Universitat Autònoma de Barcelona

2022/2023

Applied Physiology

Code: 101908
ECTS Credits: 6

Degree	Type	Year	Semester
2501230 Biomedical Sciences	OT	4	2

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

The three official languages of the UAB can be used: Catalan, Spanish and English.

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

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- 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.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Read and critically analyse original and review papers on biomedical issues and assess and choose the appropriate methodological descriptions for biomedical laboratory research work.

- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.
- Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

Learning Outcomes

1. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Identify and apply suitable functional study methodologies for the development of research projects.
3. Identify and critically evaluate methodologies for the experimental study of diseases.
4. Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
5. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
6. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
7. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
8. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
9. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
10. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
11. Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.
12. 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.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Laboratory	3	0.12	2
Lectures	33	1.32	2, 3

Seminars - Oral presentations	3	0.12	2, 3
Type: Supervised			
Tutorials for oral presentations	4	0.16	12
Type: Autonomous			
Information analysis and preparation of the oral presentation	26	1.04	2, 3, 12
Literature search	9	0.36	12
Study time	65	2.6	2, 3

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, 11, 10, 2, 3, 4, 8, 7, 5, 12
Reasonimg test - Block 2	25 %	1	0.04	2, 3, 5, 12
Test Part 1 (with laboratory)	15 %	2	0.08	2, 3, 9, 6
Test Part 2	25 %	1	0.04	2, 3, 9, 6

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 (research papers) will be provided during the course, a part from the student's autonomous search of references.

Software

This course does not use any specific softwar.