



Information about the subject

Degree: Bachelor of Science Degree in Biotechnology

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 1101103 **Name:** Plant and Animal Biology

Credits: 6,00 **ECTS Year:** 1 **Semester:** 1

Module: Fundamentals of Biology

Subject Matter: Biology **Type:** Basic Formation

Field of knowledge: Science

Department: Basic and Cross-disciplinary Sciences

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

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Module organization

Fundamentals of Biology

Subject Matter	ECTS	Subject	ECTS	Year/semester
Biology	12,00	Cell Biology	6,00	1/1
		Plant and Animal Biology	6,00	1/1
Animal physiology	6,00	Animal Physiology	6,00	2/2
Plant Biology	6,00	Plant Physiology	6,00	2/1
Microbiology	6,00	Microbiology	6,00	2/1
Virology	6,00	Virology	6,00	3/2

Recommended knowledge

No prerequisites.



Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

- R1 The student has understood and assimilated the contents of the subject.
- R2 The student is able to solve problems or case studies related to the subject contents, by using different resources (bibliographic, IT, etc.)
- R3 The student is able to work in a laboratory, carrying out basic operations correctly and taking into account the corresponding safety standards. He/she understands the planning, development and purpose of the experience, and is able to contrast and validate the obtained results.
- R4 The student is able to write an intelligible and organized text on different aspects of the subject.
- R5 The student is able to present and defend his/her work adequately.
- R6 The student seeks bibliographic information from different sources and can analyze it with a critical and constructive spirit.
- R7 The student collaborates with the teacher and his/her peers throughout the learning process; he/she works in a team; treats everyone with respects, is proactive and fulfills the organization rules of the course.



Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

BASIC		Weighting			
		1	2	3	4
CB1	Students acquire and understand knowledge in their field of study based on general secondary education but usually reaching a level that, although supported on advanced text books, also includes aspects involving state-of-the-art knowledge specific to their area.			X	
CB2	Students are able to apply knowledge to their work in a professional way and have the competences enabling them to state and defend views and opinions as well as perform problem-solving tasks in their field of study.		X		
CB3	Students are able to collect and interpret relevant data (generally in their field of study) and give opinions that involve reflection on relevant social, scientific or ethical issues.	X			
CB4	Students can communicate information, ideas, problems and solutions to a specialized or non-specialized audience.	X			
CB5	Students develop the necessary learning skills to undertake further studies with a high level of autonomy.			X	
GENERAL		Weighting			
		1	2	3	4
CG01	Capacity to analyze and synthesize.			X	
SPECIFIC		Weighting			
		1	2	3	4
CE22	Knowing and understanding contents, principles and theories related to biotechnology.	X			



CE23 Knowing how to use laboratory equipment and to carry out basic operations for each discipline including: safety measures, handling, waste disposal and activity register.

X

CE26 To understand and identify the mechanisms that influence genetic inheritance

X

TRANSVERSAL

Weighting

1 2 3 4

CT02 Capacity to organize and plan.

X

CT03 Mastering Spanish oral and written communication.

X

CT05 Knowing and applying Basic ITC skills related to Biotechnology.

X

CT06 Capacity to manage information (capacity to look for and analyze information coming from different types of sources).

X

CT07 Problem solving.

X

CT08 Decision making

X

CT09 Capacity to work in interdisciplinary and multidisciplinary team.

X

CT10 Interpersonal skills.

X

CT12 Critical and self-critical capacity.

X

CT13 Ethics.

X

CT14 Capacity to learn

X

CT15 Capacity to adapt to new situations

X

CT16 Capacity to produce new ideas (creativity)

X

CT19 Capacity to apply theoretical knowledge

X

CT21 Sensitivity to environmental issues

X



Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R3, R4, R5	45,00%	Written test
R1, R2, R4, R5, R6, R7	40,00%	Submission of papers
R1, R2, R3, R4	15,00%	Laboratory test

Observations

According to the general evaluation and qualification regulations, the preferred evaluation system will be by means of continuous evaluation and will be implemented by means of questionnaires at the end of each block of content, so that the student has support during the semester to prepare for the final exam. This subject cannot be assessed by means of a single assessment.

- In order to average, a minimum grade of 5/10 is required in the written exam, as well as in the other assessment tools.
- The final grade may be reduced by up to 10% due to spelling mistakes.
- The grade of all the approved items (5/10 or more) will be saved during one more academic year only.
- Attendance to the practicals is compulsory.

The use of tools based on artificial intelligence (AI) is subject to the teacher's criteria, who may establish specific limits or conditions depending on the training or assessment activity.



MENTION OF DISTINCTION:

In accordance with the regulations governing the assessment and grading of subjects in force at UCV, the distinction of "Matrícula de Honor" (Honours with Distinction) may be awarded to students who have achieved a grade of 9.0 or higher. The number of "Matrículas de Honor" (Honours with Distinction) may not exceed five percent of the students enrolled in the group for the corresponding academic year, unless the number of enrolled students is fewer than 20, in which case a single "Matrícula de Honor" (Honours with 9 Distinction) may be awarded. Exceptionally, these distinctions may be assigned globally across different groups of the same subject. Nevertheless, the total number of distinctions awarded will be the same as if they were assigned by group, but they may be distributed among all students based on a common criterion, regardless of the group to which they belong. The criteria for awarding "Matrícula de Honor" (Honours with Distinction) will be determined according to the guidelines stipulated by the professor responsible for the course, as detailed in the "Observations" section of the evaluation system in the course guide.

Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

- M1 Teacher presentation of contents, analysis of competences, explanation and in-class display of skills, abilities and knowledge.
- M2 Group work sessions supervised by the professor. Case studies, diagnostic tests, problems, field work, computer room, visits, data search, libraries, on-line, Internet, etc. Meaningful construction of knowledge through interaction and student activity.
- M3 Activities carried out in spaces with specialized equipment.
- M4 Supervised monographic sessions with shared participation..
- M5 Application of multidisciplinary knowledge.
- M6 Personalized and small group attention. Period of instruction and/or guidance carried out by a tutor to review and discuss materials and topics presented in classes, seminars, readings, papers, etc.
- M7 Set of oral and/or written tests used in initial, formative or additive assessment of the student
- M8 Group preparation of readings, essays, problem-solving, seminars, papers, reports, etc. to be presented or submitted in theoretical, practical and/or small-group tutoring sessions. Work done on the university e-learning.



- M9 Student's study: Individual preparation of readings, essays, problem-solving, seminars, papers, reports, etc. to be presented or submitted in theoretical, practical and/or small-group tutoring sessions. Work done on the university e-learning platform.

IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
ON-CAMPUS CLASS M1	R1, R3, R4, R7	37,55	1,50
PRACTICAL CLASSES M2	R1, R2, R4, R5, R6, R7	4,15	0,17
LABORATORY M3	R1, R3, R4, R5	10,40	0,42
GROUP PRESENTATION OF ASSIGNMENTS M5	R1, R2, R4, R5, R6, R7	3,90	0,16
TUTORIAL M6	R2, R4, R5, R6	2,00	0,08
ASSESSMENT M7	R1, R2, R3, R4, R5, R6, R7	2,00	0,08
TOTAL		60,00	2,40

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
AUTONOMOUS GROUP WORK M8	R1, R2, R3, R4, R5, R6, R7	17,90	0,72
AUTONOMOUS INDIVIDUAL WORK M9	R1, R2, R3, R4, R5, R6	72,10	2,88
TOTAL		90,00	3,60



Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
LESSON 1	Diversity. Systematic and Taxonomy. The five kingdoms. Specie as a classification unit. Definition of “specie”, types of speciation.
LESSON 2	Biological nomenclature international code. Linneo’s binomial nomenclature. Phylogeny and evolutive history. Evolution theories.
LESSON 3	Definition of animal. Differenciación between animal cell and plant cell. Types of reproduction. Embriology. Types of eggs and segmentation. Blastulation. Gastrulation. Celoma.
LESSON 4	General classification of the animal kingdom. Diblastic metazoan: Phylum Porifera. Types of organization. Radiates. Phylum Cnidaria: General characters. Polipo and jellyfish structure. Phylum Ctenophora. Structure and general organization.
LESSON 5	Triblastic Metazoa. Bilateral Acelomates: Phylum Plathelminthes. General characters.
LESSON 6	Pseudocelomates. Phylum Rotifera. Phylum Nematoda.
LESSON 7	Phylum Mollusca. General characters. Shell structure. Class Gastropoda. Class Bivalvia. Class Cephalopoda. Phylum Annelida. General characters. Systematic synopsis.
LESSON 8	Phylum Arthropoda. General aspects. Systems and structures. Systematic synopsis. Subphylum Trilobitomorpha. Subfilo Chelicerata: 3 Class: Arachnida, Merostomata y Pycnogonida. Subphylum Unirramia: Class Insecta. Subphylum Crustacea. General aspects.



LESSON 9	Phylum Chordata. General characters. Systematic synopsis. Evolutive squem. Subphylum Tunichata o Urochordata. Subphylum Cephalochordata.
LESSON 10	Subphylum Vertebrata. Introduction to the study of vertebrates. General characteristics. Superclass Agnatha. Superclass Gnathostomata: Class Elasmobranchii, Actinopteri and Sarcopteri.
LESSON 11	Class Amphibia. Class Reptilia. Class Aves. Class Mammalia.
LESSON 12	<u>Introduction of Plant Biology.</u> Definition of plant species. Systematics and basic nomenclature in plant organisms. Plant organization levels. Algae, plants and fungi in the context of the five kingdoms and the phylogenetic tree of life "The tree of life". Plant evolution and Theory of Endosymbiosis.
LESSON 13	<u>The plant cell: structure and molecular composition of the plant cell.</u> Differences between prokaryotic and eukaryotic plant cells. The cell cycle in the plant cell. Plant cell totipotency and differentiation.
LESSON 14	<u>Plant tissues:</u> internal organization of the plant body. Support tissues, vascular tissues and dermal tissues. Plant organs. Morphogenesis and development.
LESSON 15	<u>Root and stem structure:</u> primary and secondary growth. Morphogenesis and development.
LESSON 16	<u>Diversity of prokaryotic organisms and protists.</u> Cyanoprocaryotes, algae and photoautotrophic and mixotrophic protists. Importance of these organisms in Biotechnology.
LESSON 17	<u>Diversity of fungi, lichens and yeasts.</u> Importance of these organisms in Biotechnology.
LESSON 18	<u>Diversity of bryophytes and pteridophytes.</u> Importance of these organisms in Biotechnology.
LESSON 19	<u>Seed Plants.</u> Biological cycle and diversity of seed plants. Main groups of interests in Biotechnology.



LESSON 20

Molecular basis of plant growth and development. Plant growth regulators: diversity, biosynthesis and mechanisms of action. Environmental control of plant growth and development. Applications in Biotechnology.

PRACTICAL CONTENTS

- LABORATORY:

- 1.- Organization levels in Biology.
- 2.- Observation and characterization of animal tissues.
- 3.- Identification of animal species.
- 4.- Observation and characterization of plant tissues.
- 5.- Identification of plant organisms.

Organization of the practical activities:

	Content	Place	Hours
PR1.	Levels of organization in Biology	Laboratory	2,00
PR2.	Observation and characterization of animal tissues	Laboratory	2,00
PR3.	Identification of animal species	Laboratory	2,00
PR4.	Observation and characterization of plant tissues	Laboratory	2,00
PR5.	Identification of plant species	Laboratory	2,00



Temporary organization of learning:

Block of content	Number of sessions	Hours
LESSON 1	2,00	4,00
LESSON 2	1,00	2,00
LESSON 3	2,00	4,00
LESSON 4	2,00	4,00
LESSON 5	1,00	2,00
LESSON 6	1,00	2,00
LESSON 7	2,00	4,00
LESSON 8	2,00	4,00
LESSON 9	1,00	2,00
LESSON 10	1,00	2,00
LESSON 11	1,00	2,00
LESSON 12	1,00	2,00
LESSON 13	2,00	4,00
LESSON 14	2,00	4,00



