



Universitat de Lleida

DEGREE CURRICULUM **BIOLOGY**

Coordination: GEMENO MARIN, CESAR

Academic year 2023-24

Subject's general information

Subject name	BIOLOGY			
Code	102510			
Semester	1st Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Bachelor's Degree in Agricultural and Food Engineering	1	COMMON/CORE	Attendance-based
Course number of credits (ECTS)	6			
Type of activity, credits, and groups	Activity type	PRALAB		TEORIA
	Number of credits	1.8		4.2
	Number of groups	4		1
Coordination	GEMENO MARIN, CESAR			
Department	AGRICULTURAL AND FOREST SCIENCES AND ENGINEERING			
Teaching load distribution between lectures and independent student work	Hores presencials: 60 Hores no presencials: 90			
Important information on data processing	Consult this link for more information.			
Language	Català (50%) Castellà (50%)			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
GEMENO MARIN, CESAR	cesar.gemeno@udl.cat	6,6	
SANCHEZ GONZALEZ, JORGE RUBEN	jorge.sanchez@udl.cat	2,4	
TORRES GRIFO, MERCE	merce.torres@udl.cat	2,4	

Subject's extra information

It is a basic subject that is taught in the first year of the studies of the Degree in Agricultural and Food Engineering. This subject provides basic and fundamental knowledge about living beings and the components of living matter, biological diversity, and the integration of living beings in their natural and human environment.

Assimilating the concepts taught in this subject is essential to be able to understand the subjects, fundamental or optional, related to Plant and Animal Production, Crop Protection and Food Science and Technology.

Learning objectives

1. Know the molecular and cellular foundations that are common to all living beings.
2. Understand how living things capture, store and use energy (photosynthesis, metabolism, oxidative respiration).
3. Understand the fundamentals of genetic inheritance at the cellular, organismal and population levels.
4. Introduce the fundamentals of ecology and evolution that allow us to understand the domestication and use of animal and plant species and varieties.
5. Have solid knowledge of unicellular and acellular microorganisms and study techniques.
6. Identify the main groups of animal species of agricultural interest.

Competences

Basic skills

CB1. That students have demonstrated possession and understanding of knowledge in an area of study that starts from the base of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that imply knowledge coming from the forefront of their field of study.

CB5. That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.

General skills

CG7. Knowledge in basic, scientific and technological subjects that allow continuous learning, as well as an ability to adapt to new situations or changing environments.

CG8. Ability to solve problems with creativity, initiative, methodology and critical reasoning.

Specific skills

CEFB8. Knowledge of the bases and biological fundamentals of the plant and animal field in engineering.

Subject contents

1. General biology (24 hours)

1.1 Biochemistry. Fundamentals of physics and chemistry that allow us to understand biochemistry. Know the properties of the fundamental atomic elements of life (C, H, O, N), atomic and molecular bonds and polarity. Know the organic macromolecules important for life: sugars, lipids, proteins and nucleic acids, their composition, chemical characteristics and biological function.

1.2 Cytology. The cell as the central element of life. The cell membrane, constitution, properties and transport. Eukaryotic cells. Cell organelles. Methods for cell study.

1.3 Metabolism: understand the two fundamental mechanisms through which energy flows in living beings: oxidative respiration and photosynthesis. The importance of the cell membrane to establish gradients and transform energy.

1.4 Genetics. Mendelian genetics. Genetic code. Replication, transcription and translation. Mutation. Cellular reproduction, mitosis and meiosis

1.5 Ecology, Evolution and Biodiversity. Organization of organisms: the tree of life. Biotic factors (food, reproduction, competition, diseases) and abiotic factors (geology and climate) as selection forces. Natural selection, artificial selection, reproductive isolation, speciation. Species and varieties.

2. Microbiology (8h)

2.1 Eubacteria. Form and organization. Membrane and cell wall. Capsule, flagella and hairs. The bacterial cytoplasm and structures it contains. The bacterial chromosome. Mechanisms of genetic variability. bacterial endospore.

2.2 Bacterial nutrition. Nutritional requirements: nutrients and organic growth factors. Functions of oxygen in nutrition. Nutritional categories of bacteria. Culture media. non-nutritive environment.

2.3 Bacterial growth: Definition. Growth measurement. Nature and mathematical expression of growth. Diauxic growth. Discontinuous culture: phases of growth. Continuous culture: chemostasis.

2.4 Viruses. General properties of viruses. Virion: nucleic acid and capsid, other structures. viral replication

3. Animal Biology (8 hours)

3.1 Animal structure and function. Organization levels.

3.2 Evolution and animal behavior.

3.3 Animal diversity: Protozoa, polymers, Cnidarians, Platyhelminths.

3.4 Nematodes. Molluscs and Annelids.

3.5 Arthropods and vertebrates

Practical activities (2h each)

1. General biology

- 1.1. The chemistry of life
- 1.2. The world of the small: Microscopy I.
- 1.3 The world of the very small: Microscopy II.
- 1.4. Biodiversity. Use of dichotomous keys
- 1.5. Dissection of an invertebrate

2. Microbiology

- 2.1 Viable count: dilution bank technique
- 2.2 Total Count: counting chamber
- 2.3 Gram stain
- 3. Animal Biology
 - 3.1 Recognition of the main groups and species of vertebrates (2 h).
 - 3.2 Recognition of the main groups and species of insects (2h).

Methodology

The theoretical classes are face-to-face and consist of lessons by the teaching staff supported by audiovisual media (microphone, blackboard and projector cannon). The theoretical classes will deal with the topics that will be included in the exams and on which the practices are based. The theoretical and practical classes are complementary, therefore to pass the course it is mandatory to attend the practices. In the practices, laboratory material will be handled and therefore students must bring their own lab coat and latex gloves to the practices.

The PPT presentations of the face-to-face classes will be posted on the UdL's virtual website (cv.udl.cat). These presentations will contain links to web pages where they can learn more about the topic.

Student-professor communication will always be through the virtual campus (cv.udl.cat), especially when it comes to requests to change internship groups, etc.

The tutorials will be on demand, by appointment through the e-mail of the virtual campus.

The books that appear in the Bibliography section are in the ETSEA Library.

In the practical classes of the General Biology part, students must keep a laboratory notebook where they must take notes of the practice activity, observations, results and answers to questions that will be asked "in situ", that is, during the time of the practice. At the end of each practice, before the student leaves, the teacher will mark the notebook with the activity corresponding to that day. This notebook is what will be used to calculate the final mark corresponding to the practices, therefore the notebook must be personalized with the student's name, must indicate the date of the practice and must be available for the final evaluation.

In the microbiology practices, the presentation of a single report of the set of practices will be required once they have been completed.

Development plan

Theoretical and practical classes will be held on the dates, times and classrooms that appear in the schedule available on the degree website (<https://geaa.udl.cat/es/calendari-horaris/horaris/>), except for agreed changes between teachers and students throughout the course.

In theoretical classes, the material that will be asked in the exams is provided, and the practices will also be discussed and the general evolution of the course will be reported, so it is advisable to attend all classes.

Attendance at practical classes is mandatory (unless justified). Roll call will be taken, and not attending the practical classes counts as a zero in that practice.

Each student is assigned to a practice group at the beginning of the course. The change to another group can be made in a timely manner with justification, after consulting the corresponding teaching staff.

Evaluation

The evaluation will follow the "Regulations for the Assessment and Qualification of Teaching in Graus and Masters at the University of Lleida" which is available to students on the web (<https://www.udl.cat/ca/udl/norm/ordination-/>). When in doubt, students are advised to consult these regulations before asking the faculty. These regulations deal with matters such as the recovery of exams (Art.1.2.2.d), the modification of the teaching guide (Art.1.2.5), the language of the evaluation (Art.1.3.7), the contribution of each test to the final grade (Art.1.4.6), the discontinuous evaluation (Art.1.5.2), the date of the tests (Art.3.1.4), and finally the way of performing the tests, the consequences of disruptive behavior, plagiarism or cheating, the justified reasons why a test date can be changed, etc. (Art.3.1.6-3.1.15).

The exams will be taken on the dates, times and classrooms that appear in the schedule available on the degree website (<https://geaa.udl.cat/es/calendari-horaris/horaris/>), except for changes agreed between teachers and students along the course.

Attendance at practical classes is mandatory (not attending a practice is evaluated as a zero in that practice)

The three sections of the course (General Biology, Microbiology and Animal Biology) will be evaluated by their corresponding teachers. The final grade percentage corresponding to each of the three sections of the course (General Biology, Microbiology and Animal Biology) is 60%, 20% and 20%, respectively. Within each section, 70% of the mark corresponds to theory and 30% to practices. The distribution of percentages of the final grade is, therefore, as follows:

Section	Exam	% Final grade
General Biology	Theory 1	25
General Biology	Theory 2	24
General Biology	Practical	21

Microbiology	Theory	14
Microbiology	Practical	6
Animal Biology	Theory	14
Animal Biology	Practical	6

Students who do not obtain ≥ 03.50 in a theory exam will have to take a make-up exam for that exam. The average final grade of the course must be ≥ 05.00 (Article 4.1.4. Evaluation Regulations)

Bibliography

General Biology

Neil Campbell. 2007. BIOLOGÍA. ISBN: 9788479039981. Biblioteca ETSEA 573/.578 Cam, 1 copy.

Helena Curtis. 2008. BIOLOGÍA. ISBN 10: 9500603349. Biblioteca ETSEA 73/.578 Bio, 2 copies.

Eldra Solomon. 2008. BIOLOGÍA. ISBN: 9701063767. Biblioteca ETSEA 573/.578 Sol, 2 copies.

Microbiology

MADIGAN M T; MARTINGO J M; PARKER J. Brock Biología de los microorganismos. 10 Ed. Pearson-

Animal Biology

AUTORS DIVERSOS. Història natural dels Països Catalans. Enciclopèdia Catalana.

CASALS, F., and SANUY, D. 2006. La fauna vertebrada a les Terres de Lleida. Gran Angular

DIAZ, J.A. & SANTOS T. Zoología. Aproximación evolutiva a la diversidad y organización de los animales. Ed.Síntesis. 1998