UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Elements of Experimental Methods

2425-1-ESM01Q023-ESM01Q024M

Aims

Aim of the course is to give the basis of Experimental Physics and to learn statistics and error analysis.

Contents

The first part of the course is based on lectures on statistics: Analysis of experimental data, random and systematic errors, Distributions, Probability and confidence. The second part of the course is carried out in laboratory, by making basic Physics experiments.

Detailed program

The first part of the course is based on lectures on statistics: Analysis of experimental data, random and systematic errors, Distributions, Probability and confidence.

The second part of the course is carried out in laboratory, by making the following basic physics experiments

1 DENSITY
2 BINOMIAL AND GAUSSIAN DISTRIBUTIONS
3 MOMENT OFDI INERTIA
4 STANDING WAVES
5 ELASTICITY
6 RADIOACTIVE DECAY
7 PENDULUM
8 PROJECTILE MOTION

9 FORCED AND DAMPED HARMONIC OSCILLATOR
10 POISSON DISTRIBUTION

Prerequisites

Basic knowledge of calculus, algebra, geometry, and analytical geometry and of classical physics are required, as commonly taught in high school.

Teaching form

Lessons and activity in laboratory, in groups of three/four students each, managing experimental activities varying every day of presence. Lessons will be held in Italian.

32 hours of in-person lectures
40 hours of in-person laboratory (10 sessions of 4 hours)

Textbook and teaching resource

J.R. Taylor, *Introduzione all'analisi degli errori*, ed. Zanichelli

Laboratory notes (e-learning page of the course)

Semester

Lessons: September - December 2024

Laboratory activities: February - April 2025

Assessment method

The student will acquire credits by 1) attending the Physics Laboratory I,2) writing laboratory reports and 3) passing an oral exam. The oral exam will focus on the content of the lectures and the experiences carried out in the laboratory.

Office hours

On request contacting the teacher: roberto.lorenzi@unimib.it

Sustainable Development Goals