COURSE DATA

DATA SUBJECT

Code: 33051
Name: Botany
Cycle: Undergraduate Studies
ECTS Credits: 10
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period

SUBJECT-MATTER

Degree	Subject-matter	Character

COORDINATION

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SUMMARY

The Botany course subject is annual, is taught in the second course of the Biology degree and forms part of the Plant Biology subject, along with Plant Physiology. It covers the study of: cyanobacteria, algae, plants, and fungi from an evolution and up-to-date perspective. It is one of the basic course subjects to learn diversity among living beings.

This course subject is taught in two parts: a theoretical program, containing thirty subjects and forty-three theoretical classes; a practical program, comprising fourteen laboratory sessions, and includes a visit to the didactical garden in the Burjasot campus, a visit to the Botanical Gardens belonging to the Universidad de Valencia, and two field trips. The content of both parts is related in such a way that the theoretical contents will have been explained prior to the corresponding practical session.

The central part of the course subject involves studying the diversity of plants, algae and fungi, as well as their structural, reproductive, systematic, evolutionary, ecological and conservational aspects.

The aspects it includes are summarized as follows:

- Plants and fungi in the tree of life context. Role of these organisms in the biosphere and their importance.
- Complexity of algae, plants and fungi organization.
- Endosymbiosis and the origin of chloroplasts.
- Reproduction in algae, plants and fungi. Life cycles.
- Diversity of fungi, algae and plants. This is the most extensive part of the course subject as it includes studying very diverse organisms, ranging from prokaryotes to eukaryotes and, among these, the organisms belonging to various supergroups, as well as their phylogenetic relations. Plants are studied by covering the structural characteristics of embryophytes: bryophytes, cormophytes and spermatophytes.
- Geographical distribution of plants and floristics divisions on Earth. Plant communities and the biomass on Earth.

Introduction to the study of conservation strategies and how to manage plant biodiversity. Threat and protection categories of threatened plants.

FOR STUDENTS ENROLLED WITH THE 2010 STUDY PLAN (OLD STUDY PLAN, 1100-BIOLOGY DEGREE, IN THE PROCESS OF EXTINCTION): DUE TO THE IMPLEMENTATION OF THE NEW PLAN OF STUDIES FOR THE DEGREE IN BIOLOGY, THIS SUBJECT IS IN THE PROCESS OF EXTINCTION AND, THEREFORE, IT IS OFFERED ONLY WITHOUT TEACHING (SD). THIS MEANS THAT THERE WILL NOT BE ANY ASSOCIATED TEACHING ACTIVITY AND THAT THE EVALUATION OF THE SUBJECT WILL BE CARRIED OUT ONLY THROUGH A THEORETICAL-PRACTICAL EXAM.

STUDENTS WHO DO NOT PASS IT IN ANY OF THE CALLS OF THE 2024-25 OR 2025-26 COURSES WILL BE OBLIGED TO ADAPT TO THE NEW PLAN TO CONTINUE THEIR DEGREE STUDIES IN BIOLOGY.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

COMPETENCES / LEARNING OUTCOMES

1100 -

Adquisición de conciencia social y profesional sobre la problemática ambiental y la importancia de la biotecnología vegetal y sus implicaciones éticas.

Capacidad de análisis y síntesis de la información relativa a la materia.

Capacidad de comunicar ideas e información a nivel escrito y oral.

Capacidad de diseñar y llevar a cabo experimentos, así como de analizar e interpretar datos.

Capacidad de interactuar tanto con el profesorado como con los compañeros.

Capacidad para trabajar en grupo.

Comprender e interpretar trabajos científicos relacionados con los vegetales.

Comprender los ciclos vitales de los vegetales y los hongos.

Comprender y manejar la terminología científica básica relacionada con la materia.

Conocer el funcionamiento de aparatos y técnicas elementales relacionadas con la asignatura.

Conocer el papel de los vegetales y los hongos en los ecosistemas naturales y su importancia económica.

Conocer la diversidad de los principales grupos de vegetales y de hongos.

Conocer la estructura y organización de los vegetales y los hongos.

Conocer las colecciones botánicas, los bancos y las bases de datos y su importancia como fuentes de información para el conocimiento de las plantas.

Conocer los factores ecológicos que condicionan la vida de las plantas, los tipos de comunidades vegetales y las formaciones vegetales de la tierra.

Conocer los principales tipos de reproducción de los vegetales y de los hongos.

Conocer los principios básicos del funcionamiento de las plantas.

Habilidad para argumentar desde criterios racionales, diferenciando claramente lo que es opinable de lo que son hechos o evidencias científicas aceptadas.

Preparar, conservar e identificar plantas utilizando claves.

Preparar e identificar material de origen vegetal.

Saber buscar la información bibliográfica adecuada para, en un momento dado, poder actualizar y profundizar en sus conocimientos sobre un tema especifico.

DESCRIPTION OF CONTENTS

1. Organisation and reproduction in plants and fungi

The 0rganization, life cycles and reproduction of algae, plants and fungi in the context of the Tree of Life are studied. Four theoretical classes are taught (T).

(T1)Algae, plants and fungi in the tree of life context. Role of these organisms in the biosphere and their importance for humanity. Historical overview of the Botany science.

(T2)Photoautotrophic prokaryotic organisms: Domain Bacteria: the cyanobacteria, Phylum Cyanobacteria. The origin of plastids. Primary and secondary endosymbiosis.

(T3)The complexity of algae, plants and fungi organization. From unicellular to multicellular organization: thallophytes, bryophytes and cormophytes.

(T4)Reproduction in algae plants and fungi. Vegetative, asexual and sexual reproduction. Life cycles in algae plants and fungi: zygotic, gametic or sporic alternation of generations, meiosis. Adaptive importance of the life cycles. Representative examples.

2. Fungi and related heterotrophic organisms

Biology and diversity of fungi and related heterotrophic organism such as Amebozoa and moulds are studied. Four theoretical (T) classes and two laboratory (P) sessions are taught.

(T5)Heterotrophic organism in the Domain Eukarya: Organisation and structure of the Fungi (Opisthokonta, Fungi). Reproduction types (sexual, asexual and parasexual). The fungi life cycle. Nutrition, physiology and ecology of fungi.

(T6)The fungi (Fungi): diversity, systematic arrangement and phylogenetic relationships. Detailed study of the main groups of fungi. Phylum Chytridiomycota. Phylum Zygomycota Phylum Glomeromycota, Phylum Ascomycota (Euascomycotina, yeasts), Phylum Basidiomycota (Himenomicetes, rusts and smuts fungi). Mitosporic fungi.

(T7)Mutualistic symbiosis between fungi and other organisms: Lichens and mycorrhizas . Biological, ecological and economic importance of fungi.

(T8) Amebozoa (slime molds, Amebozoa): Phylum Myxomycota; Phylum Dictyosteliomycota. Heterotrophic Heterokonts (aquatic molds and mildews, SAR): Phylum Oomycota.

(P1) Macroscopic/Microscopic observation of the vegetative organisation and reproductive structures of various Basidiomicetes and Ascomicetes specimens. Observation of ectomycorrhizae and endomycorrhizae.

(P2) Lichens: Macroscopic/ Microscopic observation of the vegetative organisation and reproductive structures of various lichens specimens. Major lichen growth forms. Identification of epiphytic lichens using identification keys.

3. The Algae

Biology and diversity of algae are studied. Three theoretical (T) classes and two laboratory (P) session is taught.

(T9)Photoautotrophic eukaryotic organisms: the algae. Organization and structure of the algae. Reproduction types, nutrition and physiology of the algae. Ecological factors; plankton and benthos. Phylum Euglenophyta (Excavata).

(T10) Heterokonts photoautotrophs (SAR): Phylum Dinophyta (dinoflagellates);Phylum Ochrophyta Class Bacillariophyceae (diatoms), Class Phaeophyceae (brown algae). Kelp forest of Laminariales.

(T11) Archaeplastida: Phylum Rhodophyta (red algae); Phylum Chlorophyta and Phylum Charophyta (green algae). Main distinguishing features, evolutionary scenario, organisation, reproduction, ecology and systematics.

(P3)Unicellular algae: vegetative organisation and reproduction. Microscopic observation of microalgae. Study of their vegetative structure and reproduction.

(P4) Multicellular algae: macro algae. Macroscopic/microscopic observation of the vegetative and reproductive structures of some Phaeophyceae, Rhodophyceae and Chlorophyceae specimens. Observation of selected fixed and living specimens.

4. Adaptation and colonization of terrestrial environment by plants. The Bryophytes

Plant adaptations to land Biology and diversity of the bryophytes are studied. Two theoretical (T) classes and one laboratory (P) session are taught.

(T12)Terrestrial plants (Archaeplastida): The occurrence of an embryo (Embryophytes). Adaptations and terrestrial invasion by plants. The importance of the alternation of generations and the reproduction of plants. Sporophylls. Isosporous and heterosporous life cycles. Groups of embryophytes.

(T13)Bryophytes: Phylum Marchantiophyta; Phylum Anthocerophyta; Phylum Bryophyta. Main characteristics of the group. Life cycle: gametophytes and sporophytes structure. Ecology. Phylogeny. Diversity.

