

**COURSE DATA****Data Subject**

Code	33080
Name	Botany
Cycle	Grade
ECTS Credits	6.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. Period	year
1104 - Degree in Environmental Sciences	Faculty of Biological Sciences	1	Second term

Subject-matter

Degree	Subject-matter	Character
1104 - Degree in Environmental Sciences	118 - Botany	Basic Training

Coordination

Name	Department
GARILLETI ALVAREZ, RICARDO	32 - Botany

SUMMARY

Botany in Environmental Science aims to introduce the student, in general, the variability of organisms traditionally studied in this specialty: Fungi, Algae, Bryophytes, Ferns, Gimnosperms, and Flowering Plants, following an evolutionary perspective that unifies content as far as possible. When dealing with different groups, the environmental importance of each of them or, in special cases, of a particular organism, is taken into consideration. The study of plants of importance in defining the landscape and ecosystems (vascular plants) introduces fundamental concepts on the distribution of plants, the Phytogeography. This can be broken down into a series of objectives:

- To acquire a general knowledge of the organization, life cycles, reproduction, evolution and classification of plants.
- To know the major plant groups and their evolutionary relationships and their relative importance in ecosystems.
- To develop a solid conceptual and terminology relating to various aspects of botany.



To gain comprehensive knowledge about the distribution patterns of plants, their causes, results and implications for evolutionary and conservation of biodiversity at regional, national and global.

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 (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

1104 - Degree in Environmental Sciences

- Conocer los principales impactos humanos sobre los sistemas naturales.
- Conocer las características y los procesos generales de los principales ecosistemas y hábitats.
- Conocer y dominar los procedimientos para estimar e interpretar la biodiversidad.
- Identificar y comprender las bases de la diversidad microbiana y su importancia ambiental.
- Conocer e interpretar la biodiversidad vegetal y su interacción con otros sistemas biológicos y su importancia ambiental.
- Conocer y comprender la estructura y función de Microorganismos.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

Students who pass the course will:

- Know the different plant groups, their evolutionary relationships and role in different ecosystems.
- Manage the basic tools for self-study of botanical diversity.
- Know the basic types of ranges of plants and know the value of different areas when analyzing the importance of flora and vegetation of a given territory and the possible impact on them of human activity.

Reach the understanding of the plant world needed to evaluate the botanical richness of a territory, from previous data or made *ad hoc*.



DESCRIPTION OF CONTENTS

1. Botany

Justification of the subject. Importance of plants and vegetation in Environmental Sciences. Concept of plant variability. General features. The evolutionary perspective on the study of botany.

2. Diversity and Classification of the plant world.

Diversity of the plant world. Managing diversity: plant classifications. Taxonomy. Botanical nomenclature. Classification of plants. Outline of the main groups. Levels of organization and main morphological types.

3. Reproduction

Asexual reproduction: vegetative propagation and mitotic sporulation. Sexual reproduction: fertilization and main types of life cycle.

4. Mushrooms

Concept, morphology and interest in human activity. Description of lichenized fungi. Description and importance of mycorrhizae

5. Symbiotic fungi: Lichen and mycorrhizae

Concept, morphology and interest in human activity. Description of lichenized fungi. Description and importance of mycorrhizae.

6. Introduction to embryophytes

The colonization of the aerial environment. Archegoniates. Meaning of the embryo. Bryophytes. Characteristics of the main Divisions. Importance in nature and interest in human activity.

7. Algae

Concept. Characteristics of the main divisions. Importance in nature and interest in human activity.

8. Introduction to embryophytes

The colonization of the aerial environment. Archegoniates. Meaning of the embryo. Bryophytes. Characteristics of the main Divisions. Importance in nature and interest in human activity.

**9. Introduction to vascular plants**

Fundamentals of organization and general morphology of the vegetative body. Adaptations to environmental stresses or special ways of life.

10. Pteridophytes: Ferns and ferns allies

Characteristics of the main divisions. Importance in nature and interest in human activity. Types of life cycles and their evolutionary significance

11. Introduction to spermatophytes

Present moment of the process of reducing the gametophytes. Interpretation of the life cycle and its implications. Meaning of the seed. The spermatophyte morphology.

12. Gymnosperms

General features. Main families and genera in Spain.

13. Flowering plants

General features. Morphology of the flower. Inflorescences. The fruit and the mechanisms of seed dispersion.

