COURSE DATA

DATA SUBJECT

Code: 33166
Name: Biological diversity
Cycle: Undergraduate Studies
ECTS Credits: 12
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1111 - Grado en Biotecnología	Facultat de Ciències Biològiques	1	Annual

SUBJECT-MATTER

Degree	Subject-matter	Character
1111 - Grado en Biotecnología	Biología	BASIC

COORDINATION

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SUMMARY

Biological Diversity is a subject included in the matter **Biology**, belonging to the module **Fundamentals of Biology** of the **Degree in Biotechnology**. It is annual, is taught along two semesters of the first year, consists of 12 ECTS credits and has the character of Basic Training in the branch of Sciences.

Biological Diversity aims to introduce the future graduates to the principles of the organization of living beings, their diversity, systematics and bioecology, with an evolutionary approach. It also gets special emphasis on *model organisms* for biotechnology studies and the reasons that justify both their suitability and their uniqueness. The course provides the biological foundations necessary to address issues of a biotechnological nature.

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

1102 -

Aprender a trabajar de forma adecuada en un laboratorio con material biológico (microorganismos, plantas y animales) incluyendo seguridad, manipulación y eliminación de residuos biológicos, y con registro anotado de actividades.

Be able to observe and interpret the results obtained through optical microscopes.

Be able to place the different living beings in the phylogenetic tree.

Be able to understand the evolutionary relationships between organisms.

Identificar y describir los distintos órganos y tejidos animales y vegetales en preparaciones in situ y en preparaciones histológicas.

Learn, develop and apply the main techniques for the preparation, staining and observation of biological samples.

Saber predecir las consecuencias de la actividad humana sobre la biodiversidad y el medio ambiente.

Ser capaz de dar una breve charla a un auditorio no especializado sobre un tema general de Biología con impacto actual en la sociedad.

Ser capaz de identificar organismos eucarióticos y procarióticos a nivel de género y/o especie.

1111 - Grado en Biotecnología

Actuar con autonomía en el aprendizaje, tomando decisiones fundamentadas en diferentes contextos, emitiendo juicios en base a la experimentación y el análisis y transfiriendo el conocimiento a nuevas situaciones

Apply analytical, synthetic and critical thinking skills in the application of the scientific method.

Assimilate ethical and legal principles in scientific research in biotechnology.

Colaborar eficazmente en equipos de trabajo, asumiendo responsabilidades y funciones de liderazgo y contribuyendo a la mejora y desarrollo colectivo

Demostrar razonamiento crítico y autocrítico en el ámbito de la titulación, considerando aspectos tales como la ética profesional, los valores morales y las implicaciones sociales de las diferentes actividades realizadas

Disseminate and engage in public debate on issues related to biotechnology and its applications.

Participate in multidisciplinary teams, engaging in teamwork and collaboration.

Propose creative and innovative solutions to complex situations or problems, typical of the area of ¿¿¿¿connection, to donate responses to the various professional and social needs

Que el estudiantado demuestre su capacidad para utilizar las diferentes fuentes bibliográficas y bases de datos biológicos y usar las herramientas bioinformáticas

Saber comunicarse de manera efectiva, tanto de forma oral como escrita, adaptándose a las características de la situación y de la audiencia

Ser capaz de situar los distintos seres vivos en el árbol filogenético

Understand evolutionary relationships among organisms.

Use English to write reports and to interpret information from protocols, manuals and databases.

Work in laboratories, including safety procedures, waste management and accurate activity logging.

DESCRIPTION OF CONTENTS

1. Theoretical Lessons - Part 1

1.- Concept of Biological Diversity. Types: intraspecific diversity, interspecific diversity, diversity of ecosystems. Diversity of organisms: complexity and multicellularity. How many species are there? The tree of life: current classification of the diversity of organisms.
2.- Systematics, Taxonomy, and Phylogeny, the basic tools to organize, name and understand the diversity of life.
3.- The history of life on earth. Conditions of the earth that made the appearance of life possible. The fossil record. Key events in the history of life. The colonization of the terrestrial environment. Extinctions.
4.- The domains of life. Prokaryotic organisms: Archaea and Bacteria. The cyanobacteria. Functions of prokaryotes in the biosphere: recycling of organic matter, ecological interactions. Symbiosis. Impact of prokaryotes on human beings.
5.- Eukaryotic organisms, theories about their origin. Endosymbiosis, plastids diversity, evolution of eukaryotes. The sexual reproduction, advantages. Types of life cycles.
6.- Eukarya domain. Supergroup Excavata. Supergroup SAR (Stramenopiles-Alveolates-Rhizaria). Organization, reproduction and ways of life. Importance and uses, BPMO (Beneficial or Pathogenic Model Organisms).
7.- Archaeplastida supergroup (I). Red algae. The green lineage: green algae Organization, reproduction and diversity. Importance and uses, BPMO.
8.- Archaeplastida (II). Terrestrial plants, embryophytes. The bryophytes. Vascular plants. Anatomy of the cormophytes: the root, the stem and the leaf. The pteridophytes.
9.- Archaeplastida (III). The appearance of the seed and the fruit. Gymnosperms and angiosperms. Compounds of secondary metabolism. Importance and uses, BPMO.
10.- Unikonta Supergroup Amebozoa: amoebas and mucilaginous molds. Organization and reproduction. Diversity. BPMO: Fungi Organization reproduction and cycles; diversity. Importance and uses, OMBP.

