

Academic Year: ( 2022 / 2023 )

Review date: 25-01-2023

Department assigned to the subject: Bioengineering Department

Coordinating teacher: LORENTE BALANZA, JOSE ANGEL

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 2

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

It is preferable, although not required, to have completed:

- Cell and molecular biology
- Biochemistry
- Biological systems

**OBJECTIVES**

The subjects Medical Physiology I and Medical Physiology II are mainly focused in providing a sound background on human Anatomy and Physiology. It will also cover some aspects of Pathology and Patophysiology, diagnostic and therapeutic procedures and medical terminology. Whenever possible, the different topics will be explained trying to address an engineer's perspective and interests rather than providing a conventional medical or biological viewpoint. After this fascinating course, the student will certainly acquire the necessary knowledge to understand the key role of engineering in advances in physiology-based patient monitoring and treatment.

The practical sessions will facilitate a better understanding of the bases of physiology and a closer contact with the real world, using instrumentation and devices available at the University and at the Hospital Universitario de Getafe. Hospital Visits with experts in the different fields are planned in key hospital services deeply dependent on technology and engineering.

Among the skills the students are expected to acquire we can mention:

- Basic knowledge of human anatomy and anatomical terminology.
- Intermediate-level knowledge of human physiology, with particular emphasis on quantitative descriptions of physiological models, whenever appropriate.
- Familiarity with some basic medical procedures.
- Understanding of the (past and ongoing) key role of engineering in the advancement of medical physiology.
- Ability to communicate with physicians, understanding their jargon and needs, and being able to read clinical documents.

**DESCRIPTION OF CONTENTS: PROGRAMME**

The program for the subjects Medical Physiology I and Medical Physiology II include the following modules:

Medical Physiology I:

- Introduction to the human body
- Musculo-skeletal system
- Brain and nervous system
- Blood and coagulation
- Immunity and lymphatic system
- Respiratory system

Medical Physiology II:

- Special senses: Vision, audition, olfaction, gustation, equilibrium

- Endocrine system
- Cardiovascular system
- Digestive system
- Metabolism and nutrition
- Urinary system and fluid and electrolyte balance
- Coagulation
- Reproductive system, development and inheritance

## LEARNING ACTIVITIES AND METHODOLOGY

Each section of the program will be divided into lectures and practical sessions/seminars.

Some practical sessions will take place at the Laboratories in the UC3M some others will require visits to Hospital Universitario de Getafe (lab coat mandatory).

## ASSESSMENT SYSTEM

Students should read assigned chapters before lectures and seminars. During seminars there will be interactive discussion with the students.

Periodically short-exams will be passed during the first half-hour of the session. Results of these exams will constitute part of the continuous evaluation.

Grading:

- Final exam: 60%
- Continuous evaluation: 40% (Short exams, practical sessions and hospital visits)

FINAL EXAM: To perform an average with the continuous evaluation the minimum score in the final exam must be  $\geq 4.5$  out of 10.

EXTRAORDINARY EXAM: The mark for students attending any extraordinary examination will be:

- 100% exam
- 60% exam and 40% continuous evaluation if it is available in the same course

The student will be asked to indicate her/his preference before the exam starts.

ACADEMIC CONDUCT: Unless specified all exams will be closed-book, closed-notes, no PC or mobile phone. Plagiarism, cheating or other acts of academic dishonesty will not be tolerated. Any infractions what so ever will result in a FAILING GRADE.

% end-of-term-examination:	60
% of continuous assessment (tests, assignments, laboratory):	40

<b>% end-of-term-examination:</b>	<b>60</b>
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	<b>40</b>

## BASIC BIBLIOGRAPHY

- Guyton & Hall Textbook of medical physiology, Saunders Elsevier, 2011
- Linda S. Costanzo Physiology. Cases and problems, Lippincot Williams & Wilkins, 2012
- Tortora & Derrickson Principles of Human Anatomy and Physiology, WILEY, 2009
- Walter F. Boron Medical Physiology, Elsevier 2016, 2016