(P5)Bryophytes: Macroscopic/microscopic observation of the vegetative organisation and reproductive structures of some representative specimens.

5. Vegetative organization of the Cormophytes

Cormophytes organization and their adaptation to various environmental factors are studied. Four theoretical (T) classes and one laboratory (P) session are taught.

(T14) Cormophytes plant body development (1). The root. Anatomy: Primary and secondary structure. Root systems. Root modifications.

(T15) Cormophytes plant body development (2). The shoot. Shoot systems. Shoot anatomy: Primary and secondary structure. Shoot modifications.

(T16) Cormophytes plant body development (3). The leaf: types; morphology and anatomy. Leaf modifications.

(T17)The plants and the environmental factors such as climate, soil, topography, biological interactions. Biotypes. Hydrophytes, xerophytes and mesophytes plants. Plants and fire. Carnivorous plants. Holoparasites and hemiparasites. Adaptive importance of the various photosynthetic pathways for plants.

(P6) Comparative anatomical and morphological study of leaves of xerophytes, hydrophytes and mesophytes.

6. Seedless vascular plants

Seedless vascular plants are studied. Biology and the diversity of the pteridophytes. One theoretical (T) class and one laboratory (P) session are taught.

(T18)The seedless vascular plants: The pteridophytes: Phylum Lycopodiophyta, Phylum Monilophyta, characteristics, diversity and phylogenetic relationships.

(P7)The Pteridophytes: vegetative organization and reproductive structures in lycopods, ferns and horsetails. Macroscopic/microscopic observation of some representative specimens.

7. Seed plants

Seed plants biology and the diversity of the Gymnosperms are studied. Two theoretical (T) classes and one laboratory (P) session are taught.

(T19)The seed plants (Spermatophytes). Main characteristics. Life cycle. The seed. Origin and evolution of the seed. Seed plants groups: Gymnosperms and Angiosperms.

(T20)Gymnosperms: Reproductive characteristics, Diversity and phylogeny. Phylum Cycadophyta, Phylum Ginkgophyta, Phylum Pinophyta and Phylum Gnetophyta.

(P8) Gymnosperms: Macroscopic observation of members of Cupressaceae and Pinaceae. Vegetative and reproductive structures. Identification of representative specimens using identification keys.

Biology and diversity of the Angiosperms are studied.

(T21)The Angiosperms: Phylum Magnoliophyta. Main characteristics. Ultra-structural and chemical characters. The Flower structure of the angiosperms. Flower parts. The perianth; flower types. Inflorescences.
(T22)Androecium. Organisation of the stamen. Pollen. Main pollen types and evolutionary patterns. The gynoecium. Carpels and types of placentation. Parts of the Ovule. Genes that regulate flowering.
(T23)Pollination: Definition and types. Mechanisms that avoid self-pollination. Male gametophyte and female gametophyte. The double fertilization. The seed development.
(T24) Structure and development of the fruit and the seed in the Angiosperms. Fruits and seeds types. Multiple fruits. Fruits and seeds dispersal agents.
(T25) Systematic arrangement of the Angiosperms: origin, phylogeny and evolutionary patterns: basal groups and main clades, Magnoliidae, Monocots, Eudicots (Rosidae, Asteridae).
(P9) Extraction and microscopic observation of different pollen types. Pollen types correlation with the pollination systems. "In vitro germination of the pollen tube.
(P10) Angiosperms I: Macroscopic observation of some reproductive and vegetative structures of various families e.g.Family Brassicaceae.
(P11) Angiosperms II: Macroscopic observation of some reproductive and vegetative structures of various families e.g. Lamiaceae and Ericaceae. Identification of representative specimens.
(P12) Angiosperms III: Macroscopic observation of some reproductive and vegetative structures of various families e.g. Globulariaceae y Asteraceae. Identification of representative specimens.

8. The Angiosperms

Biology and diversity of the Angiosperms are studied.

(T21)The Angiosperms: Phylum Magnoliophyta. Main characteristics. Ultra-structural and chemical characters. The Flower structure of the angiosperms. Flower parts. The perianth; flower types. Inflorescences.
(T22)Androecium. Organisation of the stamen. Pollen. Main pollen types and evolutionary patterns. The gynoecium. Carpels and types of placentation. Parts of the Ovule. Genes that regulate flowering.
(T23)Pollination: Definition and types. Mechanisms that avoid self-pollination. Male gametophyte and female gametophyte. The double fertilization. The seed development.
(T24) Structure and development of the fruit and the seed in the Angiosperms. Fruits and seeds types. Multiple fruits. Fruits and seeds dispersal agents.
(P13) Angiosperms IV: Macroscopic observation of some reproductive and vegetative structures of various families e.g. Fabaceae y Fagaceae. Identification of representative specimens.
P14) Angiosperms V: Macroscopic observation of some reproductive and vegetative structures of various families e.g. Poaceae y Liliaceae. Identification of representative

9. Plant Ecology and Biodiversity Conservation

Chorology, vegetal ecology, the worlds major terrestrial ecosystems or biomes are studied conservation biology of plants and fungi. Four theoretical (T) classes and Four Field trips/visits (P) are taught.

