Universitat Autònoma de Barcelona

2023/2024

Biology and Diversity in Cryptogams

Code: 100802
ECTS Credits: 6

Degree	Type	Year	Semester
2500250 Biology	OT	4	1

Contact

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Teaching groups languages

You can check it through this link. To consult the language you will need to enter the CODE of the subject.
Please note that this information is provisional until 30 November 2023.

Teachers

Lorenzo Saez Goñalons

Prerequisites

There are no official prerequisites, but it is advisable for the student to review the contents related to the subject of Botany.

Objectives and Contextualisation

Throughout this course, students must acquire the knowledge that gives them a vision as fully as possible of the knowledge bases and the diversity of cryptogamous plants, from a functional, systematic and phylogenetic perspective. It should also allow it to place each group in an ecological context, in relation to the number of species, habitat and way of life, position within the ecosystems as well as their importance in relation to their interest in the activities of management of the natural environment .

The specific training objectives are:
- Introduce to the students the main structuring concepts of the study of cryptogames
- Understand the systematics and phylogenetic relationships between the main groups of organisms as a result of evolutionary and adaptive processes.
- Know the main levels of organization and biological patterns of organisms.
- Give some knowledge about morphological features, biological cycles, ecological importance and highlight the biotechnological importance of the main groups of organisms.

Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Analyse and interpret the development, growth and biological cycles of living beings.
- Be able to analyse and synthesise
- Develop a sensibility towards environmental issues.
- Identify and classify living organisms.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- 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.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.

Learning Outcomes

1. Analyse a situation and identify its points for improvement.
2. Analyse and interpret the development, growth and biological cycles of plants.
3. Be able to analyse and synthesise.
4. Critically analyse the principles, values and procedures that govern the exercise of the profession.
5. Develop a sensibility towards environmental issues.
6. Identify and classify the plants.
7. Propose new methods or well-founded alternative solutions.
8. Propose viable projects and actions to boost social, economic and environmental benefits.
9. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
10. 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.
11. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
12. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
13. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
14. Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.

Content

The main groups of the Cryptogamic Botany and types of classifications.

BRYOPHYTES: Diversity, main evolutionary lines and common and distinctive characteristics of the main groups.

BRYOPHYTES: Liverworts, Mosses and Hornworts. Vegetative and reproductive characteristics. Diversity, Phylogeny and Ecology. Examples of some of the species present in the Iberian Peninsula more characteristics.

BRYOPHYTES: Adaptations, biogeographical and conservationist aspects.

FERNS: Diversity, main evolutionary lines and common and distinctive characteristics of the main groups and mechanisms of speciation.

FERNS: Morphological diversity, phylogeny and ecology. Characteristics of the main groups: Lycophytes and Monilophytes. Examples of some of the species present in the Iberian Peninsula more characteristics. Diversity in the Iberian Peninsula and biogeographic patterns.

ALGAE. Taxonomic characteristics Evolution of the chloroplast. The phylogeny of algae. Pigments, reserve substances and other cellular characteristics.

ECOLOGY OF ALGAE. Biotic and abiotic ecological factors that condition the distribution of algae. Zonation The algae as indicators of the evolution of climate and landscape. Outcrops, blooms and red tides. Conditioning factors. Algae toxins.

BIOLOGICAL ASPECTS. Symbiosis. Zooxantelas, zoocianelas and cyanocyanals. Symbiosis with vascular plants. Lichens Natural resources of human exploitation. Applications.

CYANOBACTERIA. Cell structure. Stromatolites. Reproduction. Morphological diversity. Movement. Ecology. Applications.

GLAUCOPHYTES. Ancestral characters of the chloroplast and phylogeny. Mobility. Ecology.

RODOPHYTES, CHLOROPHYTES. Cell structure. Morphological diversity. Reproductive structures. Vital cycles. Distribution and economic interest. Characteristics of the different representative groups and genres. Ecological aspects Evolutionary interest of chlorophytes and relation to CLORARACNIOPHYTES

EUGLENIDS, DINOFLAGELLATES, HETEROCONTOPHYTES and CRIPTOPHYTES Cell structure. Ecology. Study of the most representative genera.

PRIMNESIOPHYTES. Cell structure. Climatic indicators

Methodology

Teaching methodology and training activities

The subject consists of two types of teaching, lectures and seminars, with an integrated program so that the student must relate throughout the course content and activities scheduled to achieve the competencies indicated

Participatory lectures: The student must acquire the scientific-technical knowledge of this subject by attending these classes and complementing them with the personal study of the topics explained. The teaching of each subject will be based on a theoretical presentation with student participation.

Lab sessions: one of the main objectives will be the knowledge of the different groups of cryptogams, their characteristics and their ecology. The students must learn the correct way in terms of handling the different taxa and their conservation.

Seminars: will be based on exhibitions that students will have prepared and will deal with issues related to the subject and will allow the students to reflect and personally work on the topics discussed. As a complement to the seminars, issues related to the subject that may be discussed by students and teachers in the virtual campus forum will be considered.

