Fakultät für Ingenieurwesen
Facoltà di Ingegneria
Faculty of Engineering

COURSE DESCRIPTION – ACADEMIC YEAR 2023/2024

Course title	**Physics I**
Course code	42403
Scientific sector	FIS/01
Degree	Electronics and Cyber-Physical Systems Engineering
Semester	1
Year	1
Credits	2023/24
Modular	No

Total lecturing hours	36
Total lab hours	24 (16 exercises + 8 laboratories)
Attendance	Recommended
Prerequisites	Mathematics
Course page	Teams

Specific educational objectives	The course aims to give the attendants a scientific basis in statics, mechanics, fluids, and thermodynamics, as well as practical methods and the ability to solve problems related to the same topics.

Lecturer	Prof. Franco Cacialli
Contact	Office: Building K, Room 2.04 - e-mail: franco.cacialli@unibz.it - tel. 0471 017119
Scientific sector of lecturer	FIS/01
Teaching language	English
Office hours	By appointment via e-mail.
Lecturing assistant (if any)	--
Contact LA	--
Office hours LA	--
List of topics	1. Measurement and vectors: units of measurement, dimensions of physical quantities, mathematical operations with vectors. 2. Kinematics: average and instantaneous velocity and acceleration, uniformly accelerated motion. 3. Dynamics: Newton's three axioms, gravitation, work, energy, ~~law of~~ conservation of energy, linear momentum, collisions, centre of mass. 4. Rotation: angular displacement, average and instantaneous angular velocity and acceleration, torque, moment of inertia, angular momentum, general rotation. 5. Fluids: Ideal fluids, Pascal's and Archimedes' principles, Bernoulli's equation. 6. Thermodynamics: thermal expansion, kinetic theory of gases, heat, ideal gases, zeroth, first and second law, circular processes, Carnot cycle, entropy.

Teaching format	Frontal lectures, exercises, labs

Learning outcomes	Knowledge and understanding Knowledge and understanding of physical laws of: 1. Basics of Physics 2. Kinematics 3. Dynamics 4. Fluids 5. Thermodynamics Applying knowledge and understanding 4. Ability to analyse and solve problems on mechanics, fluid dynamics and thermodynamics. Making judgements 5. Students are expected to develop the ability to judge the plausibility of results. Communication skills 6. Further development of a quantitative, technical, and scientific terminology to express ideas and opinions about physical phenomena. Ability to learn Development of an analytic attitude enabling the student to divide a problem into sub-tasks which can be solved using previously-acquired knowledge.

Assessment	**Formative assessment** **Form** | **Details** | **ILOs assessed** In-class exercises | Continuously as part of course-accompanying exercises | 1-7 **Summative assessment** **Form** | **Details** | **ILOs assessed** Written | Closed book exam | 1-7
Assessment language	English
Assessment Typology	Monocratic
Evaluation criteria and criteria for awarding marks	The exam includes a written and an oral component. The written exam consists of two parts: a first part (problem 1) with a series of (mostly) qualitative questions based on the understanding of the topics covered in the lectures, as well as a second part (problems 2-5) consisting of several numerical or symbolic problems to be solved related to the various topics covered in the lectures. Grading will be based upon:

	- The correctness of the approach and the mathematical steps of the solution, the calculation of numerical results and the correct use of physical quantities and units. - The correctness of the provided answers and of the presented, as well as the terminology used. To pass the exam the final grade must be greater or equal to 18. If the final score is greater than 30, a "with honors" grade is awarded. The student can have access to the exam with pen, pencil and a portable calculator. A short list of constants is provided to the students along with the text of the exam. Students should also be able provide proof of identity (e.g. Campus card, ID card, passport) before the start of the exam. The oral exam will include questions on the programme covered in the lectures (including those of the written part of the exam), and may lead to an increase or a reduction of the grade of the written component.

Required readings	Blackboard / lecture slides
Supplementary readings	• *Physics for Scientists and Engineers with Modern Physics*, Douglas C. Giancoli, Pearson, 4th edition, 2008. Also available in electronic format (pdf) from UNIBZ library. • *Physics for Scientists and Engineers*, Paul A. Tippler, Macmillan, 6th edition, 2007 Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it and Ilaria Miceli, Ilaria.Miceli@unibz.it
Software used	--