

Degree	Type	Year
2500004 Biology	OB	2

Contact

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Teachers

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Teaching groups languages

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

Prerequisites

none

Objectives and Contextualisation

The subject introduces students to the basic physiological concepts of plants. The subject gives an overview of plant physiology and establishes the basic operating processes through morphological, metabolic and plant nutrition concepts. The integrative vision of these basic mechanisms of Plant Physiology is essential to understand the complexity of the growth and development of plants and their relationship with the environment, topics that will be covered in subjects taught in subsequent courses.

The main educational objectives of this subject are:

- Identify the crucial discoveries in the history of Plant Physiology and evaluate their significance for the further scientific development of the discipline
- Explain the functional processes of plants based on the different organizational levels within the plant organism
- Describe the functional mechanisms of plants and their regulation through external and internal factors

Competences

- Apply statistical and computer resources to the interpretation of data.
- Be able to analyse and synthesise
- Be able to organise and plan.
- Carry out functional tests and determine, assess and interpret vital parameters.
- Develop a historical vision of biology.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
- Understand the processes that determine the functioning of living beings in each of their levels of organisation.

Learning Outcomes

1. Apply statistical and computer resources to the interpretation of data.
2. Be able to analyse and synthesise.
3. Be able to organise and plan.
4. Consolidate understanding of physiological processes in plants with the aim of putting this to practical use.
5. Describe the functional mechanisms of plants and how these are regulated by internal and external factors.
6. Identify the crucial discoveries in the history of plant physiology and assess their significance in the subsequent development of the discipline.
7. Integrate the functional processes of plants, from the different levels of organisation to the whole plant organism.
8. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
9. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
10. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.

Content

Lectures

- Concept of Plant Physiology, history, sources of information
- Distinctive characteristics of plant cells. Vacuole and cell wall
- Water relations. Concept of water potential and its components
- Absorption and transport of water in plants
- Perspiration and stomatal regulation
- Transport by the phloem
- Mineral nutrition. Concept of essentiality. Functions of mineral nutrients
- Passive absorption and active absorption of mineral nutrients
- Nitrogen, symbiotic fixation of atmospheric nitrogen
- Photosynthesis concept history
- Light and photosynthetic pigments
- Photosynthetic electronic transport and photophosphorylation
- Assimilatory reduction of CO₂, Calvin cycle
- Photorespiration
- C₄ and CAM plants
- Assimilatory reduction of nitrogen and sulphur
- Regulation of photosynthesis

- Distinctive characteristics of plant respiration. Alternative oxidase.
- Secondary metabolism

Practices

- 1.- Water relations: measurement of water potential and observation of plasmolysis
- 2.- Photosynthesis - Hill reaction in isolated chloroplasts and its inhibition by DCMU. Demonstration of the need for CO₂
- 3.- Measurement of the rate of transpiration and the speed of transpiration in different environmental conditions. Stomatal morphology
- 4.- Study of nitrate reductase activity induced by nitrate

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Lab practice	12	0.48	1, 4, 2, 3
Lectures	32	1.28	4, 5, 6, 7, 10, 9, 8
Seminars	6	0.24	10, 9, 8
Type: Supervised			
Group tutorials	3	0.12	4, 6, 7, 10, 9
Type: Autonomous			
Personal study	61.5	2.46	4, 6, 7, 9, 8
Preparation of homework and/or seminars	20	0.8	10, 9, 8, 2, 3
Preparation of lab practice report	12	0.48	1, 10, 8, 2, 3

Theory classes

In theory classes, the teacher explains the fundamental mechanisms of how plants work, establishing the relationships between nutrition and metabolism processes for a good understanding of the syllabus. The methodology is a master class with digital accompaniment and with teacher-student interaction in terms of questions, concerns, anecdotes or reasoning to link the syllabus to current events that the students know. The basic bibliographic references used and other more interactive ones are given for the independent study of the students.

