

Biology and Diversity in Phanerogams

Code: 100841
ECTS Credits: 6

Degree	Type	Year	Semester
2500251 Environmental Biology	OT	4	0

Contact

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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 Sáez Gonyalons

Prerequisites

It is desirable, and will help the follow-up of the course, that students are familiar with basic knowledge of botany, phylogeny and plant evolution.

Objectives and Contextualisation

This course deals with basic aspects related to the biology and diversity of the Spermatophytes. Its general objective is to train the students in the main theoretical aspects and in the applicable methods in research or management initiatives in the field of the inventory of the biodiversity. The specific objectives are the following:

- (1) To provide a scientific framework that integrates information from various scientific disciplines and allows the study of the diversity of seed plants.
- (2) To addressing the study of plant biodiversity from an evolutionary perspective.
- (3) To understand the main biological, evolutionary and ecological processes that influence the diversity of seed plants.
- (4) To provide knowledge about the differential characteristics, reproductive, biological, ecological and corological aspects, as well as human applications, of the main families of studied plants.

Skills

- Adopt an ethical stance.
- Describe, analyse and interpret the vital adaptations and strategies of the principal groups of living beings.
- Develop a sensibility towards environmental issues.
- 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. Adopt an ethical stance.
2. Collect, determine and conserve specimens and collections of cryptogams and phanerogams.
3. Develop a sensibility towards environmental issues.
4. Interpret and recognise the different stages in the biological cycles of phanerogams and cryptogams.
5. Interpret the causes and the functioning of adaptation to the environment on the part of cryptogams and phanerogams.
6. Interpret the origin and functioning of cell and tissue structures in the different groups of cryptogams and phanerogams.

Content

Topic 1: Introduction to Spermatophytes: origin, evolution, characteristics and main groups.

Topic 2: Evolution and main mechanisms of speciation. Hybridization and introgression: implications.

Topic 3: Apomixis: Problematic groups of plants with apomictic reproduction mechanisms.

Topic 4: Biological strategies of the Spermatophytes. Analysis of the different vital forms and examples of the variation of the spectrum of biological forms.

Topic 5: Reproductive strategies of spermatophytes. Pollination. Autogamy and allogamy: implications. Mechanisms to avoid auto pollination.

Topic 6: Reproductive strategies of the Spermatophytes: Analysis of the different dispersion mechanisms and examples.

Topic 7: Gymnosperms: characteristics, evolutionary trends and study of different groups.

Topic 8: Angiosperms: characteristics, evolutionary trends and study of the different groups.

Methodology

The methodology used is based on 1) the information directly provided by the teacher and 2) the work of the student both in the laboratory and field sessions. The course is based on the combination of lectures (theory classes), seminars and laboratory work.

(1) lectures or theory (in whole group) where the concepts and methods of the discipline are explained. Lectures stand out and address the complicated and important points of the subject. The student should complement the information given in class with bibliographic information and autonomous work. The lectures are 50 minutes long and will be presented using material prepared by the teacher, and that the student will have available on the Virtual Campus.

(2) seminars (in party group) where problems are analyzed or specific cases of study and participatory debates are made about the significance and limitations of the concepts and methods explained in theory. These seminars allow to deal with topics that are usually of special interest (due to their controversy or current affairs) but which are outside a general agenda of the subject, as they refer to a very specific topic and would break the main thread of the course.

(3) laboratory work. Laboratory practices will be carried out. Tools and bibliography will be provided to the students so that they can identify the species studied.

(4) field excursions. There will be field practices in which the students will visit areas with floristic diversity representative of the ecosystems of the northeastern Iberian Peninsula and that allow to work, analyze and

criticize some of the concepts and methods treated in both lectures and seminars. Students will also see practical cases of conservation of species and habitats on the ground.

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Elaboration of works	60	2.4	1, 4, 6, 5, 3
Field practices	18	0.72	1, 5, 2, 3
Laboratory work	12	0.48	4, 5, 2
Lectures	18	0.72	4, 6, 5
Seminars	6	0.24	4, 5, 3
Type: Autonomous			
Study	30	1.2	4, 6, 5, 3

Evaluation

The assessment consists of a block of theory and a block of practices. The student will need to get a minimum score of 4 in each of the two blocks to pass the subject.

Block of theory:

Theoretical exams: set of questions (brief and very specific in general) related to the theoretical classes. There will be two eliminatory and non-recoverable partial exams, each of which will have a weight of 20% of the final mark of the subject.

Each of the two parts of the block of theory can be reassessed through a reassessment exam that will be equivalent to the partial exam and will have the same weight in the final score.

To be eligible for the retake process, the student should have been previously evaluated in a set of activities equaling at least two thirds of the final score of the course. Thus, the student will be graded as "No Avaluable" if the weighing of all conducted evaluation activities is less than 67% of the final score.

Block of practices:

Practical exam: test that will consist of the identification of plants. Laboratory and field practices will help the student have the necessary skills and knowledge to successfully pass this test, which will have a weight of 30% of the final mark of the subject.

Field work: the student will carry out a work that consists in the elaboration of a floristic catalog of an area of free choice. The student will have the orientation on the part of the professors during the sessions of laboratory work to make progress on this work, that will have a weight of a 30% of the final mark of the subject.