Field trips: two field trips will be made to study the main studied taxa of bryophyte and pteridophyte algae "in situ". Equally important will be able to establish the main ecological parameters of the groups that are seen in the field.

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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Field trips	10	0.4	6, 5
Lab sessions	10	0.4	2, 6
Lectures	24	0.96	2, 5
Seminars	8	0.32	3
Type: Autonomous			
Preparation of filed trips and reading of texts	9	0.36	5, 3
Preparation of seminars conducted by students on a specific topic	20	0.8	2, 3
Study	60	2.4	2, 3

Assessment

The evaluation of the subject will be individual and continuous through the following tests:

- Two theoretical eliminatory exams (each one is 30% of the overall mark). Two partial tests eliminatory matter when the grade obtained by the student is equal to or greater than 5. There will be a recovery test where you can recover the partial no superats.Per participate in the recovery, the student must have been previously evaluated in a set of activities the weight of which equals a minimum of two thirds of the total grade of the subject or module. Therefore, the students will obtain the "Not Evaluable" qualification when the evaluation activities carried out have a weight lower than 67% in the final grade "

- Evaluation of the seminars and autonomous activities (20% of the global mark). The oral presentation of a topic within the scope of the seminars will be evaluated (content, synthesis capacity, rigor in the expression, quality of the documentary sources and adaptation to the established time) as well as the participation and attendance to seminars and field trips. On the other hand, there will also be an evaluation on the knowledge obtained in the field trips.

-Practical exam (20% of the overall score). Attendance at practical sessions (or field trips) is mandatory. The students will obtain the grade of "Not Evaluable" when the absence is superior to 20% of the programmed sessions.

- Unique evaluation: Students who take the Unique evaluation must complete the laboratory practicals (PLAB) in presential sessions as well as the Field courses (PCAM). Attendance will also be compulsory for the seminars (SEM), these with their own evaluation, with weight on the final mark as in the continuous evaluation. The unique evaluation consists of a single synthesis test on the contents of the whole theory programme plus the contents of the PLAB and PCAM. The mark obtained in the synthesis test is 80% of the final mark of the subject, the mark obtained in the seminars is the remaining 20%. The single assessment test will be held on

the same date set in the calendar for the last continuous assessment test and the same recovery system will be applied as for the continuous evaluation.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evaluation of the presentations in the seminars, attendance and attitude in field trips and other autonomous and supervised activities	20	2	0.08	14, 4, 1, 7, 8, 13, 12, 11, 9, 5, 3
First	30%	2.5	0.1	4, 2, 1, 6, 7, 8, 5, 3
Practical exam	20%	2	0.08	2, 6, 10, 3
Second mid-term theoretical exam	30%	2.5	0.1	4, 2, 1, 6, 7, 8, 5, 3

Bibliography

BOLD, H.C. & M.J. WYNNE. 1987. Introduction to the Algae, ed. 2. Prentice-Hall, Englewood Cliffs, New Jersey.

BOLD, H.C. et al. 1989. Morfología de las plantas y los hongos. Omega. Barcelona.

CASAS, C.; BRUGUÉS, M.; CROS, R.M.; SÉRGIO, C. 2020. Handbook of mosses of the Iberian Peninsula and the Balearic Islands [Recurs electrònic] : illustrated keys to genera and species. IEC. ISBN: 978-84-9965-560-4

CASTROVIEJO et al. 1986 (eds.) Flora Iberica [Part corresponent a Pteridophyta]. Real Jardín Botanico-CSIC. Madrid.

LEE, Robert Edward. 2008. Phycology. Cambridge: CambridgeUniversity Press. (4th edition). 560 pp

LLIMONA, X. et al. 1985. Plantes inferiors. Història Natural dels Països Catalans. Vol. 4. Enciclopèdia Catalana. Barcelona.

MARGULIS, L., CORLISS, J.O., MELKONIAN, M, CHAPMAN, D.J. 1990. Handbook of Protoctista. Ed. Jones & Barlett Publishers

MARGULIS, L., CHAPMAN, M. J. 2009. Kingdoms & domains: an illustrated guide to the phyla of life on earth. Ed. Elsevier, Academic Press.

MAUSETH, J. D. 1998. Botany. An Introduction to Plant Biology, 2/e. Multimedia enhanced edition. Ed. Jones & Bartlett Publ.

INTERNET

http://tolweb.org/tree

Websites for phytoplancton identification

http://algaekey.com/index.php

http://www.algalweb.net/search1.htm

http://cfb.unh.edu/phycokey/phycokey.htm

http://protist.i.hosei.ac.jp/

http://researcharchive.calacademy.org/research/diatoms/genera/

http://arts.monash.edu.au/ges/research/cpp/diatoms/generic.php

http://westerndiatoms.colorado.edu/taxa

Software

Throughout the theoretical and practical laboratory sessions, online databases (with information on the diversity, ecology and distinctive characters of some representative species), are used.