

Academic Year/course: 2022/23

69700 - Fundamentals of Anatomy, Physiology, Pathology and Therapeutics

Syllabus Information

Academic Year: 2022/23

Subject: 69700 - Fundamentals of Anatomy, Physiology, Pathology and Therapeutics

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 633 - Master's Degree in Biomedical Engineering

ECTS: 12.0

Year:

Semester: First semester

Subject Type: Compulsory

Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

Students have to demonstrate that they have achieved the expected learning outcomes through the following assessment activities:

A written exam that will include:

- Evaluation of the theoretical part of the subject (90% of the final mark). It will consist of multiple choice questions (multiple choice, no penalty for failures), development questions and short questions.
- Evaluation of the practical part (10% of the final mark) will be carried out by means of test questions and short questions that will be about the practices carried out.

There will be an earlier written exam of the Anatomy or Physiology part in the month of December or January in order to be able to eliminate material before the final exam. Its realization will depend on the possibility of finding a classroom and a suitable date, in consensus with all students.

The minimum mark to pass the subject will be 5 out of 10 possible points. This final mark will be obtained by averaging the marks of the three sections that make up the subject (anatomy, physiology and pathology / therapeutics). It will be required that the student has obtained a mark equal to or greater than five points in two of the sections, and at least four points in the remaining section. If this requirement is not met or the final grade is less than five points, the subject will not be passed.

In case of not passing the subject in the first call, the student may retake the written exam in a second call in which they will examine the sections in which they would not have reached five points in the first call.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process will be developed in several levels: master classes in which the participation of the student will be encouraged, practical laboratory classes, practical classes of the operating room, realization of practical application works. The methodology proposed aims to encourage the student's continued work.

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials, including a discussion forum.

Further information regarding the course will be provided on the first day of class.

4.2. Learning tasks

The teaching and assessment activities will be carried out face-to-face unless, due to the health situation, the provisions issued by the competent authorities and by the University of Zaragoza provide for them to be carried out on line.

The learning process that has been designed for this subject is based on the following:

In order that the students achieve the learning results described above and acquire the competences designed for this subject, the following training activities are proposed:

A01 Participatory master class (95 hours). Teacher's presentation of the main contents of the subject. This activity will take place in the classroom in person.

A03 Laboratory practices* (8 hours). They may take place in the research laboratories of the I3A or the Faculty of Veterinary Medicine.

A04 Special practices* (8 hours). They will take place in the operating rooms of the Hospital Clínico Universitario Lozano Blesa and Miguel Servet.

A06 Tutoring. Schedule of personalized attention to the student with the objective of reviewing and discussing the materials and topics presented in the theoretical and practical classes. The schedules will be informed at the beginning of the course.

A08 Evaluation. Set of theoretical-practical written tests and presentation of reports or works used in the evaluation of the student's progress. The detail is found in the section corresponding to the evaluation activities.

* **Whenever socio-sanitary circumstances allow it.**

4.3. Syllabus

The program offered to the student to help him achieve the expected results includes the following sections with the following lessons:

The three sections will not be taught simultaneously, but for a better monitoring and understanding of the subject, sequencing will be planned so that the student has first seen the biological and anatomical aspects, then the physiological and finally the pathology and therapeutics for a certain device or organ.

The following is the schedule for each thematic block separately:

SECTION 1. Fundamentals of Anatomy and Cell Biology:

Theoretical classes:

- Topic 1 The cell
- Topic 2 Cellular organelles
- Topic 3 Mitosis and Meiosis. Fundamentals of general embryology
- Topic 4 Histology I
- Topic 5 Histology II
- Topic 6 Histology III
- Topic 7 Introduction to Anatomy
- Topic 8 Anatomy of the Nervous System
- Topic 9 Anatomy of the Locomotor Apparatus
- Topic 10 Anatomy of the Urinary System
- Topic 11 Anatomy of the Circulatory and Respiratory Apparatus
- Topic 12 Anatomy of the digestive system

Practical sessions:

- Performing a blood smear.
- Operation of an anatomopathological diagnostic laboratory.
- Histology viewing.
- Comparative osteology.

SECTION 2. Fundamentals of Physiology:

Theoretical classes:

- Topic 1: Concepts of Physiology.
- Topic 2: Homeostasis. Internal medium. Bases of cellular metabolism
- Topic 3: Transmembrane transport.
- Topic 4: Bioelectrical potential. Genesis and conduction of the action potential.
- Topic 5: Transmission of the action potential. Neurotransmission.
- Topic 6: Muscular physiology.
- Topic 7: Neuromuscular junction. Excitation-contraction coupling.
- Topic 8: Functional structure of the nervous system.

Topic 9: Nervous sensitivity.
Topic 10: Motor control.
Topic 11: Electroencephalography.
Topic 12: Renal physiology.
Topic 13: General functions of the cardiovascular system.
Topic 14: Electrical activity of the heart.
Topic 15: Mechanical activity of the heart. Cardiac cycle.
Item 16: Cardiac expenditure. Regulation of cardiac activity.
Topic 17: Blood pressure and its regulation. Microcirculation
Topic 18: Venous and lymphatic returns.
Topic 19: Respiratory mechanics.
Topic 20: Respiratory membrane. Transport of blood gases.
Topic 21: Physiology of the digestive system.

Practical sessions:

- Blood groups.
- Blood pressure.
- Electrocardiogram.
- Electromyography.

SECTION 3. Fundamentals of Pathology and Therapeutic:

Theoretical classes:

Topic 1: Concept of health and disease.
Topic 2: Pathology and Therapeutics in the context of Medicine as science.
Topic 3: General bases for the study of diseases
Topic 4: General bases of Therapeutics
Topic 5: Pathology of the respiratory system.
Topic 6: Pathology of the Locomotor System
Topic 7: Pathology of the Cardiovascular System
Topic 8: Oncology
Topic 9: Bases and fundamentals of surgical therapy
Topic 10: Surgical maneuvers.
Topic 11: Current evolution of Surgery I
Topic 12: Current evolution of Surgery II
Topic 13: Bases of organ transplants
Topic 14: Bioethics
Topic 15: Sources of information in Medicine and Evidence Based Medicine
Topic 16: Research in Surgery.
Topic 17: Bioengineering-Telemedicine-Robotics

4.4. Course planning and calendar

The calendar of the subject, both of the classroom sessions and of the laboratory sessions, will be determined by the academic calendar that the center establishes for the corresponding course.

Among the main activities planned are the presentation of the theoretical contents and the realization of laboratory practices in the Faculty of Veterinary and in the operating rooms of Lozano Blesa and Miguel Servet University Hospital Clinics.

The start and end dates of the theoretical and problem classes, as well as the dates of completion of the laboratory practices and the global assessment tests will be set by the School of Engineering and Architecture and published on the master's website (<http://www.masterib.es>).

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=69700>