

Botany

Code: 100801
ECTS Credits: 6

Degree	Type	Year	Semester
2500250 Biology	OB	1	2

Contact

Name: Juan Antonio Calleja Alarcon
Email: JuanAntonio.Calleja@uab.cat

Use of languages

Principal working language: spanish (spa)
Some groups entirely in English: No
Some groups entirely in Catalan: No
Some groups entirely in Spanish: No

Teachers

Laia Guardia Valle
Javier Lopez Alvarado

Prerequisites

No prerequisites are required.

The subject will be easier with previous knowledges on evolution, reproductive biology and morphological diversity of plants and fungi. It is also very useful to have a good base on geography on a global and Iberian scale and on geological periods.

Objectives and Contextualisation

Botany deals with the study of plant diversity in a broad sense and, with a synthetic focus, also addresses the diversity of fungi.

The student will be able to construct a scheme (based on the phylogeny) to address flora and fungal biodiversity. This work will be closely related to aspects of systematics and plant evolution as well as the study of techniques and knowledge that allow classification of living beings (morphology, anatomy, molecular indicators, biogeographic aspects, etc.). Also, a strong emphasis will be placed on the main biological processes (life cycles, reproduction, etc.), evolutionary (phylogenetic relationships, evolutionary trends, coevolution, etc.), ecological (limiting factors, habitats, And applications by man (industry, land management, etc.) of the main groups studied.

Botany will be complemented with the Vegetation Analysis and Mapping (where the supra-specific entities will be studied in detail), and it is fundamental to attend optional subjects such as Biology and diversity of cryptogamic plants, Biology and diversity of phanerogams and Applied botany.

Skills

- Analyse and interpret the development, growth and biological cycles of living beings.
- Analyse and interpret the origin, evolution, diversity and behaviour of living beings.

- Be able to analyse and synthesise
- Describe and identify the levels of organisation of living beings.
- Develop a historical vision of biology.
- Develop a sensibility towards environmental issues.
- Develop critical thinking and reasoning and communicate ideas effectively, both in the mother tongue and in other languages.
- Identify and classify living organisms.
- Obtain, manage, conserve and observe specimens.
- Work in teams.

Learning outcomes

1. Analyse and interpret the development, growth and biological cycles of plants.
2. Analyse and interpret the origin, evolution, diversity and behaviour of plants.
3. Be able to analyse and synthesise.
4. Describe and identify the levels of organisation of plants.
5. Develop a sensibility towards environmental issues.
6. Develop critical thinking and reasoning and communicate ideas effectively, both in the mother tongue and in other languages.
7. Explain the principal historical landmarks in botanical knowledge.
8. Identify and classify the plants.
9. Obtain, manage, conserve and observe plant specimens.
10. Work in teams.

Content

- Macroevolution and phylogeny of plants and fungi

Fundamental concepts to understand the origin and evolution of the main groups (phylogenetic lines) of plants, fungi and unicellular autotrophic organisms. Importance will be given to the endosymbiotic origin that originated the main phylogenetic lines and plant diversity at basal levels of the tree of life.

The levels of organization, systematics, diversification, reproduction and biological cycles, ecology and uses of the main phylogenetic groups of plants and fungi will be characterized. The bases will be laid for the interpretation of the classification and definition systems of the taxa under a fundamentally evolutionary perspective, as well as of the mechanisms of speciation and the macroevolutionary processes that have taken place. Updated classification systems will be followed although classic and still existing alternative classification proposals will also be presented.

- Characteristics, biodiversity and systematics of the main groups of plants and fungi

Biological characteristics (morphology, reproduction and ecology) and some examples of biodiversity of the main phylogenetic lines of: cyanobacteria, fungi, "algae" and especially terrestrial plants (bryophytes - mosses and liverworts- ferns, gymnosperms and angiosperms).

A criterion of phylogenetic organization will be followed in accordance with the most current and classical classification proposals, where more emphasis will be placed on shared characters (synapomorphies) and genetics relations.

