UNIVERSITÀ DI TRENTO

[145033] General Physics I (part 2)

General information

Course	MATHEMATICS
Curriculum	standard
Course type	Degree
Academic year	2023/2024
Training activity type	Supplementary compulsory subjects
Scope	Supplementary compulsory subjects
Language	ITALIANO
CFU	6 CFU
Didactic Activity Type	Lecture
Teaching period	Second semester (from 26/02/2024 to 07/06/2024)
Holders	VAGNOZZI SUNNY ,
Teachers	RINALDI MASSIMILIANO ,
Length	56 hours (56 hours Lecture)
Didactic method	Conventional
Subject area	FIS/03
Location	Polo di collina - Povo A - via Sommarive, 14

Subjects

The second module of the course will cover the following topics. Thermodynamic quantities: temperature, zeroth law of thermodynamics, gas thermometers; thermodynamic processes; First law of thermodynamics: phase diagrams; equation of state of ideal gases; heat and work, mechanical equivalent of heat; first law of thermodynamics and internal energy; specific heat; Second law of thermodynamics: thermal machines; Carnot cycle; second law of thermodynamics; Carnot's theorem; absolute temperature; Clausius theorem; thermodynamic definition of entropy; Microscopic interpretation: kinetic theory of gases; statistical interpretation of entropy.

Books

Reference textbook:

M.W. Zemansky, Calore e termodinamica, Vol 1 (Zanichelli)

Recommended exercise book:

G. Dalba e P. Fornasini, Esercizi di Fisica: meccanica e termodinamica (Springer)

Other useful textbooks:

S. Focardi, I. Massa, A. Uguzzoni, Fisica Generale: Meccanica e termodinamica (Casa Ed. Ambrosiana)

P. Mazzoldi, M. Nigro, C. Voci, Elementi di Fisica: meccanica e termodinamica (Edises)

C. Mencuccini e V. Silvestrini, Fisica: meccanica e termodinamica, (Casa Ed. Ambrosiana)

E. Fermi, Termodinamica (Bollati Boringhieri)

J. Walker, Halliday & Resnick, Fondamenti di Fisica (meccanica, onde, termodinamica) (Ambrosiana)

Goals

This course is devoted to introducing the foundations of classical thermodynamics. The aim is to allow the acquisition of general knowledge in this field of physics, as well as the ability and competences required to set up with rigor and efficiency the solution of exercises and problems applied to various situations of interest, including concrete and technological scenarios. Participating to and attending lectures and exercises sessions as assiduously as possible will allow to: (1) familiarize with the scientific method in the study of physics; (2) understand the foundations, principles, laws and simple applications of classical thermodynamics; (3) set up, deal with, discuss, solve, and deepen the study of problems and exercises within thermodynamics at various levels of difficulty. The topics treated will allow the gradual acquisition of an increasingly broad and complete view of the world of physical studies which in the subsequent courses, through the exposure to analytical approaches to mechanics, classical electromagnetism, and statistical mechanics will lead to the study of modern physics.

Required skills

The course does not require any particular prior knowledge with regard to thermodynamics. Knowledge and reasonable experience with regard to basic algebra and calculus are useful. Being able to carry out derivatives, simple integrals and, obviously, mathematical computations at the high school level is essential.

Teaching methods

The course lasts 56 hours (corresponding to 6 CFU), 10 of which devoted to exercise sessions, distributed in blocks of two hours twice a week. Lectures will be at the blackboard, with the help of slides where needed.

Extra info

No additional information.

Verification of learning

The exam consists of a written test and an oral examination, regarding all aspects covered during the course. Passing the written test is mandatory to sign up for any subsequent oral exam (the result of the written test does not lose validity in time). It is possible to improve a written test replacing it with a subsequent instance thereof (without invaliding previous tests). The result of the written test, necessarily greater or equal to 18 in order to be able to take the oral test, acts as starting point for the final result, which can at best improve by +5 in truly exceptional cases. Conversely, there is no lower limit as to how much the final result can decrease from the result of the written test after having taken the oral test.