

Teaching guide

IDENTIFICATION DETAILS

Degree:	Biotechnology		
Scope	Biology and Genetics		
Faculty/School:	Experimental Sciences		
Course:	ANIMAL AND PLANT PHYSIOLOGY		
Type:	Basic Training	ECTS credits:	6
Year:	2	Code:	2026
Teaching period:	Fourth semester		
Subject:	Physiology		
Module:	Biochemistry and Molecular Biology		
Teaching type:	Classroom-based		
Language:	Spanish		
Total number of student study hours:	150		

SUBJECT DESCRIPTION

The purpose of this course is for the student to know the functioning of the different systems of animal and plant organisms and the way in which each of them contributes to the functions of the organism complete. You must understand the principles and foundations of the physiological responses of animals and plants to the environment and know the repercussions of the alterations in these responses, the mechanism of action of these alterations and their basic expression.

They will also allow us to acquire a global vision of biological systems essential in biotechnological processes, such as obtaining nutrients and energy, the synthesis of complex organic molecules... etc. The teaching methodology used will promote active student learning and will raise fundamental questions about their person and their place in society. Physiological knowledge will broaden your view of yourself and, as you approach the

results of the scientific method, you will discover both the answers and the limitations of this science and its relationship with others. The knowledge and skills acquired with this subject will be essential for learning others such as Pathophysiology, Bioengineering, Genetically Modified Organisms, Agrobiotechnology and Integrated Laboratory.

GOAL

To facilitate knowledge of the functions of tissues, organs and systems in healthy human beings, as well as the cellular and molecular regulatory mechanisms for maintaining homeostasis, and to know the physiology of plants, understanding the biological mechanisms with which the plant develops in the environment in which it lives. The detailed knowledge of physiology together with the acquisition of competency skills through the methodologies used in the subject seek to promote critical thinking and the search for truth regarding health, environmental and social problems, and will prepare our students for the search for solutions to which they are called as Biotechnologists.

PRIOR KNOWLEDGE

Knowledge of physics, biochemistry and cell biology, all perfectly attainable with other subjects previously studied in this degree.

COURSE SYLLABUS

The syllabus consists of two blocks:

ANIMAL PHYSIOLOGY

Topic 1. Nervous System: 1.1. Nerve cells. Electrical signals and synapses. 1.2. Organization and functions of the central nervous system. 1.3. Afferent division: sensory system. 1.4. Efferent division: somatic autonomic and motor nervous system.

Theme 2. Physiology of the muscular system. Skeletal, smooth and cardiac muscle.

Theme 3. Cardiovascular system. The heart. Circulatory system.

Topic 4. Respiratory system. Ventilation mechanics. Gas diffusion and transport.

Topic 5. Renal physiology. The kidneys. How the nephron works. Homeostasis of volume, pressure, osmolality and pH.

Theme 6. Digestive system. Gastrointestinal tract function. Exocrine glands, pancreas, and liver.

Topic 7. Endocrine system. Hormones of the hypothalamic-pituitary axis. Pancreatic hormones.

Block 2: PLANT PHYSIOLOGY

Topic 0. Plant Physiology Presentation. Fundamentals of plant anatomy

Topic 1. Development and relations with the environment 1.1. Plant Development: Growth and Differentiation 1.2. Phytohormones and other developmental regulators 1.3. Role of light and other environmental signals in plant development 1.4. Physiological integration: Integration of endogenous and environmental signals, Physiological responses to environmental stress

Theme 2. Water relations and translocation 2.1. Water: Absorption and transport. Water balance and perspiration 2.3. Phloematic translocation

Theme 3. Acquisition of inorganic nutrients. Absorption and transport mechanisms

Topic 4. Energy acquisition and nutrient assimilation 4.1. Absorption and transformation of light energy 4.2. Photoassimilation of CO₂. Photorespiration. Environmental Factors 4.3. Assimilation of mineral nutrients. Assimilation of N and S

EDUCATION ACTIVITIES

This course will use teaching methodologies focused on promoting student participation and responsibility, and on achieving the proposed learning outcomes. To this end, 1) presentations of theoretical and practical content will be made by teachers both asynchronously (through videos or documents) and through class presentations, and 2) student work activities, individually or in groups, during classes and in their autonomous work time, but always guided and monitored by teachers.

The weekly organization of face-to-face theoretical classes will be as follows: 3 hours for Animal Physiology and 1 hour for Plant Physiology.

The methodology and tools used are as follows:

Direct instruction classes by teachers.

Carrying out exercises, tasks and evaluation activities such as questionnaires, clinical cases, problems, concept mapping, etc. during face-to-face classes, individually or in cooperative groups.

Independent work by individual or group students, which includes viewing and studying videos, reading scientific documents or articles, carrying out questionnaires, exercises or problems, making infographics, presentations or videos.

Practical seminars. There will be 1 practical seminar on plant physiology.

DISTRIBUTION OF WORK TIME

TEACHER-LED TRAINING ACTIVITIES	INDIVIDUAL WORK
60 Horas	90 Horas

SKILLS

Basic Skills

Students must have demonstrated knowledge and understanding in an area of study that is founded on general secondary education. Moreover, the area of study is typically at a level that includes certain aspects implying knowledge at the forefront of its field of study, albeit supported by advanced textbooks

Students must be able to apply their knowledge to their work or vocation in a professional manner and possess skills that can typically be demonstrated by coming up with and sustaining arguments and solving problems within their field of study.

