

Degree	Type	Year
2500502 Microbiology	OB	1

## Contact

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## Teaching groups languages

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

## Prerequisites

It is advisable to review: cell structure and function; fundamentals of Biochemistry; taxonomic ranks and geological eras.

## Objectives and Contextualisation

The main objective of the subject is to introduce students to the basic knowledge of plant biology from a systematic approach as well as structural and functional fundamentals.

Plants and microorganisms have a close evolutionary and functional relationship that in many cases has led to strong mutual dependence. Significant examples are, among others, symbiosis like mycorrhizae or the symbiotic fixation of atmospheric nitrogen, but also phytopathological interactions, of great importance in agriculture, or saprophytic, essential for the cycling of mineral nutrients in the ecosystems.

In order to understand these complex interactions, which are formative objectives of following years, the student must first obtain the ability to recognize the different levels of organization of plants, its diversity in the environment, its basic vital functions and its regulation pathways.

In order to facilitate the learning process, the subject has been subdivided in three thematic modules, or areas, that include respectively the systematic, structural and functional fundamentals and have the following objectives:

To study the main plant groups in a phylogenetic (evolutionary), morphological and ecological way. To understand the richness and importance of plant diversity in the biosphere, as well as its interactions with other organisms.

## Learning Outcomes

1. CM05 (Competence) Evaluate the global dynamics of natural systems at different scales of analysis to provide innovative responses to societal demands and care for the environment.

2. CM06 (Competence) Integrate knowledge and skills from the field of biology, working individually and in groups, to prepare and present in writing or orally and publicly a scientific work.
3. KM09 (Knowledge) Describe the taxonomic, morphological and anatomical diversity of the main groups of living organisms and their position within ecosystems.
4. SM08 (Skill) Interpret the bases of evolution and its relationship with the structure and operation of biological systems at all levels of organization.

## Content

### BOTANICS

- 1.1. The origin of life and the evolution of main groups. Key events in the life history of "plants".
- 1.2. Classification of life. From Aristotle's two kingdoms to the present day. The five kingdoms of Whittaker and Margulis & Schwartz. Woese. Cavalier-Smith. Tolweb.org: "The Tree of Life".
- 1.3. Taxonomy, Systematics and Phylogeny. Definition of Taxonomy and Systematics. Species concept. Biodiversity. Linnaeus and the Binomial System. Taxonomic categories. Basic concepts of phylogeny.
- 1.4. Levels of morphological organization, reproduction and biological cycles. Prokaryotes and Eukaryotes. Protophytes. Talophytes. Bryophytes. Cormophytes. Asexual and sexual reproduction. Biological cycles. Monosporic and heterosporic organisms.
- 1.5. Introduction to Algae. Phylogeny of the algae. Origin and evolution of the chloroplast. Green, red and brown lines. Criteria for classification.
- 1.6. Heterokonta: Phaeophyceae (Brown Algae). General characteristics. Morphology. Systematics. Dictiotales. Laminariales ("kelp"). Fucales. Uses of the Phaeophyceae.
- 1.7. Rodophyta (Red Algae). General characteristics. Cell structure. Pit connections. Reproduction and cycles: the trigenetic cycle. Diversity-Morphology. Applications.
- 1.8. Green Algae: Chlorophyta + Basal Streptophyta. Definition of Viridiplantae. Phylogeny. General Characteristics of Chlorophyta. Diversity. Chlorophyceae. Ulvophyceae: Ulotricales, Ulvales, Cladoforales, Caulerpales. Basal Streptophyta. Streptophyta: Charophyceae: phylogenetic location; Zignematales, Charales and Coleocetales.
- 1.9. Colonization of the terrestrial environment. Origin. Adaptations to the terrestrial environment. Vegetative and reproductive structures.
- 1.10. Bryophyta. Phylogeny. General characteristics. Lifecycle. Gametophyte and Sporophyte. Differential characters between the three groups. Liverworts (Marchantiophyta): Morphology. Biological cycle, diversity. Mosses (Bryophyta): Morphology. Biological cycle, diversity. Hornworts (Antocerotophyta).
- 1.11. The Vascular Plants. Phylogeny. Apomorphies of Vascular Plants. The corm: root, stem and leaves.
- 1.12. "Pteridophytes". General characteristics of Pteridophytes. Systematics. Colonization of the terrestrial environment: chronology. First non-bryophytic terrestrial plants. First symbiosis. Pteridophytes Diversity.
- 1.13. Spermatophyta: seed origin and pollen. Evolutionary trends. The seed. The pollen grain. The origins: Pteridosperms and Progimnosperms. Biological strategies.
- 1.14. Gymnosperms. Systematics. Cicadpsida. Ginkgopsida. Gnetopsida, Coniferopsida. Morphology. Reproductive elements. Diversity. Ecology and distribution.
- 1.15. Flower Plants: Angiosperms (Phylum Magnoliophyta) -I. Origin and evolution. The vegetative body. Sinapomorphies.

1.16. Flower Plants: Angiosperms (Phylum Magnoliophyta) -II. The flower. Reproductive systems: Microsporogenesis, Megasporogenesis, Embriogenesis. The seed. The fruit.

1.17. The Angiosperms: systematic-I. Evolutionary characteristics of the characters, coevolution strategies and radiation of flowering plants.