- Functional characteristics

Following the phylogenetic framework, the different goals acquired throughout the evolutionary process by fungi and especially by terrestrial plants will be highlighted: embryo occurrence, vascular tissue acquisition, origin and evolution of seed and pollen grain and evolution of the flower. Special mention will be made of the processes of coevolution and diversification.

The functional approach will also be developed for other groups such as the importance of algae in marine and continental ecosystems or the ecological role of fungi or fungal symbiosis in terrestrial ecosystems.

Methodology

Botany has a strong practical component closely related to theoretical botanical knowledge. Therefore students should be responsible for keeping up to date the knowledge acquired during both theoretical and practical sessions including seminars.

- Presential sessions (directed)

- Theory classes:

The diversity, ecology and systematics of plants, fungi and other photosynthetic groups will be presented. Phylogenetic groups will be organized according to an updated classification system. The teaching material corresponding to each topic of theory will be available to students in Moodle (Virtual Campus). These materials can be reviewed, updated and improved in the Moodle (Virtual Campus) by the teachers throughout the course

- Supervised activities

- Seminars:

2 Seminars. A part of the knowledge of this subject will be transmitted from seminar sessions. They will establish a connection between theory, practices and practical work. Emphasis will be placed on developing skills for plant identification, the use of dichotomous keys and the recognition of plants and their diagnostic characteristics. In addition, it will deepen in understanding the morphology and diversity of fruits.

- Practices:

There will be two practical sessions: laboratory and field sessions. Each student should keep a (single) practice notebook that will be used for all laboratory and field activities.

It is obligatory to carry the notebook every practice and a hand magnifier.

- Laboratory practices:

6 sessions of laboratory practices where the different groups of organisms treated in the theoretical classes will be presented. Students will have an internship script that will include both the observational methodologies of the plant material and the main structures to identify and a specific glossary. Students should bring this script to practice. In order to maximize the use of the material presented in each practice, the students will also have to bring in the laboratory the learning files corresponding to the practice, and that the teachers will provide them via the Virtual Moodle Campus. Without these printed materials the practice will not be allowed. The dressing gown is mandatory, without it you can not access the lab.

- Field Practices:

3 sessions to be held in the field, in places accessible and / or of floristic interest. There will be an introduction to floristic diversity and general aspects of the ecology of plant communities. The students must take in the field exits the compulsory notebook for the rest of the practices. In the Virtual Campus - Moodle will be offered documents that will include the environmental and landscape characteristics of some itineraries visited.

- Botany work: Herbarium

It is intended to maximize the learning of the morphological characteristics and morphological structures of seed plant families (spermatophytes) that will have to study in detail. The students will have to elaborate in a group of three people an integrated work of characterization and description of these taxonomic groups. Delivery will be made towards the end of the course. The quality of the descriptions provided by the students will be evaluated. The work will be associated with the preparation of a collection of plants that will include testimonies of fresh and / or dry material obtained by the components of the groups.

The fundamental objective is that the students become familiar with the flora and with the morphology of the plants that surround us. It is important that the student develop both a minimum capacity for recognition of

plant identity, phylogenetic relationships, ecology and the economic importance of some families, and the ability to scientifically describe characters and morphologies with the appropriate lexicon.

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Field practices (3 sessions, 10 hours)	10	0.4	4, 6, 8, 9, 5, 3, 10
Laboratory practices (6 sessions, 12 hours)	12	0.48	4, 6, 8, 9, 3, 10
Theory classes	27	1.08	1, 2, 4, 6, 7, 5, 3
Type: Supervised			
Seminars (2 sessions, 4 hours)	4	0.16	2, 6, 8, 5, 3, 10
Type: Autonomous			
Herbarium	50	2	1, 2, 4, 6, 7, 8, 9, 3
Study	44	1.76	2, 4, 6, 8, 9, 5, 3, 10

Evaluation

The competences of Botany will be evaluated by two partial exams, a Visum exam and a practical work in the form of a Herbarium. There is recovery exams for the theory partial yet not for Visum and Herbarium.

