# Biophysics

**Academic Year: ( 2024 / 2025 )** **Review date: 25-04-2024**

**Department assigned to the subject: Physics Department**

**Coordinating teacher: AUGER MARTINEZ, MARIA ANGUSTIAS**

**Type: Basic Core ECTS Credits : 6.0**

**Year : 1 Semester : 1**

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

Mathematics, Physics and Chemistry (high-school level)

## OBJECTIVES

- Ability to know and understand the basic laws and concepts of Physics, focusing on its applications to biochemistry and biology
- Ability to understand the basic elements of the interaction of radiation with matter, atomic and nuclear structure essential in Medical Physics
- Ability to understand and use the mathematics involved in the physical models
- Ability to understand and use the scientific method
- Ability to understand and use the scientific language
- Ability to develop problem solving skills
- Ability to use scientific instruments and analyze experimental data
- Ability to retrieve and analyze information from different sources
- Ability to work in a team

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Scientific method, critical attitude and importance of the representation of experimental data. Data representation and analysis.
2. Living beings as thermodynamic systems.
3. Biophysics of gases: respiration.
4. Biophysics of fluids: haemodynamics.
5. Biophysics of cell membranes.
6. Wave biophysics: hearing
7. Physical basis of vision.
8. Physical principles of diagnostic imaging.

## LEARNING ACTIVITIES AND METHODOLOGY

In person master classes. Lectures supported by computer and audiovisual aids.
In person practical learning sessions based on cases and and exercises resolution.
Individual work.
Laboratory sessions. Practical work and activities held in a Physics laboratory. Individual and collaborative work + written reports submission.
Individual and/or group tutorial sessions to resolve doubts and queries about the subject.
Final exam.

## ASSESSMENT SYSTEM

| | |
|---|---|
| **% end-of-term-examination:** | 60 |
| **% of continuous assessment (assigments, laboratory, practicals…):** | 40 |

Continuous assessment:
Midterm Exams and any assignments (25% of final mark)
Laboratory sessions (15% of final mark)
Attendance to the laboratory sessions is compulsory, as well as submitting a written report on each of

| | |
|---|---|
| **% end-of-term-examination:** | 60 |
| **% of continuous assessment (assigments, laboratory, practicals…):** | 40 |

the experiments carried out in every session. The mark will be common to the members of each laboratory working group.

Written exam (60% of final mark)
The final exam will be held at the end of the semester. A minimum score of 3 points out of 10 in the final exam is required to pass the course.

## BASIC BIBLIOGRAPHY

- P.A. Tipler, G. Mosca PHYSICS for Scientists and Engineers, W.H. Freeman, 2007

## ADDITIONAL BIBLIOGRAPHY

- D. T. Haynie  BIOLOGICAL THERMODYNAMICS, Cambridge University Press, 2003

- J.T. Bushberg, J.A. Seibert, E.M. Leidholdt Jr., J.M. Boone THE ESSENTIAL PHYSICS OF MEDICAL IMAGING, Lippincott, Williams and Wilkins, Baltimore, MD, 2002

- R. Glaser BIOPHYSICS, Springer-Verlag, 2001