Universitat Autònoma de Barcelona

2022/2023

Ecology, Evolution and Diversity of Cryptograms

Code: 100839
ECTS Credits: 6

Degree	Type	Year	Semester
2500251 Environmental Biology	OT	4	1

Contact

Name: Llorenç Saez Goñalons
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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Llorenç Saez Goñalons

External teachers

Andreu Salvat

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 architectural 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

- Describe, analyse and interpret the vital adaptations and strategies of the principal groups of living beings.
- Integrate knowledge of different organisational levels of organisms in their functioning.
- Obtain, observe, handle, cultivate and conserve specimens.
- Recognise and interpret the development, growth and biological cycles of the principal groups of living beings.

Learning Outcomes

1. Collect, determine and conserve specimens and collections of cryptogams and phanerogams.
2. Interpret and recognise the different stages in the biological cycles of phanerogams and cryptogams.
3. Interpret the causes and the functioning of adaptation to the environment on the part of cryptogams and phanerogams.
4. Interpret the origin and functioning of cell and tissue structures in the different groups of cryptogams and phanerogams.

Content

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. Phylogeny and diversity. 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 practices	10	0.4	1
Lab sessions	10	0.4	2, 4, 3, 1
Lectures	24	0.96	2, 4, 3
Seminars	8	0.32	4, 3
Type: Autonomous			
Preparation of field trips and reading of texts	9	0.36	2, 4, 3
Preparation of seminars conducted by students on a specific topic	20	0.8	2, 4, 3
Study	60	2.4	2, 4, 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).

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evaluation of the presentations in the seminars	20%	2	0.08	2, 4, 3, 1
First mid-term theoretical exam	30%	2.5	0.1	2, 4, 3
Practical exam	20%	2	0.08	2, 4, 1
Second mid-term assignment	30%	2.5	0.1	2, 4, 3

Bibliography

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. 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

Online databases (free access) on ecological, chorological data of the studied species