14. Classification of flowering plants

General traits of major groups. Systematics.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	36,00	100
Laboratory practices	21,00	100
Tutorials	3,00	100
Development of group work	20,00	0
Study and independent work	10,00	0
Readings supplementary material	10,00	0
Preparation of evaluation activities	40,00	0
Preparing lectures	10,00	0
TOTAL	150,00	



TEACHING METHODOLOGY

The subject is developed on two levels that allow the best learning and assimilation of the subject by the student: 1) lectures and 2) practical classes and 3) complementary activity.

1. Lectures. The theoretical development of the subject will be based on the lecture focused on developing more complex aspects of interest or of matter. Need for better development of the student's active participation, which should have prepared before each item.
2. Practical classes. Based on laboratory sessions and two field trips, one of which will be carried out jointly with *Zoology*. In the laboratory the student will become familiar with the different plant groups, diversity and variability, and placed in the management of identification keys for different groups, as this is a basic tool for the development of their capabilities. In the field, observe and identify different environmental parameters and how these change-in a very dynamic-the development of plants and create different types of vegetation. The field practices represent a synthesis of the laboratory practices and of many of the aspects dealt with in the theory. Students should be prepared for active participation in generating and integrating botanical information from the field.
3. Complementary activity. It is an activity called *Market Botany*. Supermarkets offer the possibility of using them as "field areas" for biodiversity surveys. They are useful to introduce students to general concepts on the study of plant communities, in relation to plant diversity and economic Botany. They are a useful tool to illustrate the overwhelming presence of plants in our lives, generally unknown to students. This activity is comparable to field work in which the plant communities present in a territory are studied, by taking field data that are analyzed in the office to identify the composition, wealth and diversity of each community and of the entire territory, integrated by several communities. The dual purpose of the activity is to familiarize students with basic concepts of interpreting the vegetation of a territory while showing how little attention we generally pay to plants in our daily lives. Another contribution is that students have a part of autonomous and collaborative work, so that they learn the advantages of coordination between different work groups seeking the same broader objective.

EVALUATION

We considered two aspects (theory and practicum) in the evaluation of the subject. The respective percentages in the final grade will be as follows:

Theory - 75%. Be evaluated by final examination. The test may consist of both short questions, preferably reasoned, or a large enough test to weigh the student learning.

Practicum - 25%. Be assessed by examination in the laboratory, consisting of the recognition of the different plant groups, with different details depending on the group in question, its overall organization and vegetative or reproductive structures are recognized.

It will be possible to **average between the grades of theory and practices**, provided that a **minimum grade of 4.0 has been achieved in both parts**.



For evaluation in second call and later the grade of passed practicum is kept, but not that of the theoretical part of the course. In any case, the student can repeat practicum to raise the overall grade.

To apply for advance evaluation of this course compulsory activities (practicum) should have been passed.

REFERENCES

Basic

- DÍAZ GONZÁLEZ, T.E., M.C. FERNÁNDEZ-CARVAJAL & J.A. FERNÁNDEZ PRIETO. 2004. Curso de Botánica. Trea. Gijón.
- IZCO, J. & cols. 2004. Botánica (2ª ed). McGraw-Hill - Interamericana. Madrid.
- RAVEN, P.H., R.F. EVERT & S.E. EICHHORN. 2004. Biology of plants (7th ed.). Freeman. Nueva York.
- STRASBURGER, E. et al. 2004. Tratado de Botánica (35ª ed.). Omega. Barcelona.

Additional

- ALEXOPOULOS, C.J., C.W. MIMS & M. BLACKWELL. 1996. Introductory Mycology (4th ed.). Wiley, New York.
- ALEXOPOULOS, C.J. & C.W. MIMS. 1985. Introducción a la Micología. Omega . Barcelona.
- BELL, A.D. 1991. Plant form. An illustrated guide to flowering plan morphology. Oxford University Press.
- BOLD, H.C., C.J. ALEXOPOULOS & S.T. DELEVORYAS. 1989. Morfología de las plantas y los hongos. Omega. Barcelona.
- FONT QUER, P. 1977. Diccionario de Botánica (6ª reimp.). Labor. Barcelona.
- FONT QUER, P. 1982. Iniciación a la Botánica: Morfología externa. Fontalba. Barcelona.
- GAYRAL, P. 1975. Les Algues: morphologie, cytologie, reproduction, ecologie. Doin. Paris.
- HOEK, C. van den et al. 1995. Algae. An introduction to Phycology. Cambridge Univ. Press. Cambridge
- LEE, R.E. 1999. Phycology (3rd. ed.) Cambridge University Press.