The total weight of each test will be as follows:

I. Theory part: 60%

30% Written exam 1st partial

30% Written exam 2sg partial

II. Practical part: 40%

15% Practical work: Herbarium

20% Practical test for identification of fungi and plants including morphological and reproductive structures: Visum

5% Overall assessment of the attitude (active, passive), performance and progression of the student in the subject.

- Description of the evaluation model:

- Theoretical part (I)

Written exams

There will be two scheduled exams on the grade calendar. The exam will be passed with a score \geq (equal to or greater than) 5.

Students who have failed the partial exams will have a second chance. For the calculation of the average of the theory part the score obtained in the second chance will replace the original note corresponding to the failed part. The partial exams do not compensate each other. Each one must be passed with a score ≥ 5 .

The partial and recovery (second chance) exams will consist of a combination of brief response and / or test and / or structure identification questions. They will include information covered in theoretical classes, seminars and internships.

Seminars

Attendance at the seminars is highly recommended. The seminars will be focused on learning the use of dichotomous keys for the identification of plants and fruits.

The material explained in the seminars is likely to be included in the Visum exam, the partial exam and the recovery (second chance) exam.

- Practical part (II)

The attendance to practices, as much of laboratory as the field, is obligatory. Field practices are particularly essential: there is a learning component that will require students to take notes and participate in the dynamics and learning activities of field sessions.

The elements to evaluate learning in laboratory and field practices will be:

Work:

An herbarium of a number to be determined of wild plants identified with the scientific name and a complete description. The quality of the descriptions and the quality and preparation of the material provided in the herbarium are especially evaluated.

Proof of identification of plants, Visum:

Will consist of the visual recognition (Visum) of samples of plants and fungi (fresh or dry), generally related to the groups of plants and fungi studied in any laboratory and field practices. There is no proof of recovery.

Short exercises related to materials worked in laboratory and / or field practices.

To pass the block of practices it is necessary that the two evaluations (Herbarium and Visum) have a score ≥ 4 and the average of the two must be ≥ 5 .

A student will pass Botany as long as the theoretical part is ≥ 5 and that of the practical part is ≥ 5 .

Non-evaluable = Not Presented will be considered that student that does not attend at least to 50% of the evaluations (2 theory exams, Visum exam and Herbarium).

prue

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Herbarium	15%	0	0	1, 4, 6, 8, 9, 3, 10
Subjective assessment by the teacher	5%	0	0	2, 5, 3
Theory exams (2)	60%	2	0.08	1, 2, 4, 7, 5, 3
Visum	20%	1	0.04	4, 6, 8, 3

Bibliography

- BYNG, J.W. 2014. The flowering plants handbook: a practical guide to families and genera of the world. Plant Gateway Ltd., Hertford.**
- BOLD, H.C., Alexopoulos, C.J. & Delvoryas, T. 1989. Morfología de las plantas y los hongos. Omega.**
- CARRIÓN, J. S. 2003. Evolución vegetal. DM. Murcia.**
- FONT i QUER, P. 1963. Diccionario de Botánica. Labor. Barcelona.**
- FONT i QUER, P. 1992. Iniciació a la Botànica. Fontalba. Barcelona.**
- IZCO, J. et al. 2004. Botánica. 2ª ed. McGraw-Hill-Interamericana. Madrid.**
- MAUSETH, J.D. 1998. Introduction to plant biology. Jones and Bartlett publishers. London.**
- RAVEN, P.H., EVERT, R.F. & EICHHORN, S.E. 1991-1992. Biología de las Plantas. Vols. 1 i 2. Reverté.**
- STRASBURGER, E. et al. 2004. Tratado de Botànica. 9ª edic. Omega. Barcelona.**
- VARGAS P. & ZARDOYA, R. 2012. El árbol de la vida: sistemática y evolución de los seres vivos. Madrid.**
- <http://www.floraiberica.es/floraiberica/texto/pdfs/000%20clavegeneral.pdf>
- http://www.floraiberica.es/PHP/generos_lista.php
- <http://www.anthos.es/>
- <http://tolweb.org/tree/>