

Physiological systems

Academic Year: (2023 / 2024)

Review date: 30-05-2022

Department assigned to the subject: Bioengineering Department

Coordinating teacher: DESCO MENENDEZ, MANUEL

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

There are no requirements to take this course.

OBJECTIVES

CB6 Possess and understand knowledge that provides a base or opportunity to be original in the development and / or application of ideas

CB7 That students know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study

CB9 That students know how to communicate their conclusions and the technical knowledge and the ultimate reasons that sustain them to specialized and non-specialized audiences in a clear and unambiguous way

CG1 Ability to learn new methods and technologies, from the domain of scientific and special techniques of Clinical Engineering, as well as for new situations.

CG2 Ability to apply advanced knowledge about the human being and the life sciences to solve problems typical of Clinical Engineering. In particular, ability to identify medical problems that can be treated using techniques encompassed in Clinical Engineering.

CE2 Ability to understand and use advanced statistical methods for conducting scientific studies, evaluation of equipment from the point of view of effectiveness, accreditation for medical use or study of comparative effects in patients.

CE4 Ability to evaluate the functioning of electromedical systems by analyzing complex data from the control / electronic / mechanical subsystems involved.

CE5 Ability to apply engineering solutions in the resolution of problems in medicine, based on the advanced knowledge of human anatomy and physiology necessary to interact in interdisciplinary environments.

CE6 Ability to apply knowledge of biological systems at the cellular and molecular level to solve problems in medicine.

CE9 Ability to establish a dialogue with doctors to understand complex medical problems and the application of quantitative methods and engineering techniques to their solution.

LEARNING RESULTS THAT THE STUDENT ACQUIRES

In overcoming this subject, students should be able to:

- Have a general vision of molecular and cellular biology that allows you to understand and address problems in the area of biomedicine.
- Know the basics of human anatomy and medical terminology.
- Know the basics of human physiology, with special emphasis on quantitative descriptions of physiological models.
- Recognize the systems of the human organism, describing its structures, functionality, functioning, location and signals generated at the physiological level.
- Demonstrate familiarity with usual medical procedures.
- Communicate effectively and understandably by doctors.

DESCRIPTION OF CONTENTS: PROGRAMME

This subject provides an approach to physiology from the point of view of systems, and its relationship with engineering. It also covers some basic aspects of medical terminology and diagnostic and therapeutic procedures. The different topics are approached from an engineering perspective and in the practical sessions contact is made with the real world, through quantitative measures as much as possible. In these sessions, the instrumentation and devices available in the laboratories of the university are used, as well as the resources of the Gregorio Marañón Hospital. The thematic content of the subject includes:

- Introduction to molecular and cellular biology
- Introduction to the human body: anatomy, physiology, homeostasis
- The muscular, skeletal system and joints
- Nervous tissue and central and peripheral nervous system.
- Blood, lymphatic system and immunity
- Respiratory system
- The endocrine system
- The cardiovascular system
- Digestive system
- The urinary system

LEARNING ACTIVITIES AND METHODOLOGY

ACTIVITIES

- Theoretical and practical classes
- Discussion seminars with clinical experts
- Laboratory Practices
- Tutorials
- Presential evaluation tests

METHODOLOGIES

- Exhibitions in the teacher's classroom with computer and audiovisual support, in which the main concepts of the subject are developed and the bibliography is provided to complement the students' learning.
- Resolution of practical cases, problems, etc. raised by the teacher individually or in a group.
- Presentation and discussion in class, under the teacher's moderation, of aspects related to the content of the course. Matter in relation to the role of clinical engineering from the perspective of care specialists, as well as case studies.

ASSESSMENT SYSTEM

Continuous evaluation, class participation and practices: 50%

Final exam: 50%

Extraordinary call:

- The final grade for students who attend the extraordinary call may be 100% of the extraordinary exam.

% end-of-term-examination:	50
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% of continuous assessment (assignments, laboratory, practicals...):	50
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BASIC BIBLIOGRAPHY

- GERARD J. TORTORA; BRYAN DERRICKSON Principles of Anatomy and Physiology, WILEY.