VNIVERSITAT DE VALÈNCIA

Course Guide
34107 Plant Physiology

COURSE DATA

Data Subject	
Code	34107
Name	Plant Physiology
Cycle	Grade
ECTS Credits	4.5
Academic year	2024 - 2025

Study (s)

Degree	Center	Acad. year	Period
1201 - Degree in Pharmacy	Faculty of Pharmacy and Food Sciences	1	Second term
1211 - Double Degree in Pharmacy and Human Nutrition and Dietetics	Faculty of Pharmacy and Food Sciences	1	Second term

Subject-matter

Degree	Subject-matter	Character
1201 - Degree in Pharmacy	43 - Biology	Basic Training
1211 - Double Degree in Pharmacy and Human Nutrition and Dietetics	1 - Asignaturas obligatorias del PDG Farmacia-Nutrición Humana y Dietética	Obligatory

Coordination

Name	Department
MARCO PICO, FRANCISCO	25 - Plant Biology

SUMMARY

The primary objective of studying Plant Physiology is the organisms which make up the plant kingdom. Plant Physiology should give students a basic knowledge of how plants work and their processes. Based on that, the basic makeup of the programme looks at all the processes of feeding, growth, continuity, and their relationship with their environment.

Students will study the major structural characteristics and plant anatomy, which is necessary in order to understand thereafter different physiological processes, hydraulics (absorption, transport, and loss of water in plants), mineral nutrition, and transport of phothosynthetic products. Metabolic photosynthesis will also be analysed, as well as that of nitrogen and sulphur. Secondary metabolism will also be introduced, where students will cover some of the enormous amount of chemical compounds used to

improve colour, scent and flavor of flowers and fruits, to battle against predators and organisms that cause illness, and even against their own neighbours.

Apart from the basic physiological plant processes, it is also important to know and understand the mechanisms which regulate growth and development, as well as their interaction with the environment. To this end, we will study the plant development looking at plant hormones, photoreceptors, plant movement, different processes during the life cycle, and the integration of all of them in space and time.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

It is highly recommended that apart from Biology, students have also studied mathematics, physics, and chemistry

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

1201 - Degree in Pharmacy

- Understand and manage the basic scientific terminology related to the subject
- Know how to apply the scientific method and acquire skills for managing the main bibliographic sources.
- Know how the plant body is organised.
- Know the basic principles of how plants work.
- Know the practical assays that can be made in order to test different hypotheses related to plant physiology.
- Know how to operate apparatus and basic techniques related to the subject.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

- Know and use the scientific terminology related to the subject
- Know plant body organisation
- Know the basic physiological functions of a plant, that allow it to feed, grow, reproduce, and interact with its environment
- Know how the environment effects plant growth and development and the development of mechanisms that help a plant adapt to its environment
- Know how to search for relevant bibliography to update and deepen knowledge on a specific topic
- Know basic techniques and apparatus related to the subject
- Understand and interpret scientific studies about plants
- Work safely and efficiently in a laboratory
- Know how to interpret and present results obtained from laboratory experiments

- Capacity to carry out experiments, analyse and interpret results
- Capacity to design experiments that allow hypotheses or theories to be proved.
- Know how plant physiology fits into science in general

DESCRIPTION OF CONTENTS

1. The plant body

2. Water balance of plants

3. Mineral nutrition

4. Translocation in the phloem

5. Photosynthesis: The light reactions

6. Photosynthesis: Carbon reactions

7. Assimilation of mineral nutrients (Nitrogen, nitrate and sulfur)

8. Secondary metabolism and plant defense

9. Phytohormones

10. Overview of plant growth and development

11. Photomorphogenesis and plant movements

12. The control of flowering

13. Fruit formation, growth and development

14. Seed maturation, dormancy and germination

15. Juvenility senescence and abscission

16. LABORATORY SESSIONS

- The plant body
- Determination of the water potential of cells
- Photosynthesis. The Hill reaction
- Phytohormones Gibberellin and cytokinins bioassays
- Seed germination

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	25,00	100
Laboratory practices	15,00	100
Seminars	2,00	100
Tutorials	2,00	100
Development of group work	4,00	0
Study and independent work	30,50	0
Readings supplementary material	2,00	0
Preparation of evaluation activities	7,00	0
Preparing lectures	20,00	0
Preparation of practical classes and problem	4,00	0
TOTAL	**111,50**	

TEACHING METHODOLOGY

Theory classes.

