1. OVERVIEW

Subject Area	Botany
Degree	Bachelor's Degree in Human Nutrition and Dietetics
School/Faculty	Biomedical and Health Sciences
Year	First
ECTS	3 ECTS
Type	Core
Language(s)	Spanish
Delivery Mode	On-campus and blended
Semester	Semester 2
Coordinating professor	Emilio Blanco Castro

2. INTRODUCTION

In order to become a professional in the knowledge of Human Nutrition and Dietetics, it is essential to have a basic knowledge of Botany, a core area of nutrition, either directly or indirectly. This subject area gives us an overall idea of the world of plants, their classification, nomenclature and uses, especially those related to the world of nutrition, edible plants and their derivatives. This is a compulsory subject area worth 3 ECTS credits, delivered over one semester in the first year of the Bachelor's Degree in Human Nutrition and Dietetics, within Module 2: Food Science.

Botany is an exciting science that studies plants in a broad sense, including the lower groups: algae, fungi, mosses, ferns, as well as the group of plants with flowers and seeds (Gymnosperms and Angiosperms), which is the most important for the subject area. Our aim is for students to learn about their diversity, classification and ecology in relation to food, nutrition and diet. Knowledge of plants we use in cooking, their origin, habitat and systems are important, and also help us to understand their nutritional value or potential toxicity.

The main objective of the subject area is to identify the main plant groups and to study their morphology, biology and ecology. Students will also learn to assess their nutritional and economic importance, requiring the study of their past, present and future.

Throughout the subject area, the aim is for students to learn about plant-based food. We will learn about the requirements for a plant to be considered food, as well as its taxonomy and the classification of plant-based foods.

3. SKILLS AND LEARNING OUTCOMES

Key skills (CB, by the acronym in Spanish):

- CB1: Students have shown their knowledge and understanding of a study area that builds on general secondary school education, and are usually at the level where, with the support of more advanced textbooks, they may also demonstrate awareness of the latest developments in their field of study.
- CB3: Students have the ability to gather and interpret relevant data (usually within their study area) to form opinions which include reflecting on relevant social, scientific or ethical matters.
- CB4: Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.

Cross-curricular skills (CT, by the acronym in Spanish):

- CT1: Communication: ability to engage in active listening, ask questions and respond in a clear and concise way, as well as to effectively express ideas and concepts. This includes concise and clear written communication. CT2: Leadership: ability to offer ideas, approaches and interpretations through strategies which offer solutions to real-life problems.
- CT3: Teamwork. Ability to integrate and collaborate actively with other people, areas and organisations to reach common goals, evaluate and integrate contributions from the rest of the group members and create a good working environment.

Specific skills (CE, by the acronym in Spanish):

- CE165: Know about plant-based food: botanical diversity, physiology, use and management.
- CE166: Identify the botanical varieties used in the human diet.

Learning outcomes (RA, by the acronym in Spanish):

- RA1: Students will learn the requirements for a plant to be considered food.
- RA2: Students will learn about the taxonomy and classification of plant-based foods.
- RA3: Students will learn which foods are plant-based.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes
CB1, CB3, CB4, CG3, CT1, CE165	RA1: Students will learn the requirements for a plant to be considered food.
CB1, CB3, CB4, CG3, CT1, CE165, CE166	RA2: Students will learn about the taxonomy and classification of plant-based foods.
CB1, CB3, CB4, CG3, CT1, CT3, CE165, CE166.	RA3: Students will learn which foods are plant-based.

4. CONTENTS

Learning Unit 1: Introduction to the Science of Botany. General aspects

- Topic 1. Introduction to the subject area.
- Topic 2.

- Part 1. General aspects. General Botany
- Part 2. The plant kingdom. Botanical nomenclature. Plant biodiversity. Food and toxic plants.

Learning Unit 2: Cryptogams

- Topic 3. Cryptogams.
  - Part 1. Algae
  - Part 2. Fungus, lichens
  - Part 3. Moss and ferns

Learning Unit 3: Phanerogams

- Topic 4.
  - Part 1. Phanerogams: General aspects of gymnosperms.
  - Part 2. Introduction to seed plants: gymnosperms and angiosperms. Conifers.
- Topic 5. Phanerogam Systems 1
  - Part 1. Angiosperms. Subclasses: Nymphaeaceae, Magnoliids and Liliidae (Monocotyledons).
  - Part 2. General aspects of angiosperms. APG-III System. Study of the most important families and genera applied to Botany, Nutrition and related topics.
- Topic 6. Phanerogam Systems 2
  - Part 1. Eudicots. Subclasses: Ranunculidae, Rosids and Asterids.
  - Part 2. Eudicots: Study of the most important families and genera applied to Botany, Nutrition and related topics.
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5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Lecture
- Problem-based learning
- Collaborative learning
- Learning based on workshops/labs

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On campus:

Learning activity	Number of hours
Lecture	25
Independent working	15
Problem-solving	7
Workshops and/or lab work	9
Tutorials	14