2. Theoretical Lessons - Part 2

11.- History of Animals. From unicellular organisms to multicellular animals.
12.- Organization of Animals. Reproduction and Development. Bauplans. Classification and Phylogeny.
13.- Basal groups. Poriferans. Diploblastic animals. Cnidarians
14.- Triploblastic and Bilaterian animals. Lophotrochozoa. Platihelminths. Molluscs. Annelids. Functional significance of coelom and metamerism.
15.- Ecdysozoa. The molting process. Nematodes. Arthropods.
16.- Deuterostome animals. Echinoderms. Hemichordates. Chordates: origin and evolution.
17.- Vertebrates. Pisciforms. Tetrapods: amphibians; reptiles and birds; mammals. From the amniotic egg to placental development.
18.- Diversity of the characters of humans.
19.- Model animals.

3. Laboratory Practices

Lab. 1.- Prokaryotes: Cyanobacteria. Eukaryotes: Excavata, Chromoalveolata and Archaeplastida (Streptophyta). Examples in freshwater and marine plankton.
Lab. 2.- Eukaryotes. Chromoalveolata: Phaeophyceae (brown algae). Archaeplastida: Rhodophyta (red algae). Streptophyta: Zygnematales and Charales. Chlorophyta (green algae). Examples of vegetative organization and reproductive structures.
Lab. 3.- Embriophyta: Bryophytes. Tracheophyte: Pteridophytes. Biological cycles. Vegetative organization. Reproductive structures: sporangia and spores.
Lab. 4.- Seed plants (1). Gymnosperms. Vegetative organization. Reproductive structures: strobili; pollen.
Lab. 5.- Seed plants (2). Angiosperms 1. Vegetative organization. Reproductive structures. Flowers and fruits. Species determination with dichotomous keys: Brassicaceae, Compositae...
Lab. 6.- Seed plants (3). Angiosperms 2. Vegetative organization. Reproductive structures. Flowers and fruits. Species determination with dichotomous keys: Fabaceae, Labiatae, Poaceae...
Lab. 7.- Unikonta: The fungi. Mucoromycota. Glomeromycota: vesicular-arbuscular mycorrhizas. Ascomycota. Basidiomycota. Lichenic symbioses. Vegetative organization: fruiting bodies (mushrooms). Reproductive structures: exospores and endospores.

Lab. 8.- Animal Diversity: body plans.
Lab. 9.- Nematodes: anisakidosis. Extraction of Anisakis simplex larvae from parasitized fish. Mechanisms for prevention and control.
Lab. 10.- Molluscs : Taxonomy and ecology. Shell morphology.
Lab. 11.- Arthropods. Dissection and protein pattern of the venom gland of bees.
Lab. 12.- Arthropods. Toxicity test with Artemia salina.
Lab. 13.- Vertebrates: constructional morphology of the skull in mammals.
Lab. 14.- Evolutionary adaptations and functional responses.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	2,00
Theory	74,00
Laboratory	32,00
Classroom practices	12,00
Total hours	**120,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	39,00
Preparation of lessons	86,00
Preparation for assessment activities	55,00
Resolution of case studies	0,00
Total hours	**180,00**

TEACHING METHODOLOGY

Theoretical sessions:

Theoretical sessions are adapted to the official schedules of the corresponding academic year. The number of theoretical sessions necessary to teach each of the themes is variable. A masterful teaching-learning process is proposed but with a strong participatory nature by students. Teaching materials will be offered both in the classroom sessions and through the Aula Virtual platform.

Practical activities:

1.- We have designed 14 practices in the laboratory, coordinated with the theoretical matter and the field trip. Practices in laboratory are held in sessions of two hours duration, and these will be placed in the labs assigned by the Faculty.

2.- Practical activities outside the laboratory have been organized: a field trip in the first semester related to botanical contents; a field trip in the second semester related to zoological contents.

Attendance to the laboratory practicals and field trip is mandatory for both practical activities.

Problems in the Classroom:

In first and second semesters exercises will be carried out to analyze and discuss articles, scientific readings and seminars related to the topics covered along the semester, providing the acquisition of solid

knowledge of biodiversity.

Tutorials:

In the tutorials, a multidisciplinary understanding will be carried out through consultation processes to allow the deepening and integrated vision of the contents addressed in the teaching-learning activities of the subject.

EVALUATION

The evaluation of the subject will take into account the exams corresponding to the contents of the theory sessions and laboratory practices, with the aim of a total integration of the theoretical-practical knowledge, as well as the marks of the other activities carried out at throughout the academic year.

Biological Diversity is an annual subject. The contents of the topics offered along the First Part of the course will be evaluated in a theoretical-practical exam corresponding to the first call that will take place at the end of the first semester. The contents of the topics offered along Part Two of the course will be evaluated in a theoretical-practical exam corresponding to the first call that will take place at the end of the second semester. If one or both parts have not been passed in the first call for not achieving the minimum grade, they may or may be passed in the exam of the second call of the course.

Each part of the subject, contents amd matters of each one of the semesters, must be passed with a minimum grade of 5.0 out of 10 points, separately and will not be compensable. The average mark of the two exams will constitute 80% of the Final Mark of the subject.

The remaining activities, Problems, Tutorials, Field Trips, will contribute 20% of the Final Mark of the subject, with a maximum of 1 point grading the activities of each one of the two parts of the subject.

Attendance at practice and problem sessions is compulsory.

The note of any exam and activity will not be saved for the following course.

for the following course.

REFERENCES

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