Students must have the ability to gather and interpret relevant data (usually within their field of study) in order to make judgments that include reflections on pertinent social, scientific or ethical issues

Students must be able to convey information, ideas, problems and solutions to both an expert and non-expert audience

Students must have developed the learning skills needed to undertake further study with a high degree of independence

To acquire firm theoretical, practical, technological and humanistic training needed to develop professional activity.

To have acquired the ability for analytical, synthetic, reflective, critical, theoretical and practical thought.

To be familiar with the basic principles and theories of human and experimental sciences.

To develop oral and written communication skills.

General Skills

To acquire firm theoretical, practical, technological and humanistic training needed to develop professional activity.

To have acquired the ability for analytical, synthetic, reflective, critical, theoretical and practical thought.

To be familiar with the basic principles and theories of human and experimental sciences.

To develop oral and written communication skills.

Specific skills

Know the anatomy and the physical, chemical and molecular bases that take place in animal and plant systems.

Understand the principles and foundations of animal and plant physiological responses to the environment.

Ability to communicate the knowledge acquired orally and in writing.

Know how to apply the theoretical knowledge acquired to solving problems and practical cases related to different subjects.

LEARNING RESULTS

Identify the cellular and anatomical structures essential for the proper functioning of systems in the human body and plants

Explain and compare the functioning at the cellular and molecular levels of organs and systems of the healthy human body.

Illustrate the physiological feedback processes responsible for maintaining homeostasis in the healthy human body

Calculate essential physiological parameters correctly and evaluate the result based on normality.

Analyze clinical cases of human pathologies in detail and justify the associated pathology based on the physiological data shown.

Identify and explain plant responses to different environmental conditions.

LEARNING APPRAISAL SYSTEM

1. Ordinary evaluation system:

The evaluation is distributed as follows:

Animal Physiology block exams, 46%

Plant Physiology block exams, 34%

Participation and homework in class, 20%

To average with the rest of the grades, it will be necessary to pass the exams in both blocks. If any of the blocks are suspended, the rating of the successful block will be saved until the extraordinary call. If you have not passed the subject in the first call, the grades of the approved parts will be saved until the extraordinary call.

2. Alternative evaluation system: Repeat students who have not opted for the primary evaluation system will have an alternative evaluation system that will consist of taking a final exam (80%) and delivering tasks through the virtual classroom (20%). Students in second or subsequent enrollment must contact the teacher to request to take advantage of this system.

Plagiarism, as well as the use of illegitimate means in evaluation tests, will be sanctioned in accordance with those established in the Evaluation Regulations and the University's Coexistence Regulations

ETHICAL AND RESPONSIBLE USE OF ARTIFICIAL INTELLIGENCE

1.- The use of any Artificial Intelligence (AI) system or service shall be determined by the lecturer, and may only be used in the manner and under the conditions indicated by them. In all cases, its use must comply with the following principles:

- a) The use of AI systems or services must be accompanied by critical reflection on the part of the student regarding their impact and/or limitations in the development of the assigned task or project.
- b) The selection of AI systems or services must be justified, explaining their advantages over other tools or methods of obtaining information. The chosen model and the version of AI used must be described in as much detail as possible.
- c) The student must appropriately cite the use of AI systems or services, specifying the parts of the work where they were used and describing the creative process followed. The use of citation formats and usage examples may be consulted on the Library website(https://www.ufv.es/gestion-de-la-informacion_biblioteca/).
- d) The results obtained through AI systems or services must always be verified. As the author, the student is responsible for their work and for the legitimacy of the sources used.

2.- In all cases, the use of AI systems or services must always respect the principles of responsible and ethical use upheld by the university, as outlined in the [Guide for the Responsible Use of Artificial Intelligence in Studies at UFV](#). Additionally, the lecturer may request other types of individual commitments from the student when deemed necessary.

3.- Without prejudice to the above, in cases of doubt regarding the ethical and responsible use of any AI system or service, the lecturer may require an oral presentation of any assignment or partial submission. This oral evaluation shall take precedence over any other form of assessment outlined in the Teaching Guide. In this oral defense, the student must demonstrate knowledge of the subject, justify their decisions, and explain the development of their work.

BIBLIOGRAPHY AND OTHER RESOURCES

Basic

Arthur C. Guyton, John E. Hall. Treatise on medical physiology/11th ed. Madrid:Elsevier, 2010.
(Arthur C. Guyton, John E. Hall. Treatise on medical physiology/11th ed. Madrid:Elsevier, 2010. , ||Walter F. Boron, Emile L. Boulpaep. Medical Physiology/3rd ed. Barcelona:Elsevier, 2017.)

Silverthorn, Dee Unglaub (1948-) Human Physiology: An Integrated Approach/8th ed. Madrid:Editorial Medica Panamericana, 2019.

(Silverthorn, Dee Unglaub (1948-) Human Physiology: An Integrated Approach/8th ed. Madrid:Editorial Medica Panamericana, 2019. , ||Joaquin Azcon-Bieto, Manuel Talón Foundations of Plant Physiology McGraw Hill)