(T26) Geographical distributions of Plants and fungi. Factors that have performed the areas. Distribution areas¿ types. Endemism. Worlds floristic divisions: Floristic Kingdoms.

(T27) Plant communities concept. Structure. Dynamics. Vegetation types. Primary and secondary succession. Altitudinal zones. Bioclimatology. Anthropic impact derived from agricultural practices, weeds communities: Malherbology.

(T28) Terrestrial Biomes. Vegetation zones. Tropical Rainforests. Savannas. Deserts. Mediterranean. Temperate deciduous forests. Grasslands and steppes. Taiga. Arctic Tundra. Marine ecosystems: prairies of marine phanerogams. Coral reefs. Mangroves.

(T29) The Mediterranean. The Iberian Peninsula. The Valencian Community: Climatic forests. The current landscape.

(T30) Estimation, scale and extinction of the biodiversity. Conservation and how to manage the plant biodiversity. Protection categories, Red Lists. In situ and ex situ species protection possibilities. Invasive species. Types of protected natural areas.

(P15) Visit to the Universitys Botanic Garden.

(P16) Visit to the Didactic Garden in the Burjasot campus. Identifying plants visually visu

(P17) Field trip to the Albufera Nature Reserve

(P18) Field trip to a Natural Reserve

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Total hours	0,00

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	1,00
Individual or group project	20,00
Independent study and work	31,00
Preparation of lessons	43,00
Preparation for assessment activities	40,00
Resolution of case studies	15,00
Total hours	150,00

TEACHING METHODOLOGY

The course subject will be taught by performing various activities and by using different methodologies:

Master classes, in which the teacher will explain the basic concepts of each subject with the help of ICT (presentations, videos, consulting web sites that provide useful information about the subject being explained).

Practical laboratory sessions, where the proposed program will be followed. Students will be able to observe, prepare and identify plant or fungi material from different groups. Visits will also be organized to the University¿s Botanical Gardens and to the Didactic Garden in the Burjasot campus for the purpose of training students in identifying plants visually.

Field trips, shared with the Zoology course subject; two field trips will be organised: one to the Albufera Nature Reserve to visit the park¿s interpretation centre at Racó de l¿Olla and to observe the rich avifauna that lives in the park in May. Afterwards, a transect will be made from the beach to the wooded scrubland on stabilized dunes where flora, fauna and changes in plants can be observed. The second field trip will consist in visiting the continental Nature Reserve. During these field trips, Zoology and Botany teachers will accompany students and will explain the most relevant aspects in each place. Students will receive information about the places to be visited beforehand.

Practicals, in which students will form groups of two or three to prepare an original practical work. Throughout the course, group tutorials will be organized to solve any doubts and problems about identifying plant material, and to help prepare the report of this work. At the beginning of the course, the work objectives will be clearly set out.

Interdisciplinary work: preparing and presenting a seminar.

This interdisciplinary activity is generic and common in nature to all the course subjects taught in the second course of the Biology degree. This activity is compulsory for all the students who are registered for the second course, but not for those students who have performed this activity formerly (and whose mark has been maintained). Each work group, made up of three students, will prepare a seminar (that will consist in a written work and an oral presentation) about the subject assigned by a public draw among those proposed by the teachers of the course subjects included in this activity. Each interdisciplinary work will be considered to be linked (see its repercussion on activity evaluation) to the course subject on which the assigned subject directly depends. A tutor will be assigned to each work, who will assist in its undertaking by means of periodical meetings held throughout the course, and who will supervise its presentation. A co-tutor will also be assigned who will review the final version of the work presented. Each work will be orally presented by all the group members over a 30-minute spell. All the students in this course will attend this presentation as attendance is compulsory, along with one teacher and the work tutor. Both teachers and students will participate in selecting the works to be presented to the Biology Congress given their quality and originality. This will take place together between the first and second course of the Biology degree.

NOT APPLICABLE TO STUDENTS ENROLLED IN THE 2010 CURRICULUM (OLD CURRICULUM, 1100, IN THE PROCESS OF BEING PHASED OUT) DUE TO THE IMPLEMENTATION OF THE NEW CURRICULUM: SEE THE SUMMARY SECTION.