The block of practices cannot be reassessed.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
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Autonomous field work	30%	0	0	1, 4, 6, 5, 2, 3
Practical exam	30%	3	0.12	5, 2
Theoretical exam	40%	3	0.12	4, 6, 5

Bibliography

TEXT BOOKS AND DICTIONARIES OF BOTANY:

AGUILELLA, A. & F. PUCHE (2004). Diccionari de Botànica. Universitat de València. València.

BYNG, J.W. (2014). The flowering plants handbook. A practical guide to families and genera of the world. Plant Gateway Ltd. Hertford.

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

CHRISTENHUSZ, M.J.M.; M.F. FAY & M.W. CHASE. 2017. Plants of the world: an illustrated encyclopedia of vascular plant families. Royal Botanic Gardens, Kew.

FONT i QUER, P. (1963). Diccionario de Botánica. Labor. Barcelona.

IZCO, J.; E. BARRENO; M. BRUGUÉS; M. COSTA; J. DEvesa; F. FERNÁNDEZ; T. GALLARDO; X. LLIMONA; C. PRADA; S. TALAVERA & B. VALDÉS (2004). Botánica. Ed. 2. Mc Graw-Hill Interamericana. Madrid.

JUDD, W.S.; C.S. CAMPBELL & E. KELLOGG (2007). Plant Systematics: A Phylogenetic Approach with CDROM. 3rd Ed. Sunderland, Massachusetts. Sinauer Associates.

MASALLES, R.M.; J. CARRERAS; A. FARRAS; J.M. NINOT & J.M. CAMARASA (1988). Plantes superiors. Història Natural dels Països Catalans. Vol. 6. Enciclopèdia Catalana. Barcelona.

SIMPSON, M.G. (2010). Plant Systematics, 2nd Ed. Burlington, MA. Academic Press.

STRASBURGER, E.; P. SITTE; E. WEILER; J. KADEREIT, A. BRESINSKY & CH. KÖRNER (2004). Tratado de Botánica (35ª ed.). Ed. Omega. Barcelona.

VARGAS, P. & R. ZARDOYA (Eds.) (2012). El árbol de la vida. Sistemática y evolución de los seres vivos. Museo Nac. Ciencias Naturales.

WILLIS, K.J. & J.C. McELWAIN (2014). The Evolution of Plants. 2nd edition. Oxford University Press. Oxford.

FLORAS, IDENTIFICATION KEYS AND REGIONAL RED BOOKS:

BOLÒS, O. & J. VIGO (1984-2001). Flora dels Països Catalans. 4 vols. Ed. Barcino. Barcelona.

BOLÒS, O.; J. VIGO; R.M. MASALLES & J.M. NINOT (2005). Flora manual dels Països Catalans. Ed. Pòrtic. 3a ed. Barcelona.

CASTROVIEJO, S. et al. (Eds.) (1986-2015). Flora iberica. Plantas vasculares de la Península Ibérica e Islas Baleares. CSIC. Madrid.

CASTROVIEJO, S. et al. (Eds.) (2001). Claves de Flora iberica. I. Real Jardín Botánico-CSIC. Madrid.

LÓPEZ, G. (2001). Los árboles y arbustos de la Península Ibérica. 2 vols. Ediciones Mundi-Prensa. Madrid.

SÁEZ, L., P. AYMERICH & C. BLANCHÉ (2010). Llibre Vermell de les plantes vasculars endèmiques i amenaçades de Catalunya. Argania Editio. Barcelona.

TUTIN, T.G.; V.H. HEYWOOD; N.A. BURGESS; D.M. MOORE; D.H. VALENTINE; S.M. WALTERS & D.A. WEBB (Eds.). (1964-1980). Flora Europaea. 5 vols. University Press. Cambridge.

INTERNET RESOURCES:

Floristic works:

Flora iberica: <http://www.rjb.csic.es/floraiberica/>

Flores d'Andalusia occidental i oriental: <http://www.biolveg.uma.es/varios/florandor/florandor.html>

Digital herbaria and plant images:

La flora del nostre entorn: www.floracatalana.net

Herbari virtual de la Mediterrània Occidental: <http://herbarivirtual.uib.es/cas-med/>

Global Biodiversity Information Facility in Spain: <http://www.gbif.es>

Herbari virtual de la Universitat de Barcelona: <http://www.bib.ub.edu/cedocbiv/herbari-virtual/>

Images de la Flore de France. Selecció de plantes de la Flora de França: http://ifdf.free.fr/index_fr.htm

Vascular Plant image gallery, arxiu de fotografies de plantes de tot el món:
<http://www.csd.tamu.edu/FLORA/gallery.htm>

Information on plant biogeography, taxonomy and conservation:

Banc de dades de Biodiversitat de Catalunya: <http://biodiver.bio.ub.es/biocat/homepage.html>

Projecte Anthos Espanya: <http://www.programanthos.org>

Angiosperm Phylogeny Website: <http://www.mobot.org/MOBOT/research/APweb/>

Espècies amenaçades: <http://www.iucnredlist.org/>