Knowledge test	5
TOTAL	**150**

Blended learning

Learning activity	Number of hours
Reading of content	5
Online seminars	10
Independent working	22
Problem-solving	10
Workshops and/or lab work	9
Online tutorials	14
Knowledge test	5
TOTAL	**150**

7. ASSESSMENT

The assessment methods, together with their respective weighting towards the final grade for the subject, are as follows:

On campus:

Assessment method	Weighting
Knowledge test	50
Learning based on workshops/labs	20
Learning portfolio	10
Problem-solving	20

Blended:

Assessment method	Weighting
Knowledge test	50
Learning based on workshops/labs	20
Learning portfolio	10
Problem-solving	20

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment activities, including the deadlines and assessment procedures for each activity.

8. BIBLIOGRAPHY

The reference work for following this subject area is:

- Audesirk T., Audesirk G, Byers B. E. (2008). *Biología: la vida en la Tierra*. 8ª ed.. México: Pearson Educación.
- Calvo, A (2015). *Biologia Celular Biomédica*. Ed. Elsevier.
- Canga, C. (2021) *Manual de Biología*. Ed. Ibersaf. Madrid.

The recommended bibliography for more specialised reading with regard to each learning unit is as follows:

Learning Unit 1.

- Audesirk T., Audesirk G, Byers B. E. (2008). *Biología: la vida en la Tierra* (8ª ed. México: Pearson Educación

Learning Unit 2.

- Audesirk T., Audesirk G, Byers B. E. (2008). *Biología: la vida en la Tierra* (8ª ed. México: Pearson Educación
- Cooper G. M., Hausman R. E. (2014). Capítulo 1. Visión global de la célula e investigación celular. *La célula* (6ª ed. p. 15-20). Madrid: Marbán
- Paniagua Gómez-Alvarez R. (1999). 1. Métodos de estudio de la célula y de los tejidos. *Biología celular* (p. 5-19). Madrid: McGraw-Hill Interamericana, D.L.
- Skloot R. (2011). *La vida inmortal de Henrietta Lacks.* Madrid: Temas de hoy.

Learning Unit 3.

- Audesirk T., Audesirk G, Byers B. E. (2008). 5. Estructura y función de la membrana celular. *Biología: la vida en la Tierra* (8ª ed. p. 80-99). México: Pearson Educación
- Cooper G. M., Hausman R. E. (2014). Capítulo 1. Visión global de la célula e investigación celular. *La célula* (6ª ed. p. 15-20). Madrid: Marbán
- Jiménez L. F., Merchant H. (2003). *Biología celular y molecular.* México: Pearson Educación.
- Gartner L. P., Hiatt J. L., Strum J. M. (2007). Capítulo 1: Membrana plasmática. *Temas claves biología celular e histología* (5ª ed.). Philadelphia: Lippincott Williams & Wilkins.
- Paniagua Gómez-Alvarez R. (1999). 2. Membrana plasmática y membranas citoplásmicas. *Biología celular* (p. 39-68). Madrid: McGraw-Hill Interamericana, D.L.

Learning Unit 4.

- Audesirk T., Audesirk G, Byers B. E. (2008). 11. La continuidad de la vida: Reproducción celular. *Biología: la vida en la Tierra* (8ª ed. p. 190-219). México: Pearson Educación
- Jiménez L. F., Merchant H. (2003). Capítulo 19: El ciclo celular. *Biología celular y molecular* (p.595-616). México: Pearson Educación.
- Gartner L. P., Hiatt J. L., Strum J. M. (2007). Capítulo 2: Núcleo. *Temas claves biología celular e histología.* Philadelphia: Lippincott Williams & Wilkins.

- Cooper G. M., Hausman R. E. (2014). Capítulo 14. Ciclo celular. *La célula* (6ª ed. p. 591-608). Madrid: Marbán.
- Paniagua Gómez-Alvarez R. (1999). 8. Ciclo celular de la célula. *Biología celular* (p. 345-357). Madrid: McGraw-Hill Interamericana, D.L.

Learning Unit 5.

- Chandar N., Viselli S. (2010). 1-Células troncales y su diferenciación. *Lippincott's Illustrated Reviews: Biología molecular y celular* (1ª ed.). Philadelphia: Lippincott Williams & Wilkins.
- Cooper G. M., Hausman R. E. (2014). Capítulo 14. Ciclo celular. *La célula* (6ª ed. p. 621-625). Madrid: Marbán.
- Sell. S. (2013). Introduction to stem cell. *Stem cell handbook* (2ª ed. p. 1-28). New York: Humana Press.
- Wobus A. M., Boheler K. R. (2006). *Stem cells.* Berlin, Heidelberg: Springer.
- Baynes, John W. (2011). Bioquímica médica 3a. ed. Madrid: Elsevier, D.L. 2011.

Mukherjee S. (2011). *El emperador de todos los males: una biografía del cáncer.* Editorial: DEBATE