COURSE DATA

DATA SUBJECT

Code: 36827
Name: Botany I
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1106 - Degree in Biology	Facultat de Ciències Biològiques	1	Annual

SUBJECT-MATTER

Degree	Subject-matter	Character
1106 - Degree in Biology	Biología	BASIC

COORDINATION

SEGARRA MORAGUES JOSE GABRIEL

GARRIDO BENAVENT ISAAC

SUMMARY

Botany I is a basic subject, in the first year of the degree in Biology at the University of Valencia. This subject will introduce the student to the learning of general concepts, terminology, diagnostic characters, the main functional adaptations and the phylogenetic framework of algae, plants and fungi, organisms that have historically been part of the field of Botany. Their study will later be expanded in subjects of later courses (Botany II, Plant Physiology, Mycology, Protistology and Geobotany). The basic knowledge of the structure, function, reproduction, taxonomic and phylogenetic diversity of algae, plants and fungi will be part of the competences of this subject, as well as ecological aspects and those related to their conservation and the understanding of relationships (symbiosis), functional and evolutionary processes (coevolution) involved.

To achieve these goals, the teaching of this subject is structured in two main parts, a theoretical program with 15 topics to be developed in 26 theoretical sessions and a conference and a practical program to be developed in 7 laboratory sessions, two field trips and three tutorials. The content of both is complementary and coordinated, so that it is intended that the theoretical contents have been explained prior to the development of the corresponding practical session.

The aspects that comprise the core of the subject can be summarized as follows:

. The algae, plants and fungi in the context of the tree of life. Role of these organisms in the biosphere and their importance from the perspective of environmental problems.
. Complexity of the morphological and functional organization of algae, plants and fungi.
. Endosymbiosis and the origin of plastids.
. Reproduction in algae, plants and fungi.
. Diversity of algae, plants and fungi. It is the most extensive part of the subject since it includes the study of organisms from prokaryotes to eukaryotes and among these belonging to different lineages, as well as their phylogenetic, taxonomic, systematic and geographical relationships and their ecological importance and for humanity.
. The algae-fungus-plant interactions, their adaptations to the environment, ecological importance and for humanity.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

No requirements or previous recommendations

COMPETENCES / LEARNING OUTCOMES

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Apply principles of physics, chemistry and geology to the field of biology.

Assimilate the process of constructing scientific knowledge: experimentation in the laboratory and field studies, gathering, handling and analysis of data and preparation of scientific documents. Use of information and communication technology (ICT) in biology.

Be able to analyse the data obtained in different biological experiments by using appropriate statistical software.

Be able to integrate knowledge of the structure and function of cells, tissues and animal and plant organs.

Be able to integrate the biological processes of energy production and cell signalling mechanisms.

Develop the skills needed to carry out a professional activity with a proactive attitude towards the world of work and with an innovative and entrepreneurial spirit. Be able to apply sustainability criteria and to work within the framework of professional ethics.

Interpret, analyse, evaluate, process and synthesise biological data and information by applying mathematical and statistical methods.

Know how to analyse the diversity of living beings and ecosystems and global, regional and local

environmental problems. Know how to relate the structure and function of biomolecules and to apply the methodologies of global structural and functional analysis of genomes and cellular processes.

Organise, plan and manage information in a manner that allows the individual to analyse, synthesise and develop critical reasoning that can be applied to solve problems, make decisions and carry out work.

Students must be able to apply their knowledge to their work or vocation in a professional manner and have acquired the competences required for the preparation and defence of arguments and for problem solving in their field of study.

Students must be able to communicate information, ideas, problems and solutions to both expert and lay audiences.

Students must have acquired knowledge and understanding in a specific field of study, on the basis of general secondary education and at a level that includes mainly knowledge drawn from advanced textbooks, but also some cutting-edge knowledge in their field of study.

Students must have developed the learning skills needed to undertake further study with a high degree of autonomy.

Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take relevant social, scientific or ethical issues into consideration.

Understand the diversity of living organisms and the various classification systems to interpret the historical nature of the evolutionary process and apply methods for reconstructing the evolutionary process so as to place major evolutionary events on the geological time scale.

Understand the morphological and functional diversity of living beings. Understand the functions of the basic underlying mechanisms from an integrative point of view and their adaptations to the environment throughout their history.

Understand the phylogenetic and geographical relationships of living organisms, as well as their taxonomy and systematics. Apply current scientific techniques to identify organisms and discern their phylogenetic relationships.

Use ICTs, apps and other computer tools to manage and disseminate information in both educational and professional environments.

Use scientific language, both oral and written, and be able to adapt the register to the target audience and/or readers. Use the most common foreign languages in each discipline as a vehicle for communication in a globalised system.

DESCRIPTION OF CONTENTS

The general characteristics, organization, structure and function of algae, plants and fungi, their phylogenetic framework and ecological importance and for humanity are studied. The contents are taught

1. Introduction to Botany

in 4 theoretical sessions (T).

(T01) Algae, plants and fungi, diversity, and phylogenetic relationships in the tree of life. Function of these organisms in the biosphere and their importance for human beings from the perspective of environmental problems.

