UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Fisica

2627-1-E1302Q007

Aims

The course aims to provide fundamental knowledge of Classical Physics, useful for understanding the physical phenomena underlying biological processes.

1. Knowledge and understanding
Acquisition of basic concepts in Classical Physics.

2. Applying knowledge and understanding
Application of physical principles to solve quantitative problems and interpret natural phenomena, including those related to chemistry and biology.

3. Independent judgment
Development of critical thinking skills in analyzing physical phenomena and evaluating the most appropriate physical models to describe a given system, including biological systems.

4. Communication skills
Acquisition of the scientific language necessary to describe and discuss physical phenomena.

5. Learning skills
Enhancement of the ability to independently and critically learn basic scientific concepts.

Contents

1. Mechanics of material point and rigid body
2. Fluid mechanics
3. Thermodynamics
4. Electromagnetism and optics

Detailed program

1. Measurable quantities, scalar and vector quantities, equations of motion
2. Rectilinear, parabolic, circular, and harmonic motions
3. Forces and principles of dynamics
4. Friction
5. Work and mechanical energy
6. Linear momentum, center of mass, systems of particles
7. Moment of inertia, torque, angular momentum
8. Fluidostatics
9. Fluidodynamics
10. Thermal energy, heat, temperature
11. Thermodynamics principles
12. Kinetic theory of gases, statistical mechanics
13. Electrostatics
14. Electrodynamics
15. Magnetic fields and electromagnetic induction
16. Electromagnetism and Maxwell's equations
17. Mechanical waves and electromagnetic waves
18. Geometrical optics and wave optics

Prerequisites

Basic mathematics of the high school

Teaching form

32 lectures (2h) in the classroom, composed by:

a) a section focused on the presentation of contents, concepts and principles (didattica erogativa, DE).
b) a section focused on trainees interventions, guided problem-solving and discussion of practical examples, including applications in the biological (didattica interattiva, DI).

Didactic activities are conveyed by means of face-to-face lectures.

Teaching language: Italian.

Textbook and teaching resource

A. Alessandrini: "Fisica per le scienze della vita", Casa Editrice Ambrosiana. Distribuzione esclusiva Zanichelli 2023
J.W. Jewett & R.A. Serway: “Principi di Fisica”, EdiSES, vol.1 e 2
A. Giambattista: "Fisica Generale" 3/ed. McGrawHill

Semester

First semester

Assessment method

Student knowledge is assessed through a written and an oral exam.

The written exam (90 minutes) consists of 5 exercises (3 points each) and 4 problems (4 points each). The exam must be completed on official paper provided by the instructor, and the results must be recorded on a specific answer sheet also provided by the instructor. The use of mobile phones or tablets is not allowed, calculators are permitted. The exam is passed with a score higher or equal to 18.

The oral exam can be done only after the written exam, and involves a discussion of the course topics to evaluate the student’s understanding and knowledge. The exam is passed with a score higher or equal to 18.

The final score is the average of the written and oral score.

During the academic year, two partial exams are held.

- First partial: mechanics
- Second partial: thermodynamics and electromagnetism

The format of the partial exams is the same as that of the written exam. If both the partial exams are passed, the written exam is considered passed (with the average score of the partial exams).

Office hours

Mail to the instructor

Sustainable Development Goals

QUALITY EDUCATION