UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Physics Laboratory

2526-1-E3004Q005-E3004Q00502

Aims

Get a deeper understanding of the laws of mechanics and thermodynamics from the direct observation of phenomena. Learn how to perform physics measurements, elaborate data, and critically evaluate the uncertainties in the results.

Contents

Experiments: Study of motion, elastic and inelastic collisions, friction; Pendulum, springs; Torsion. Moments of inertia; Standing waves on a spring; Acoustic waves and speed of sound; Harmonic oscillator, dumped and forced oscillations, resonance; Measurement of the gravitational constant; Coulomb law; Measurements of density, viscosity and dynamics of fluids; Calorimeter; Gas expansions and compressions; Geometric optics.

Detailed program

- Acceleration of gravity: Kater pendulum, free-fall motion
- General gravity: measurements with a Cavendish's balance
- Elastic and inelastic collisions. Inclined plane
- Torsion pendulum and measurements of inertia moments
- Hook's law. Spring and harmonic oscillations
- Forced and damped oscillations, resonance
- Steady waves on a string
- Steady waves in a pipe filled with various gases. The velocity of sound
- Stokes' law and viscosity of glycerol
- Archimede's principle and measurements of density

- Bernoulli's principle and Venturi's pipe
- Calorimetry measurement
- Thermodynamics: compression and expansion in adiabatic and isothermic regimes of various gases
- Electrostatic: measurements with a Coulomb's balance
- Geometric optics: reflection, refraction and thin lenses

Prerequisites

Basic knowledge of the contents of the course of Physics I

Teaching form

Laboratory activity. 72 hours of laboratory experiments carried out in interactive mode, in person, in groups of three students under the supervision of the teacher and tutors.

Textbook and teaching resource

Description of the experiments available on the e-learning page.

Semester

Second semester.

Assessment method

1. Reports on the experiments performed in the laboratory by the group of students, written in collaboration by the three students, to be provided one week before the oral exam.
2. Oral exam, individual. The exam will concern the experiments performed in the laboratory concerning the related physics laws, the adopted instrumentation, the data-taking procedure, the data analysis, and the results. A logbook containing data taken in all experiments should be carried at the exam.

Office hours

By appointment (via email).

Sustainable Development Goals

QUALITY EDUCATION