(T02) Complexity in the organization in algae, plants, and fungi. From unicellular to multicellular organization: unicellular, thallophytes, bryophytes and tracheophytes.

(T03) Reproduction: structure and function of reproductive structures throughout life history. Vegetative multiplication and asexual reproduction. Advantages of sexual reproduction, types of meiosis, alternation of generations. Biological cycles, adaptive importance.

(T04) Domains of prokaryotic organisms: Archaea and Bacteria. Cyanobacteria. Endosymbiotic theory of the origin of plastids, types of endosymbiosis and its impact on the diversity of plastids and photosynthetic organisms.

2. Biology and diversity of algae

The evolutionary innovations that allowed plants to colonize the terrestrial environment are studied. The biology and diversity of bryophytes and pretracheophytes are studied. Unit contents are taught in 3 theoretical sessions (T) and 1 practical session (P).

(T09) The conquest of the earth by land plants (Embryophytes). Evolutionary innovations. Current groups of embryophytes.

(T10) Bryophytes: Divisions Bryophyta (mosses), Marchantiophyta (liverworts) and Anthocerotophyta (hornworts). General characteristics of the different groups. Diversity. ecological importance

(T11) Pretracheophytes. main groups. Organization and evolutionary relationships.

(P04) Bryophytes. Vegetative organization and reproductive structures. Observation of representative examples.

3. The colonization of land. Early divergent groups: bryophytes and pretracheophytes.

The evolutionary innovations that allowed plants to colonize the terrestrial environment are studied. The general vegetative and reproductive characteristics of embriophytes are studied. Unit contents are taught in two theoretical sessions (T) and one practical session (P).

(T09) The conquest of the earth by land plants (Embryophytes). Evolutionary innovations. Current groups of embryophytes.

(T10) Main evolutionary lineages of embriophytes. General vegetative and reproductive characteristics.

4. The fungi and other heterotrophic organisms.

The biology (structure, reproduction, life cycles and dispersal), taxonomic diversity and phylogenetic relationships of the main groups of amoebozoa, oomycetes and true fungi are studied. Special emphasis is devoted to symbiotic interactions with other autotrophic (algae and vascular plants) and heterotrophic organisms. The contents are taught in 5 theoretical sessions (T) and 3 practices (P).

(T11) Amoebozoans or slime molds (Divisions Myxomycota and Dyctiosteliomycota) and oomycetes or water molds and mildews (Division Oomycota). Model organisms in Biology and plant and fish pathogens.

(T12) The Fungi kingdom: basal groups of fungi and their ecological and evolutionary peculiarities.

(T13) Dikaryotic fungi (Divisions Ascomycota and Basidiomycota). Ecological (symbiosis and pathogenicity), gastronomic (edible and toxic mushrooms) and biotechnological (yeasts and molds) importance.

(T14) Lichen symbiosis: the lichen thallus and its components Lichen substances. Biodeterioration and bioindication.

(T15) Mycorrhizae: the internet of forest systems. Typology and ecological relevance. Mycoheterotrophy.

(P05) Vegetative structure and reproductive characteristics of selected species of ascomycete fungi and basal groups. Endomycorrhizal study.

(P06) Vegetative structure and reproductive characteristics of selected species of basidiomycete fungi. Study of ectomycorrhizae.

(P07) Lichen symbiosis: thallus structure and lichen biotypes. Traits of sexual and asexual reproduction. Identification of lichen substances.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	3,00
Theory	30,00
Laboratory	27,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	15,00
Independent study and work	50,00
Preparation of lessons	20,00
Preparation for assessment activities	5,00
Resolution of case studies	0,00

Total hours	**90,00**

TEACHING METHODOLOGY

The subject will be taught by carrying out different activities and using varied methodologies:

