UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

General Physics - Mechanics and Waves

2425-1-ESM01Q001

Aims

The course aims at introducing students to the discipline of physics, in particular to the knowledge of classical mechanics. The topics are treated by accompanying theoretical explanations with numerous examples and problems, useful for a better understanding of the subjects. Extensive references to the connections between the topics covered and the topics developed in more advanced courses are also proposed.

Contents

Classical mechanics and an introduction to special relativity.

Detailed program

Algebra of vectors

Kinematics of a material point

Dynamics of a material point

Mechanical work and kinetic energy

Conservative forces

Potential energy; mechanical energy and its conservation

Non conservative forces; sliding and viscous friction

Inertial and non inertial reference systems; Galileian principle of relativity; fictitious forces

Dynamics of points systems

Collisions between material points

Dynamics of rigid bodies

Properties of a central force field

Universal gravitation

Kinematics and dynamics of fluids

Free, damped, and forced oscillations; two-body oscillator

Propagating and standing mechanical waves

Special relativity

Prerequisites

Knowledge of algebra and analysis (program of the first math course)

Teaching form

The course is held in delivery mode and in Italian; consists of lectures (56 hours) and exercises (24 hours).

Textbook and teaching resource

P. Mazzoldi, M. Nigro, C. Voci, "Elementi di Fisica vol. 1 - Meccanica e Termodinamica" EdiSES

Semester

First and Second semester (January-June)

Assessment method

The assessment consists in a written examination followed by an oral examination.

The written examination (2:30 hours duration) concerns the solution of 5 problems related to topics of classical mechanics developed during the course. A work in which at least 3 problems out of the 5 proposed are correctly solved is considered sufficient.

The oral examination consists in the discussion of problems not correctly solved by the student in the written examination, followed by an extended discussion of some topics of classical mechanics developed during the course.
The oral examination can be performed in the same session of the written part, as well as in one of the two following sessions. During the course, two ongoing written examinations are also proposed: the passing of both (in each one, at least 2 correct problems among the 4 proposed) is considered as equivalent to passing the written eaxm of the June exam session.

Office hours

Upon agreement by email.

Sustainable Development Goals

QUALITY EDUCATION