1.18 The Angiosperms: systematic-II. The main clades of Angiosperms.

## Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Seminars	4	0.16	CM05, CM06, KM09, SM08, CM05
Theory classes	18	0.72	CM05, CM06, KM09, SM08, CM05
Type: Supervised			
Tutorials	1	0.04	CM06, CM06
Type: Autonomous			
Literature review	4	0.16	CM06, CM06
Preparation of herbarium specimens	4	0.16	CM06, KM09, SM08, CM06
Public speaking preparation	4	0.16	CM06, CM06
Study	22	0.88	CM05, CM06, KM09, SM08, CM05
Text reading	5	0.2	CM05, CM06, KM09, SM08, CM05
Work composition	3	0.12	CM05, CM06, KM09, SM08, CM05

The contents of BOTANY will be taught in theoretical classes and 2 seminars of 2 hours (4 hours). In the seminars, topics related to teaching will be discussed, in a participatory manner and establishing a debate on the topic presented. At the end of the seminars there will be a quiz. In theory classes, the teaching staff will present the contents of the syllabus following an evolutionary (phylogenetic) thread, from the most primitive plants to the most modern phyla.

Work will be done in groups, which involves field work and recognition of plants to make a herbarium. A forum will be activated (on the Virtual Campus) where students will have to make contributions as determined by the teaching staff and these will be evaluated.

Tutorials:

Tutoring will take place in a personalized way in each teacher's office (hours to be agreed). The tutorials will be used to clarify concepts, establish the knowledge acquired and facilitate the study by the students.

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
Exam part 1	32,5	2	0.08	CM05, CM06, KM09, SM08
Exam part 2	32,5	2	0.08	CM05, CM06, KM09, SM08
Seminars	10	4	0.16	CM05, CM06, KM09, SM08
Virtual Herbarium	20	2	0.08	CM06, KM09, SM08

The specific and transversal skills of this subject will be assessed continuously through written tests (exams), thematic assignments delivered in writing, individual work on a specific topic, oral presentations; participation in seminars and tutorials.

To take part in the recovery, students must have previously been assessed in a set of activities whose weight is equivalent to a minimum of two-thirds of the total grade 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".

Repeaters will only have to be assessed for specific modules that have not been passed.

The final grade for BOTANY will be calculated from the grades for the continuous assessment activities:

- 1st term Written test (35%): quiz and/or short answer type questions. A minimum grade of 5 is required to be weighted with the other activities.
- 2nd partial written test (35%): quiz and/or short answer type questions. A minimum grade of 5 is required to be weighted with the other activities.
- Seminars (10%): questionnaire at the end of the sessions and active participation.
- Delivery of group work (20%): realization of a virtual herbarium from own material
- Participation in the Virtual Campus forum: the contributions made will be assessed, both quantitatively and qualitatively (5%).

To pass the module, a minimum grade of 5 must be obtained.

#### Unique assessment

The single assessment of the module will consist of a single test in which the theory and seminar content of this module will be assessed. The delivery of the group work (herbarium) must be done following the same procedure as the continuous assessment. The written test will correspond to 80% of the grade, the remaining 20% corresponds to the group work (herbarium). The single assessment test will be held on the same day, time and place as the day of the module theory exam. The single assessment can be recovered on the day set for the recovery of the subject.

Students will be able to take a grade improvement exam for each of the modules they wish. These exams will be held on the same day as the make-up exam. The presentation of the student to a grade improvement exam involves renouncing the qualification previously obtained in the module in question.

## Bibliography

CARRIÓN, J. S. 2003. Evolución vegetal. DM. Murcia.

IZCO, J. et al. 2004. Botánica. McGraw-Hill-Interamericana. Madrid.

LLIMONA, X. (ed.) 1985. Plantes inferiors. Història Natural dels Països Catalans. Vol. 4. Enciclopèdia Catalana. Barcelona.

RAVEN, P.H., EVERT, R.F. & EICHHORN, S.E. 1991-1992. Biología de las Plantas. Vols. 1 i 2. Reverté. Barcelona.

SIMPSON, M.J. 2009. Plant Systematics. 2ª ed. Elsevier

STRASBURGER, E. et al. 2004. Tratado de Botànica. 9ª edic. Omega. Barcelona.

1) [Introducción a la botánica](#) / Murray W. Nabors (University of Mississippi) ; traducción: Paola González Barreda ; revisión técnica: Mercedes García Antón, Juan Carlos Moreno Sáiz (Departamento de Biología, Universidad Autónoma de Madrid)

2) [Strasburger's Plant Sciences : Including Prokaryotes and Fungi](#) / by Andreas Bresinsky, Christian Körner, Joachim W. Kadereit, Gunther Neuhaus, Uwe Sonnewald

[Bresinsky, Andreas, autor](#)

3) [Los Árboles y arbustos de la Península Ibérica e Islas Baleares \[Recurs electrònic\]](#) / Ginés A. López González

### The most important references

1) [Botánica](#)/ Jesus Izco (Coord.) ja inclosa a la bibliografia en format físic i electrònic

2) [Introducción a la botánica](#) / Murray W. Nabors (University of Mississippi) ; traducción: Paola González Barreda ; revisión técnica: Mercedes García Antón, Juan Carlos Moreno Sáiz (Departamento de Biología, Universidad Autónoma de Madrid).

## Software

No software is needed

## Language list

Name	Group	Language	Semester	Turn
(SEM) Seminars	711	Catalan/Spanish	second semester	afternoon
(SEM) Seminars	712	Catalan/Spanish	second semester	afternoon
(TE) Theory	71	Catalan/Spanish	second semester	afternoon

PROVISIONAL