Theoretical classes.
Throughout 26 expository and participatory sessions, the teacher will explain the fundamental concepts of each one of the topics, using the audiovisual resources available. These presentations will be accessible to students through the Virtual Classroom.
Attendance at seminars or conferences.
Students will attend a scheduled conference within the course that will address current issues that will connect with the concepts and subjects explained during the course. The students will later prepare a review or will participate in an activity based on the conference. Conference attendance is mandatory.
Practical classes in the laboratory.
The laboratory practices will be coordinated with the proposed theoretical program, in which the student will be able to observe, prepare and identify material from the different groups of organisms treated in the subject. The students will have at their disposal through the virtual classroom the script of the practice, prior to carrying it out. Students may be asked to submit a report on the practical sessions.
Field trips.
Two field trips are planned. The first will be shared with the Zoology I. In this field trip, a coastal marine ecosystem will be visited where it is intended to observe the different communities of algae, which develop in the photophilous mid-littoral and infralittoral, as well as the collection of material that will be used during the practical sessions. For logistical reasons, this field trip will take place during the first semester of the course, prior to the start of the theoretical classes of the subject, for this reason a preparatory tutorial has been scheduled prior to the outing. The second field trip will take place in a Mediterranean forest/scrub area where communities of bryophytes and lichenized fungi will be observed. This second field trip will also be preceded by a preparatory tutorial.
Group tutorials associated with the subject of Botany I.
Attendance at tutorials is mandatory. The three tutorials are synchronized with the contents of the subject but are independent of those related to transversal activity which are integrated into the Biology subject. Within Botany I there will be two preparatory tutorials for field trips of 1 hour each and another 1-hour tutorial, in which, with prior information, through reading and exercises, the students will discuss some complex concepts explained during the subject.
Electronic tutorials.
The student can address specific queries to any of the teachers involved in the subject by email or through the Virtual Classroom.
Preparation of seminars in the form of panels: transversal group activity.
The Biology subject supports interdisciplinary seminars developed in conjunction with the rest of the course subjects in which Botany I is included, under the panel or poster format. Each panel is proposed and developed by a group of three students supervised by a teacher of the subject. The topics chosen by the students who are assigned to carry out in Botany I will be related to this subject. For this, they will always have the advice and help of the teachers designated for this purpose whenever they need it. Before finishing the course there will be a session ¬as a congress- in which the panels will be presented. In this session, the students must answer the questions that are formulated. The posters will be evaluated jointly by the teachers of the subjects involved. Elaboration of this panel in English will be valued. As an alternative to this activity, some other transversal activity may be carried out, endorsed by the CAT, within the framework of different educational innovation projects. The activity is prepared and followed up through group tutorials (see the teaching guide for the Biology subject where this activity is explained in detail).

EVALUATION

A continuous evaluation of each student will be carried out, based on the different face-to-face and non-face-to-face activities described in the section dedicated to Teaching Methodology. Attendance at all face-to-face activities, including exams, the completion and presentation of all work and complementary activities, participation, and degree of involvement in the teaching-learning process will be assessed. In general, the attendance at practices, field trips, group tutorials and conferences is mandatory. Unjustified absence will result in a penalty in the general grade of the subject at the discretion of the teaching team. The final grade to pass the course must be equal to or greater than 5 out of 10 points. In general, the qualification of the different evaluable sections will not be saved for subsequent courses, except for the evaluation of the interdisciplinary activity.

The specific aspects to assess will be the following:

Assessment of theoretical content through exams (40% of the final grade):
The qualification of the theoretical exam will mean 40% of the final grade for the subject. In this exam, special importance will be given to the understanding of basic concepts for the development of their botanical training and for the achievement of the general objective of the subject. The qualification will be obtained after completing a final exam in the first call (May-June) or in the second (June-July). Obtaining a grade equal to or greater than 5 points (out of 10) will be required to be able to compensate with other parts of the course grade.

Assessment of the conference (5% of the final grade):
Attendance at the conference will be an indispensable condition for the students to be able to present a summary -conference sheet-. Late deliveries will not be accepted or by any other means that is not through the task programmed for this purpose in the virtual classroom.

Assessment of practical classes through exams (45% of the final grade):
In general, it will be necessary to have obtained at least 5 points out of 10 in the practices section to be able to add with the theory note. In case of failing the subject, the grade obtained in practices will not be saved for the following courses.

The **practical grade** will address the following mandatory aspects:

Practical exam (30% of the final grade): In the practical exam, the acquisition of practical concepts will be assessed, as well as the ability to use laboratory instruments and preparations and interpretation of structures. Obtaining 5 points out of 10 will be required to be able to add the practical exam note to the rest of the sections of the practical grade.

Continuous student work (15% of the final grade):
The continuous work of the students will be assessed through the delivery of practical reports, questionnaires or other activities proposed during the realization of the practical sessions.

Assessment of interdisciplinary work through group seminars (10% of the final grade):
The grade obtained in the interdisciplinary work will account for 10% of the final grade for the subject. The evaluation of this activity will allow verifying the ability to obtain scientific information and have criteria to discern its validity, the ability to disseminate scientific knowledge, the ability to work in a team and the ability to present the work orally and publicly. The preparation of this poster in English will be particularly valued, which may lead to an extra score of up to 10%. The evaluation of this activity will be carried out in a coordinated and unified manner for the entire course. If the interdisciplinary work is not carried out, the subject grade will be reduced by 10% and it will be necessary to obtain a final grade equal to or greater than 4.5 points out of a maximum of 9 to pass the subject.
If the subject is not passed, the qualification of the interdisciplinary work will be saved for the following course.

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- Referencia c2: http://www.hiperbotanica.net/ [biología (UNNE)]
- Referencia c3: http://tolweb.org/tree/ [árbol de la vida]
- Referencia c4: http://www.ucmp.berkeley.edu/fungi/fungisy.html [hongos]
- Referencia c5: http://www.ucmp.berkeley.edu/fungi/lichens/lichens.html [líquenes]
- Referencia c6: http://botany.si.edu/projects/algae/ [algas]
- Referencia c7: http://bryophytes.plant.siu.edu/ [musgos, hepáticas y antocerotas]
- Referencia c8: https://italic.units.it/¿ Literature: Nimis P.L. & Martellos S., 2020 - Towards a

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