual diagrams. During the lectures, exercises will also be proposed and questions will be thrown to the students which will be solved by the teachers in order to know the degree of follow-up and facilitate the understanding of the concepts. Bibliographical references and other sources of information are given to foster self-study.

Seminars

The main purpose of the seminars in this course is to promote students' understanding of the general and transversal competencies associated with the subject. The teaching methodology is based on project-based learning, in which students, divided into groups of 3-5 members, will discuss and analyze real cases or issues related to the content covered in the theoretical classes. In some cases, this will involve the oral presentation of their work.

Laboratory practices

Some of the topics covered in the theory class are visualized through laboratory testing. The student became familiar with protocols and techniques of Applied Plant Physiology and have to analyze the results from theirown experiments. The student will be able to access the protocols and guides of practices through the Virtual Campus.

Field trips

A visit to an plant agrobiotechnology research center.

Tutorial

In tutorials, 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
Evaluation of seminar	15%	0	0	CM31, KM33
Exam of second part	35%	2	0.08	KM33
Evaluation of lab practice	15%	1	0.04	CM31, SM29, SM30
Exam of part 1	35%	2	0.08	KM33

The content covered in the theoretical classes will be assessed through written examinations. Two midterm examinations will be held, corresponding to the two equal parts into which the syllabus has been divided. To pass each midterm examination, students must obtain a minimum grade of 5. If a midterm is passed, the

corresponding syllabus content will be exempt from further examination. Each midterm examination accounts for 50% of the theory grade. The theory grade represents 70% of the final course grade.

To improve a grade or to recover grades below 5, students may take a resit examination at the end of the course for each of these exams as part of a final examination. A minimum grade of 5 is required to pass the final examination.

Students who sit the resit examination to improve their grade waive their previously obtained mark, and only the resit examination grade will be considered. Students who take the final examination will not be eligible for distinction ("Matrícula de Honor").

To be eligible for resit examinations, students must have previously completed assessment activities whose combined weight corresponds to at least two-thirds of the total course grade. Therefore, students will receive a grade of "Not Assessable" (NA) when the assessment activities completed represent less than 67% of the final course grade.

Laboratory practicals will be assessed through an individual theoretical examination taken upon completion of the practical sessions, accounting for 80% of the practicals grade. The laboratory report will be completed in groups and will account for the remaining 20% of the practicals grade. The report must be submitted via the Virtual Campus one week after the completion of the practical sessions.

The practicals grade accounts for 15% of the final course grade. Attendance at laboratory practicals is compulsory. In the event of a justified absence, students may make up the session by attending another group's practical session or, if this is not possible, by completing an alternative assignment. There is no resit examination for practicals.

Participation in seminars accounts for 15% of the final course grade. Attendance at seminars is compulsory. There is no resit option for seminars. 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.

To pass the course, students must obtain a minimum grade of 5 in the theory component and achieve an average grade of at least 5 across the different components of the course (theory, practicals, seminars, and the flipped-classroom video assessment).

Students who are unable to attend an individual assessment activity for justified reasons (such as illness, the death of a first-degree relative, or an accident) and who provide the corresponding official documentation to the Degree Coordinator will be entitled to take the assessment on an alternative date.

Use of Artificial Intelligence

For this course, the use of Artificial Intelligence (AI) technologies is permitted exclusively as a support tool for bibliographic or information searches, language correction of texts, translations, improvement of writing style, or organization of content. The use of these tools to generate, either wholly or partially, answers to examinations, reports, assignments, or other assessable activities requiring personal analysis, interpretation of results, or scientific reflection is not permitted.

Students must clearly identify any use of AI tools, specify the tools used, and briefly describe how they contributed to the development of the activity.

Single Assessment

Students opting for the single assessment system must attend the laboratory practical sessions (PLAB) in person alongside students following the continuous assessment pathway. Passing the practical component is a compulsory requirement and represents 15% of the final course grade.

Seminars (SEM) will not be compulsory to attend. Students choosing the single assessment option must

complete 3 of the 6 seminars included in the course through the continuous assessment format. The teaching staff will determine which seminars must be completed under the single assessment scheme. Seminar assignments must be submitted on the same date as the synthesis examination.

The single assessment consists of a single synthesis examination (including essay questions, concept-integration questions, and the resolution of real-life case studies) covering the entire theoretical syllabus.

The grade obtained in the synthesis examination will account for 70% of the final course grade, the practicals grade for 15%, and the seminar grade for the remaining 15%.

The single assessment examination will take place on the same date as the final continuous assessment examination, and the same resit system will apply.

To pass the course, students must obtain a minimum grade of 5 out of 10 in each component: the synthesis examination, laboratory practicals (PLAB), and seminars (SEM).

Assessment Misconduct

Any irregularity committed during an assessment activity (academic fraud, plagiarism, or improper use of AI, unless such use is expressly authorized in the course guide) that may lead to a significant alteration of the assessment outcome will result in a grade of 0 for that 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 assessment activities within the same course, the final grade for the course will be 0. In addition, disciplinary proceedings may be initiated against any student involved in such misconduct.

Bibliography

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Software

None

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