COURSE DATA

DATA SUBJECT

Code: 36833
Name: Botany II
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1106 - Degree in Biology	Facultat de Ciències Biològiques	2	Annual

SUBJECT-MATTER

Degree	Subject-matter	Character
1106 - Degree in Biology	Biología Vegetal	COMPULSORY

COORDINATION

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SUMMARY

Botany II is a compulsory subject in the second year of the degree in Biology at the University of Valencia.

The terrestrial colonisation of our planet by plants approximately 480 million years ago was a key event in the evolutionary history and in the abiotic transformation of ecosystems. The subject Botany II focuses on the study of Land Plants or Embryophytes, a monophyletic clade of the Archaeplastidia group, which includes the three groups of bryophytes, lycopods, ferns, gymnosperms and angiosperms, as well as the major extinct transitional groups. Using an evolutionary approach, the relevant structural and functional aspects associated with their emergence, diversification and extinction are discussed. The biodiversity of the group, their integration and interrelationship in ecosystems, as well as various aspects associated with their use and conservation, will also be discussed.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

Related to the first-year course Botany I, which should have been taken previously

COMPETENCES / LEARNING OUTCOMES

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Organise, plan and manage information in a manner that allows the individual to analyse, synthesise and develop critical reasoning that can be applied to solve problems, make decisions and carry out work.

Students must be able to communicate information, ideas, problems and solutions to both expert and lay audiences.

Students must have acquired knowledge and understanding in a specific field of study, on the basis of general secondary education and at a level that includes mainly knowledge drawn from advanced textbooks, but also some cutting-edge knowledge in their field of study.

Students must have developed the learning skills needed to undertake further study with a high degree of autonomy.

Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take relevant social, scientific or ethical issues into consideration.

Understand the morphological and functional diversity of living beings. Understand the functions of the basic underlying mechanisms from an integrative point of view and their adaptations to the environment throughout their history.

Understand the phylogenetic and geographical relationships of living organisms, as well as their taxonomy and systematics. Apply current scientific techniques to identify organisms and discern their phylogenetic relationships.

Use scientific language, both oral and written, and be able to adapt the register to the target audience and/or readers. Use the most common foreign languages in each discipline as a vehicle for communication in a globalised system.

DESCRIPTION OF CONTENTS

1. Introduction to land plants (Embryophytes)

Section dedicated to general aspects of embryophytes, with their evolutionary and ecological implications.
Phylogenetic outline and overview of the monophyletic groups covered in the course.
Relevant cytological aspects in embryophytes. The three genomes present: nuclear, mitochondrial and plastidial.
Life cycles in embryophytes: evolution and biological repercussions.
Nutrition in embryophytes: autotrophy, saprophytism, parasitism and symbiosis. Evolutionary and

ecological implications.
Species and speciation. Evolutionary trends. Homologies, analogies, divergences and parallels. Systematics and phylogeny. Nomenclature: from Linnaeus to the Phylocode.

2. Land Plant diversity: main groups of embryophytes

Section dedicated to the description of the groups of embryophytes.
The green evolutionary line. The conquest of the land (air). Origins and evolutionary scenarios. Embryophytes, their origin and evolution.
The bryophytes: liverworts, mosses and anthocerotes. Divisions Marchantiophyta, Bryophyta and Anthocerotophyta. Morphological and anatomical features of the gametophyte. Typical sporophyte structure and main variations. Diversity, ecological importance, distribution, habitats and classification of the most significant groups.
Vascular land plants. Radiation of Tracheophytes. General morpho-anatomical trends. Heterospory. Extinct groups.
Lycopods and related plants. Class Lycopodopsida. Morphological and reproductive characteristics. Evolution of microcophylls and adaxial sporangia. Diversity and life history of the most representative groups.
True ferns. Class Polypodiopsida. Morphological and reproductive diversity. Appearance of megaphylls. Morphological characteristics, reproduction and life cycles, diversity and life history of the most representative groups.
Spermatophytes. Differential features and vegetative organisation of cormophytes: root, stem and leaves. Sexual structures and development of gametophytes. Reproduction and control of self-pollination. The seed.
Gymnosperms. Morphological characteristics. Origin, evolution, diversity and role importance in the vegetation. Extinct groups. Orders Cycadales, Ginkgoales, Pinales, Cupressales and Gnetales.
Angiosperms. Hypotheses about their origin. The angiosperm flower. Fruit and dispersal.
Diversification of angiosperms, ecological and economical importance. APG classification: basal Angiosperms, basal and central Eudicotyledons (Superrosidae and Superasteridae), Monocotyledons.

3. Vegetation of the Iberian Peninsula

Section dedicated to basic concepts on Iberian vegetation and landscape and to the description of the main plant formations of the territory.
Flora and vegetation. Vegetation determinants (historical events, climate and topography), temporal evolution, types of vegetation.
Basic data on Iberian vegetation: biogeographical regions, richness, endemicity and diversity. Main plant formations of the IP and the CV.