LESSON 15	2,00	4,00
LESSON 16	2,00	4,00
LESSON 17	1,00	2,00
LESSON 18	1,00	2,00
LESSON 19	2,00	4,00
LESSON 20	1,00	2,00
PRACTICAL CONTENTS	0,00	0,00



References

- AA.VV. (1985). Historia Natural dels Països Catalans. Enciclopedia Catalana, S.A. BARNES, R.S.K., CALOW, P., OLIVE, P.J.W., GOLDING, D.W. & SPICE, J.I. (2001). The Invertebrates a new synthesis. 3ª Edición. Blackwell Scientific Publications. BRUSCA, R.C. & BRUSCA, G.J., (2005). Invertebrados. (2ª edición). McGraw-Hill Interamericana. COMISIÓN INTERNACIONAL DE NOMENCLATURA ZOOLOGICA. (2000). Código Internacional de Nomenclatura Zoológica. 4ª Edición. CSIC. DÍAZ, T.E., FERNÁNDEZ-PRIETO, J.A., FERNÁNDEZ-CARVAJAL, Mª.C. (2004). Curso de Botánica. Editorial Trea, S.L. FONT QUER, P. (2020). Diccionario de Botánica. Ed. Península. GRASSE, P.P. (1978). Vertebrados. Reproducción, Biología, Evolución y Sistemática. Tomo III. Toray Masson. GRASSE, P.P. (1980). Vertebrados. Reproducción, Biología, Evolución y Sistemática. Tomo IV. Toray Masson. GRASSE, P.P.; POISSON, R.A. & TUZET, O. (1976). Zoología de Invertebrados. Tomo I. Toray Masson. HAISTON, N.G. (1994). Vertebrate Zoology an experimental field approach. Cambridge University Press. HICKMAN, C.P., KEEN, S.L., EISENHOUR, D.J., LARSON A., L'ANSON, H. (2021). Principios Integrales de Zoología. (18ª Edición). McGraw-Hill / Interamericana. IZCO, J. & et al., (2004). Botánica. 2ª ed. McGraw-Hill - Interamericana. Madrid. KARDONG K.V. (2007). Vertebrados. Anatomía comparada, función, evolución. McGraw-hill. MARGULIS L. & K. SCHWARTZ. (1985). Cinco Reinos. Guía Ilustrada de los phyla de la vida en la Tierra. Ed. Labor.
- NABORS, M.W. (2006). Introducción a la Botánica. Editorial Addison-Wesley. RUPPERT E., FOX R. & BARNES R. (2004). Invertebrate Zoology. A Functional Evolutionary Approach. 7th Edition. Thompson. Brooks/Cole. USA. STORCH, V. & WELSCH, U. (2001). Curso Práctico de Zoología de Kükenthal. Barcelona. Ariel. STORER, T. I.; USINGER, R. L.; STEBBINS, R. C. & NYBAKKEN, J. W. (1986) Zoología General. Editorial Omega. STRASBURGER, E. (2004) Tratado de Botánica. 35ª Edición. Omega. WALTER, J., CAMBELL, C., KELLOG, E., STEVENS, P., DONOGHUE, M. (2015). Plant Systematics: A Phylogenetic Approach. Editorial OUP USA. WEISZ, P.B. (1985). La ciencia de la Zoología. Omega.
- ENLACES DE INTERÉS:- Base de datos Animales: <http://www.animalbase.org/>
- Fauna europea: <http://www.faunaeur.org/>- Fauna Ibérica: <http://www.fauna-iberica.mncn.csic.es>
- GBIF (Global Biodiversity Information Facility): <http://www.gbif.org/>- Species 2000: <http://www.sp2000.org/>- UICN (Unión Internacional para la Conservación de la Naturaleza): <http://www.iucn.org/>
- World Biodiversity Database: <http://www.eti.uva.nl/tools/wbd.php>
- Zoología. Interpretación de los modelos arquitectónicos.- U.C.M.: https://www.ucm.es/innovacion_zoologia/apuntes-practicas- Museos Virtuales de Biología: <http://biologicas.ucm.es/museos>
- Index Nominum Genericorum.
- International Plant Names Index (IPNI)