For theory classes lectures will be given, since this method allows the lecturer to give key concepts to understanding the subject and recommend further detailed study. In some classes student participation will be used, both between students, and between students and lecturer.

Laboratory sessions.

In these classes students will be able to learn the practical applications of the knowledge gained in the theory classes.

During the activities, both theoretical and practical, examples of the applications of the contents of the subject in relation to the Sustainable Development Goals (SDGs), as well as in the proposed topics for coordinated seminars. This is intended to provide students knowledge, skills and motivation to understand and address these SDGs, while promoting reflection and criticism.

Tutorials.

Tutorials will be carried out in small groups, where the teacher will direct students about everything related to the learning process, both in global and concrete terms, including the supervision of tasks.

Seminars.

Practical seminars and monographic work-shops programmed to work out specific aspects of plant physiology in order to reinforce the learning process. These activities will be held according to these options:

1. A conference by a visiting professional
2. A presentation made by the students of a recent development related to plant physiology (this activity will be carried out either individually or as a work group, maximum four students).
3. A presentation made by the professor of a recent development related to plant physiology

After each seminar there will be a debate where the majority of the participation should be between students.

EVALUATION

Knowledge of theory and practice will be measured according to the following criteria:

Exams: Counts up to 9 points

The exam will include questions about knowledge acquired in the theory, laboratory sessions and seminars.

- Theory exam: 7 points
- Laboratory session exam: 2 point

In order to be eligible for examination, students must have attended the laboratory sessions. Non-attendance will mean students cannot pass the subject.

Continuous assessment: counts up to 1 point.

Continuous assessment tasks will be graded by means of multiple-choice questionnaires and/or open questions, assays, exercises or other similar activities. Those activities will be available as tasks at the VLE. Students will have a time limit to provide their answers. Evaluated activities will be scheduled when all lectures of a particular unit are completed. Alternatively, these questions or tasks could also be raised and evaluated during lecture sessions, tutorials and/or seminars sessions.

Seminars: Counts up to 0,5 points

Content, oral presentation and participation in the discussions raised will be evaluated. The mark obtained in the seminar sessions will count as a bonus on the final grade.

First Call

There will be an examination of the whole subject at the end of the semester/term. The exam may include short questions, long questions, and multiple choices questions. The exam will include questions that require the student to relate concepts that appear in different topics or that may be related to current issues or to the seminars. The exam will also include parts related to the laboratory sessions. The final grade will be obtained by adding the evaluated tasks (continuous evaluation, theoretical-practical written examination and seminar). In order for the grades for the continuous assessment and seminar to be added, at least 50% of the maximum score in the theoretical and practical exams must be obtained. In order to pass, the final grade must equal or exceed the final score of 5 points.

Second Call:

Students who do not obtain a pass in the first call should resit all of the theory and laboratory session exams, with a maximum score of 9 points. The seminar and the continuous assessment marks obtained during the semester/term will be saved for this second call and added if appropriate.

Evidence of copying or plagiarism in any of the assessable tasks will result in failure to pass the subject and in appropriate disciplinary action being taken. Please note that, in accordance with article 13. d) of the Statute of the University Student (RD 1791/2010, of 30 December), it is the duty of students to refrain from using or participating in dishonest means in assessment tests, assignments or university official documents.

In the event of fraudulent practices, the “Action Protocol for fraudulent practices at the University of Valencia” will be applied (ACGUV 123/2020): https://www.uv.es/sgeneral/Protocols/C83sp.pdf

REFERENCES

Basic

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Additional

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