

Applied Physiology

Code: 101908
ECTS Credits: 6

Degree	Type	Year	Semester
2501230 Biomedical Sciences	OT	4	0

Contact

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Use of Languages

Principal working language: spanish (spa)
Some groups entirely in English: No
Some groups entirely in Catalan: No
Some groups entirely in Spanish: No

Other comments on languages

Utilitzat en algunes parts de l'assignatura

Prerequisites

This subject does not have prerequisites, although it is advised that students have passed all subjects of the first three courses of the Degree, which give the necessary knowledge to develop more specific and applied concepts.

It is advisable to have knowledge of English.

Objectives and Contextualisation

- To recognize and interpret from a physiological point of view practical situations of everyday life and laboratory situations.
- Application of basic concepts of physiology to real and experimental situations.
- To recognize the importance that animal experimentation has in the development of the biomedical sciences and of biology in general.
- Acquisition of basic concepts of biology and technology of experimental animals in biomedicine.
- Acquisition of basic concepts of experimental design (animal experimentation).
- Critical validation of animal models in biomedical research.

Competences

- Apply knowledge acquired to the planning and implementation of research, development and innovation projects in a biomedical research laboratory, a clinical department laboratory or the biomedical industry.
- Contribute to public discussions on cultural matters.
- Develop critical thinking and reasoning and communicate ideas effectively, both in the mother tongue and in other languages.
- Develop independent learning habits and motivation to continue training at postgraduate level.
- Develop independent learning strategies.
- Generate innovative and competitive proposals for research and professional activities.
- Identify and understand the advances and challenges of research.

- Plan and implement laboratory analysis experiments and procedures belonging to the biomedical field.
- Respect diversity in ideas, people and situations.
- Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

Learning Outcomes

1. Contribute to public discussions on cultural matters.
2. Develop critical thinking and reasoning and communicate ideas effectively, both in the mother tongue and in other languages.
3. Develop independent learning habits and motivation to continue training at postgraduate level.
4. Develop independent learning strategies.
5. Generate innovative and competitive proposals for research and professional activities.
6. Identify and apply suitable functional study methodologies for the development of research projects.
7. Identify and critically evaluate methodologies for the experimental study of diseases.
8. Identify and understand the advances and challenges of research.
9. Respect diversity in ideas, people and situations.
10. Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

Content

This subject is divided into two independent blocks:

Block 1 - Introduction to animal experimentation in biomedicine (approximately 20 hours of teaching)

- Ethics of animal experimentation. Basic legislation. Ethical committees
- Animal models in biomedicine - What is an animal model? Types of animal models. Validation of an animal model. Choice of the animal model. Repositories of animal models.
- Types of experimental models according to their genetic and microbiological conditions. Standardization.
- Physiology of reproduction: Comparative reproduction of experimental animals.
- Physiological parameters of the experimental animal conditioning the experimental responses.
- Animal welfare. Physiological needs and related factors.
- Basic experimental procedures. Administration and sampling. Anesthesia, analgesia and euthanasia.
- Experimental design. General principles.

Block 2 - Applied medical physiology (approximately 14 hours of teaching)

Alterations of pulmonary mechanics. Surfactant. Functional respiratory tests.

Study of pulmonary and bronchial inflammation. Respiratory insufficiency.

Pulmonary circulation. Heart lung relations.

Regulation of ventilation. clinical case.

Intracavitary electrophysiology.

Adaptation to acute and chronic exercise.

Circulation Coronary.

Stress tests Methodology and applications.

Endothelial function.

Nutrition and diet. Nutrition and cancer.

Croonophysiology.

Aging.

Laboratory program

- DETERMINATION OF RAT OESTRUS CYCLE (mandatory)
- CARDIOVASCULAR MONITORING (voluntary).
- Coronary Unit
- Hemodynamic Unit
- MECHANICAL VENTILATION (voluntary).

Methodology

- Theoretical classes. Based on presentations provided by the teacher and available prior to the classes.
- Laboratory activities. Practical activities related to laboratory animal science.

In order to attend laboratory practice sessions, the student must prove that they have passed the biosafety and safety tests found in the Virtual Campus and be aware of and accept the operating rules of the laboratories of the Biosciences Faculty.

- Oral presentations: Presentation and defense of an animal model and an experimental design before classmates and teachers. To focus the work tabs, the topics of study will be proposed by the teachers of this part of the subject.
- Self-study - Time dedicated by the student to the study of both the material presented in the theoretical classes and any other supplementary material provided by the teacher or sought by the same student (as a complement to the material provided).
- Information search.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Laboratory	3	0.12	2, 6
Lectures	33	1.32	6, 8, 7
Seminars - Oral presentations	3	0.12	1, 4, 2, 5, 6, 8, 7
Type: Supervised			
Tutorials for oral presentations	4	0.16	1, 5, 9, 10
Type: Autonomous			
Information analysis and preparation of the oral presentation	26	1.04	4, 3, 2, 5, 6, 8, 7, 9, 10
Literature search	9	0.36	4, 3, 8, 10
Study time	65	2.6	4, 3, 2, 6, 8, 7

Assessment

It is necessary to pass the two blocks of the subject with a grade ≥ 5.0 to pass the subject.

Block 1 - It is considered passed with a grade ≥ 5.0 . It is evaluated with 2 types of activities (50% of the final grade):

2.1 Examination of theoretical and practical knowledge, which may include test questions and / or development questions and / or practical cases of application of the knowledge acquired. 15% of the final grade (30% of the block mark).

2.2 Oral presentation (couples) - Selection, presentation and defense of an animal model of interest in biomedicine. 35% of the final grade (70% of the block mark).

Block 2 - Review of theoretical knowledge that will include two sub-tests: test and reasoning. It is considered passed with a grade ≥ 5.0 . 50% of the final grade.

The final grade is obtained as the compensated average of the two blocks (block 1: 50%, block 2: 50%).

Students with a grade < 5.0 will be eligible for a recovery exam for the failed part. In this case, the student must have compleatted at least 67% (2/3) of the evaluable activities.

A student will be considered "not evaluable" when he/she has taken less than 67% (273) of the evaluable activities.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Presentation Block 1	35 %	3	0.12	1, 4, 3, 2, 5, 6, 8, 7, 9, 10
Reasonimg test - Block 2	25 %	1	0.04	1, 4, 3, 2, 5, 6, 8, 7, 9, 10
Test Part 1 (with laboratory)	15 %	2	0.08	2, 5, 6, 8, 7
Test Part 2	25 %	1	0.04	1, 2, 5, 6, 8, 7

Bibliography

Ciencia y Tecnología del Animal de Laboratorio. Textos Universitarios, UAH, 2008.

Journal on line: JoVE (Jounal of Visualized Experiments) - <http://www.jove.com/>

Additional bibliographic support will be provided during the course, a part from the student's autonomous search of references.