

Syllabus

Course Description

Course Title	Physics I
Course Code	42445
Course Title Additional	
Scientific-Disciplinary Sector	PHYS-01/A
Language	English
Degree Course	Bachelor in Electronic and Information Engineering
Other Degree Courses (Loaned)	
Lecturers	Prof. Franco Cacialli, Franco.Cacialli@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/47601 dr. Riccardo Zamboni, Riccardo.Zamboni@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/51510
Teaching Assistant	
Semester	Second semester
Course Year/s	1
CP	7
Teaching Hours	48
Lab Hours	48
Individual Study Hours	79
Planned Office Hours	21
Contents Summary	The course aims to give the attendants a scientific basis in classical mechanics and thermodynamics, as well as practical methods and the ability to solve problems related to the same topics.
Course 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. Statics: Static equilibrium, stress-strain, Young's modulus. 6. Fluidics: Ideal fluids, Pascal's and Archimedes' principles, Bernoulli's equation. 7. Thermodynamics: thermal expansion, kinetic theory of gases, heat, ideal gases, zeroth, first and second law, thermodynamic cycles, Carnot cycle, entropy.
Keywords	mechanics, kinematics, dynamics, statics, fluids, thermodynamics,
Recommended Prerequisites	Calculus 1
Propaedeutic Courses	
Teaching Format	Frontal lectures, exercises, labs
Mandatory Attendance	Attendance is not mandatory but strongly recommended
Specific Educational Objectives and Learning Outcomes	Knowledge and understanding Knowledge and understanding of physical laws of: 1. Basics of Physics 2. Kinematics 3. Dynamics 4. Statics 5. Fluids 6. Thermodynamics Applying knowledge and understanding 7. Ability to analyse and solve problems on mechanics, fluid dynamics and thermodynamics. Making judgements

	8. Students are expected to develop the ability to judge the plausibility of results. Communication skills 9. Further development of a quantitative, technical, and scientific terminology to express ideas and opinions about physical phenomena. Ability to learn 10. Development of an analytic attitude enabling the student to divide a problem into sub-tasks which can be solved using previously-acquired knowledge.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	Summative assessment Form: Practical, written and oral (at the discretion of the examiner(s), based on the results of the written component). See also field below. Details: Closed book exam ILOs assessed: 1-10
Evaluation Criteria	The exam includes a practical, a written and an oral component. Practical component: the 4 practical labs are an integral part of the course, and the students are warmly invited both to attend them, and to submit a report for each experience or set of experiences covered in each lab. For each report a maximum of 1 point will be assigned, depending on correctness. Only the best 3 reports will count for the final grade. No report can be submitted if the student did not attend the practical lab. The maximum grade for this component is thus 3 points. All reports must be submitted within 1 week of the practical lab to which they pertain, and in any case at least 1 week before the written exam. The written exam (2.5 hours) consists of two parts: a first part (problem 1) with a series of (mostly) qualitative or semi-quantitative 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. Oral component: The oral component is mandatory, but depending on the quality of the written exam, and the explanations given in the solution, the commission (at their discretion) may decide it is not necessary. The oral exam may 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. Importantly, if a student is requested by the commission to attend and sit the oral exam, and the student fails to do so, the exam will be considered as “not presented”. Grading for all components 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 explanation 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 “cum laude” 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. Students should also be able provide proof of identity (e.g. Campus card, ID card, passport) before the start of the exam.
Required Readings	Blackboard / lecture slides
Supplementary Readings	· <i>Physics for Scientists and Engineers with Modern Physics</i>, Douglas C. Giancoli, Pearson, 4th edition, 2008. Also available in electronic format (pdf) from UNIBZ library. · <i>Physics for Scientists and Engineers</i>, Paul A. Tipler, Macmillan,

	6th edition, 2007 Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it and Ilaria Miceli, Ilaria.Miceli@unibz.it
Further Information	
Sustainable Development Goals (SDGs)	Quality education