UNIVERSITÀ DEGLI STUDI DI TERAMO — BACHELOR'S DEGREE IN BIOTECHNOLOGY

Applied Physics and Biostatistics

Course Introduction — A.Y. 2026/2027 (6 ECTS)

Lecturer: Prof. Valentina Notarstefano
Department of Bioscience and Technology for Agriculture, Food and Environment

The teaching method applies physics and mathematics to real biomedical problems

Blood Flow

- Model: Fluid Mechanics
- Concepts: Pressure, Bernoulli's law, Poiseuille's equation
- Goal: Understanding circulatory dynamics

Breathing & Heat

- Model: Gases and Thermodynamics
- Concepts: Gas exchange and body heat balance
- Goal: Analysing respiratory physiology

Electrical Signals

- Model: Electricity and Magnetism
- Concepts: Membrane potential, conduction, ECG
- Goal: Studying cardiac and nerve activity

Pharmacokinetics

- Model: Mathematics and Calculus
- Concepts: Functions, derivatives, integrals (Area Under Curve - AUC)
- Goal: Assessing plasma drug levels

The teaching staff provides continuous support through office hours and official channels

Lecturer Contacts

Prof. Valentina Notarstefano

Official email:
vnotarstefano@unite.it

Department:
Bioscience and Technology for Agriculture, Food and Environment

Location:
Università degli Studi di Teramo

Office Hours

Mode:
By appointment only, via email.

Days and times:
• Thursday: from 9:30 to 10:30
• Friday: from 12:30 to 13:30

Notes:
Please state the subject of your query in the appointment request.

The E-Learning portal centralises teaching materials and official announcements

Teaching Materials

- Lecture slides to download
- Worked and guided exercises
- Exam examples
- Further reading

Official Communications

- General course announcements
- Extraordinary timetable changes
- Classroom assignments and calendars
- Programme changes

Exam Management

- Written exam calendar
- Publication of results and marks
- Exam turn announcements
- Mandatory registration on the portal

The single written exam assesses theory and numerical calculations with the use of a calculator

Structure of the Written Exam

• Type: Single written exam for the whole Course (6 ECTS).

• Question format:

- Multiple-choice questions
- True / False questions
- Fill-in-the-blank questions
- You may be asked to justify your answer

• Content:

Includes both theoretical questions and practical problems requiring numerical calculations.

Rules and Permitted Tools

• PERMITTED tool:

- Standard scientific calculator.

• STRICTLY FORBIDDEN:

- The use of any connected or programmable device (smartphone, tablet, smartwatch, laptop) is strictly forbidden.

• Penalties:

The use of unauthorised devices results in the immediate cancellation of the exam.

Passing requires 18/30 and retaking the written exam cancels the previous mark

Assessment Criteria

• Minimum passing threshold:

A score of 18/30 in the written exam.

• Optional Oral Exam:

- Accessible only with a written score ≥ 25/30.
- Aimed at attempting to improve the mark.
- It is in no way compulsory.

Rule for Repeating the Written Exam

• Automatic Cancellation:

Taking the written exam again automatically cancels the mark obtained previously.

• Validity of the Result:

ONLY the last written exam taken, in chronological order, is valid.

• Recommendation:

Consider carefully whether it is worth retaking the exam if you have already obtained a passing result.

The textbook by Bacchetta and Scannicchio guides the biomedical approach of the course

Main Reference Textbook

Introduction to Medical Physics

Authors: Bacchetta, Scannicchio

Key feature:

It is the primary reference for the applied approach and for solving physics problems in living systems.

Supplementary and Reference Texts

- Fundamentals of Physics — Halliday, Resnick (CEA Ed.)
- General Physics: Principles and Applications — A. Giambattista (McGraw-Hill)
- Physics 1: Mechanics, Waves, Thermodynamics — D. C. Giancoli (CEA Ed.)

General notes:

Any standard university Physics 1 textbook is suitable for in-depth study of general theory.