4. Botany and society

Section devoted to questions relating to the social importance of botanical studies in such

pressing issues as the conservation of biodiversity and the exploitation of plant resources.
Plant conservation: basics of in situ and ex situ conservation. Invasive alien species. IUCN Red Lists and national and regional catalogues. European (Habitats Directive) and national regulatory framework.
Uses of plants and botany in the current work structure (medicinal plants, crops, landscaping, management and conservation of species and habitats, forensic botany, palynology, food quality control).

5. Laboratory and field work

PRACTICE 1. BRYOPHYTES
The green, terrestrial and non-vascular evolutionary line. Observation of vegetative morphology, organisation and reproductive structures in Marchantiophytes and Bryophytes.

PRACTICE 2. PTERIDOPHYTOPHYTES
The green, terrestrial and vascular evolutionary line. Observation of vegetative morphology, organisation and reproductive structures in Lycopodiopsida and Polypodiopsida.

PRACTICE 3. SPERMATOPHYTES - GYMNOSPERMS
Observation of vegetative morphology, organisation and reproductive structures in the major groups of Gymnosperms.

PRACTICE 4. SPERMATOPHYTES - ANGIOSPERMS I
Observation of vegetative morphology, organisation and reproductive structures. Identification with dichotomous keys.

PRACTICE 5. SPERMATOPHYTES - ANGIOSPERMS II
Observation of vegetative morphology, organisation and reproductive structures. Identification with dichotomous keys.

PRACTICE 6. SPERMATOPHYTES - ANGIOSPERMS III
Observation of vegetative morphology, organisation and reproductive structures. Identification with dichotomous keys.

PRACTICE 7. SPERMATOPHYTES - ANGIOSPERMS IV

Observation of vegetative morphology, organisation and reproductive structures. Identification with dichotomous keys.

PRACTICE 8. SPERMATOPHYTES - ANGIOSPERMS V

Observation of vegetative morphology, organisation and reproductive structures. Identification with dichotomous keys.

FIELD TRIP/ VISIT TO A SCIENTIFIC-TECHNICAL FACILITY (half day)

FIELD TRIP (full day)

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Laboratory	30,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	10,00
Independent study and work	40,00
Preparation of lessons	10,00
Preparation for assessment activities	30,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

Lectures to explain the basic concepts and contents of each subject with the help of the audiovisual media currently available.

Practical classes include laboratory sessions, visits to facilities related to botanical activity and field trips.

Interdisciplinary work: conducting and presenting a seminar. This is a cross-disciplinary activity common to all subjects in the second year of the degree in Biology (Histology, Evolutionary Processes and Mechanisms, Zoology II, Botany II, Biochemistry, Genetics, Paleontology, Developmental Biology, and Biostatistics). It consists of the preparation and presentation, by a working group (3 students), of a seminar, which will consist of a written text and an oral presentation. The activity is compulsory for all students enrolled in the second year, except for those who have done it before. Each working group prepares a seminar on a topic proposed by the teachers of the participating subjects. The assignment of each group to the subjects will be randomly done. Each interdisciplinary work will thus be linked to the corresponding subject resulting from the draw. A tutor will be assigned to each of the projects, who will supervise the completion of the project and supervise its presentation. To this end, a series of regular meetings will be held with the tutor throughout the course. A co-tutor will also be assigned, who will review the final version of the work submitted. Each paper will be presented orally by all members of the group for 30 minutes. The presentation will be attended by all students on the course, as attendance is compulsory, and by two lecturers: the tutor and a second lecturer. Both students and teachers will take part in the presentation.

EVALUATION

The work carried out during the course will be evaluated, both in the theoretical and practical segments.

50% of the grade corresponds to the mark obtained in the **theoretical segment** and 40% to the **practical segment**. The remaining 10% of the course grade corresponds to the **interdisciplinary seminar**.

The **theoretical segment** will be assessed by means of a final exam. The **practical segment** will be assessed by means of a practical exam and a compulsory report on the field activities. Both exams (theory and practical) must be passed throughout the course to pass the subject.

Additional voluntary work may be carried out at the suggestion of the teaching staff, whose grade will serve to improve the mark for the course, once the theory and practical exams have been passed.

Attendance at the practice sessions is compulsory. Report on field activities and any other continuous assessments proposed by the teacher will not be recuperable.

The grade obtained in the **interdisciplinary work** will account for 10% of the grade for the subject. The tutor and an assistant lecturer (cotutor) will participate in the grading and will take into account both the oral presentation of the work and the written text. In these assessments, the relative weight of the tutor's and co-tutor's marks will be 60% and 40%, respectively. The evaluation of this activity will consider both the scientific content and the way in which it has been presented, especially the ability to communicate and transmit ideas and concepts. The works selected for presentation at the Biology Congress will receive an extra mark, corresponding to 10% of the mark for the activity.

In the event of failing the course, the grade for the interdisciplinary work will be saved for the following year.

In the event that the interdisciplinary work (of a compulsory nature) is not carried out, this subject will be failed if it is the subject linked to this interdisciplinary work, regardless of the grade obtained in the rest of the subject.

REFERENCES

Basic references

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Complementary references

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