Seminars

The main purpose of the seminars in this subject is to promote students' knowledge of general and transversal skills. The teaching methodology is based on the presentation and discussion of case studies and/or problems posed by the teacher to the students so that they can solve them in groups, present them to their peers and discuss them with them with the help and guidance of the teacher. The teacher will arrange the tasks to be done in each case.

Practical classes

Some of the topics discussed in theory class are visualized through laboratory practices that help the student to better understand. In the laboratory, the student becomes familiar with protocols and basic techniques of Plant Physiology and learns to represent and interpret the results obtained. The protocols and practice guides will be uploaded to the Virtual Campus.

Tutoring

Group tutorials are held before each partial exam and the teacher resolves doubts about concepts or aspects explained during the theoretical classes.

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	Weighting	Hours	ECTS	Learning Outcomes
Evaluation of lab practice and seminar	30%	0.5	0.02	1, 4, 5, 6, 7, 9, 8, 2, 3
Examinations of lecture programs	70%	3	0.12	5, 6, 7, 10, 9

- The theory will be evaluated through written exams that will include the evaluation of the content of the theoretical classes. There will be two elimination tests corresponding to each of the parts into which the syllabus has been divided. In order to pass the subject, you must obtain a minimum grade of 5 in each of these parts. The weight of each partial exam in the theory grade is 50%. The weight of the theory grade in the final grade is 70%.

In order to pass grades lower than 5, it is possible to retake each of these exams at the end of the year in a final retake exam. The minimum grade to pass the subject in the final make-up exam is a 5.

In order to improve the grade, a final exam must be taken for all content and the grade for this final exam will be counted (ie with the grade previously obtained being waived).

To participate in the recovery, students must have previously been assessed in a set of activities whose weight is equivalent to a minimum of 2/3 parts of the total qualification of the subject or module. Therefore, the student will obtain the qualification of "Not Assessable" when the assessment activities carried out have a weighting of less than 67% in the final qualification".

-The practical grade represents 20% of the final grade of the subject. On the last day of practice there will be a final written test individually that will represent 80% of the practice grade. The preparation of the practice script will be done in groups and will represent the remaining 20% of the grade. The script will be delivered via Virtual Campus one week after the end of the internship.

Attendance at practices is mandatory. In case of justified non-attendance, it can be recovered by attending another group or, if this is not possible, by means of substitute work. It is at the teacher's discretion to evaluate the justification for non-attendance. There is no recovery for the practice exam.

- The seminars have a weight of 10% of the final grade. Participation in the seminars will be evaluated by the teacher. Seminars are not recovered.

The subject will be approved when the student meets the conditions to be able to pass it and the grade resulting from the different assessments (exams, practicals and seminar) is ≥ 5.0 .

Students who cannot attend an individual assessment test for justified reasons (such as illness, death of a first-degree relative or accident) and provide the corresponding official documentation to the Degree Coordinator, will have the right to take the test in question at another date.

Unique assessment:

This subject contemplates the single assessment which consists of a single synthesis test in which the contents of the entire theory program will be assessed. The test will mostly consist of questions to be developed and some relationship, test or sentence or paragraph completion questions. The grade obtained in this synthesis test will account for 70% of the final grade of the subject.

The assessment of practical activities and seminars and the delivery of assignments will follow the same process as the continuous assessment, and the grade obtained will represent 20% and 10% of the final grade of the subject respectively. The single assessment test will coincide with the same date fixed in the calendar for the last continuous assessment test and the same recovery system will be applied.

Bibliography

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Software

none

Language list

Name	Group	Language	Semester	Turn
(PLAB) Practical laboratories	121	Catalan/Spanish	second semester	morning-mixed
(PLAB) Practical laboratories	122	Catalan/Spanish	second semester	morning-mixed
(PLAB) Practical laboratories	123	Catalan/Spanish	second semester	morning-mixed
(PLAB) Practical laboratories	124	Catalan/Spanish	second semester	morning-mixed
(SEM) Seminars	121	Catalan/Spanish	second semester	morning-mixed

(SEM) Seminars	122	Catalan/Spanish	second semester	morning-mixed
(TE) Theory	12	Catalan	second semester	afternoon