EVALUATION

Assessment of theoretical and practical contents by means of exams:

The grade of the theoretical and practical part will represent, in total, 50% of the grade of the subject. The grade of the theoretical part will represent 35% of the grade, that is, the grade of the theoretical contents will represent a maximum of 3.5 points out of 10 in the final grading of the course. The grade will be obtained after taking a partial exam at the end of the first term (corresponding to the first part of the syllabus, topics 1 to 15) and another partial exam at the end of the second term (corresponding to the second part of the syllabus, topics 16-30). Those students who have not passed these mid-term exams will have an exam at the end of the second term in the first call exam session (June). To eliminate the subject corresponding to the first and/or second midterm partials, students will have to pass (5) the exam.

The grade of the practical sessions by means of exams will represent 15% of the grade of the course. The practical exam will consist of several questions on the content of the practical sessions that will take place at the end of the second term. It will be necessary to have obtained at least a 5 out of 10 in the practical exam to be able to add it to the grade of the theory exam.

In the case of failing the course in the first call, the grades of the theoretical and practical exams passed, if any, will be kept for the second call (June/July).

Assessment of practices through practical work:

It will consist of the elaboration of an original practical work in which the student can establish the relationship between the acquired knowledge and its practical applications. The ability to obtain scientific information, to work in a team and to present the work will be valued with 15% of the grade of the course.

The objectives will be explained at the beginning of the course. The grade will be obtained through the presentation of a descriptive report and analysis of results.

Assessment of participation in face-to-face activities, group tutorials and other activities:

In this section, attendance to classes in the classroom, and voluntary participation in complementary activities proposed during the course will be valued with 10% of the grade. Also, the continuous evaluation of the student's personal work in each session in the laboratory, which will be valued with 15% of the grade of the course. The part of theory and practical exams and the practical work must be passed to add the participation grade.

Evaluating the interdisciplinary work using group seminars:

The qualifying mark obtained in the interdisciplinary work will represent 10% of the course subject mark. Those works selected to be presented in the Biology Congress will obtain an extra qualifying mark, which will correspond to 10% of the mark granted to this activity.

Those students who do not do the interdisciplinary work (which is compulsory) will fail this course subject if the present subject is linked to the interdisciplinary work (that is, that proposing the theme, and that which corresponds to the teacher who is the tutor of this work). The qualifying mark obtained in the rest of the course subject will be kept only until the next course, and will be summed to the qualifying mark obtained in the interdisciplinary activity at the time that this is done.

Should the current course subject not be the course subject linked to the interdisciplinary work, to pass the course subject, and should the interdisciplinary work not have been done, it will be necessary to obtain a mark that is equal to or higher then 5 (out of 9) for not having gained a mark in the interdisciplinary activity.

Should students fail the course subject, the qualifying mark given to the interdisciplinary work will be kept until the next course.

In order to pass the course subject, it will be necessary to obtain a mark of 5 (out of 10) in the overall qualifying mark for the theory, practicals (practical exam, practical work), which will represent 90% of the course subject mark to which the qualifying mark achieved in the interdisciplinary work will be summed, which will represent the remaining 10%. The evaluation in the second lot of exams will be identical to the first lot of exams.

To request the advancement of the subject call, students must have completed the compulsory activities indicated in the course guide.

NOT APPLICABLE FOR STUDENTS ENROLLED WITH THE 2010 STUDY PLAN (OLD STUDY PLAN, IN THE PROCESS OF EXTINCTION) DUE TO THE IMPLEMENTATION OF THE NEW STUDY PLAN: SEE THE SUMMARY SECTION.

REFERENCES

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- http://www.uniovi.es/bos/Asignaturas/Botanica/ [ciclos biológicos]
- http://www.hiperbotanica.net/ [biología (UNNE)]
- http://webs.uvigo.es/mmegias/1-vegetal/guiada_v_inicio.php [visita guiada por los tejidos de las plantas]
- http://tolweb.org/tree/ [árbol de la vida]
- http://www.ucmp.berkeley.edu/fungi/fungisy.html [hongos]
- http://www.ucmp.berkeley.edu/fungi/lichens/lichens.html [líquenes]
- http://botany.si.edu/projects/algae/ [algas] -http://www.seaweed.ie
- http://bryophytes.plant.siu.edu/ [musgos, hepáticas y antocerotas]
- http://www.ucmp.berkeley.edu/seedplants/seedplantssy.html [plantas con semillas]
- http://www.nhm.ac.uk/hosted_sites/bps/index.htm [Helechos]
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