COURSE DETAILS

"FISICA GENERALE I"

SSD FIS/01

DEGREE PROGRAMME: BACHELOR DEGREE IN COMPUTER ENGINEERING

ACADEMIC YEAR: 2023-2024

GENERAL INFORMATION – TEACHER REFERENCES

TEACHER: MULTIPLE STUDY COURSE
PHONE:
EMAIL:

SEE THE STUDY COURSE WEBSITE

GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE (IF APPLICABLE): N.A.

MODULE (IF APPLICABLE): N.A.

CHANNEL (IF APPLICABLE): N.A.

YEAR OF THE DEGREE PROGRAMME (I, II, III): I

SEMESTER (I, II): I

CFU: 6

REQUIRED PRELIMINARY COURSES (IF MENTIONED IN THE COURSE STRUCTURE "REGOLAMENTO")

None.

PREREQUISITES (IF APPLICABLE)

None.

LEARNING GOALS

The student will acquire the fundamental concepts of Classical Mechanics and the first concepts of Thermodynamics, favoring the methodological and phenomenological aspects. In addition, he will acquire a conscious operational skill in solving simple exercises.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

The student must demonstrate that:

1. Understand the fundamental principles of physics and their applications in problematic situations. In particular:
   a) state the principles;
   b) indicate the relationships between the principles;
   c) compare explanations of the same phenomenon or situation by means of different principles.
2. Know the main laws that explain physical phenomena. In particular:
   a) illustrate the law in mathematical terms;
   b) assess the limits of the law;
   c) extend the law to similar situations and unknown situations.
3. Know the physical quantities operationally indicating the correct units of measurement. In particular:
   a) define the fundamental quantities;
   b) know the operations between the fundamental quantities;
   c) Describe the derived quantities in terms of the fundamental quantities.
4. Know the field of investigation of physics. In particular:
   a) understand the physical meaning of the mathematical entities used to describe phenomena;
   b) outline the field of applicability (macroscopic / microscopic) of the laws used to describe the phenomena;
   c) describe the methods of investigation used in physics.

Applying knowledge and understanding

The student must demonstrate that he/she is able to :

1. analyze and examine the proposed physical situations by formulating explanatory hypotheses through mathematical models, analogies or physical laws;
2. formalize problematic situations and apply the concepts presented in the course, the mathematical methods and disciplinary tools learned during the course and relevant for their resolution, performing, where necessary, calculations, estimates, qualitative reasoning;
3. interpret and/or process proposed and/or obtained data, also of an experimental nature, verifying their relevance to the chosen model and representing them, where necessary, through graphic-symbolic language;
4. argue and describe resolution strategies adopted in problematic physical situations, communicating the results obtained while assessing their consistency with the proposed problematic situation .

Levels for all descriptors: L1 – naïve or inadequate; L2 – superficial or fragmentary; L3 – partial; L4 – complete or generally complete.

COURSE CONTENT/SYLLABUS

The scientific method. Physical quantities and their operational definition, units of measurement, dimensions. Kinematics of the material point in one dimension. Vector quantities and point kinematics in multiple dimensions. Parabolic motion of bodies and circular motion. Inertial reference frames, definition of force and mass. Principles of dynamics. Fundamental forces and laws of force. Contact forces, constraining forces, empirical force laws (elastic force, frictional and viscous forces). Notable problems: inclined plane, harmonic oscillator, simple pendulum. Impulse and momentum. Work and kinetic energy. Conservative forces and potential energy. Conservation of mechanical energy and momentum. Bumps in one dimension. Angular momentum and momentum of forces. Relative motions, non-inertial reference frames and the concept of apparent force. Notes on the motion of the planets in the solar system. Dynamics of material point systems: cardinal equations, center of mass, conservation laws, Koenig's theorem for kinetic energy. Elements of rigid body dynamics, rotations around a fixed axis. Elements of fluid statics and dynamics. Temperature and heat, the first law of thermodynamics. Ideal gases.

READINGS/BIBLIOGRAPHY

Textbook (e.g. Mazzoldi-Nigro-Voci, Halliday-Resnick, Serwey-Jevett), exercises or questionnaires to be carried out at home.

SEE THE TEACHER'S WEBSITE

TEACHING METHODS

Lectures and classroom exercises.

EXAMINATION/EVALUATION CRITERIA

a) Exam type:

Exam type	
written and oral	X
only written	
only oral	
project discussion	
other	

In case of a written exam, questions refer to:	**Multiple choice answers**	X
	Open answers	X
	Numerical exercises	X

b) Evaluation pattern: