Fakultät für Ingenieurwesen
Facoltà di Ingegneria
Faculty of Engineering

COURSE DESCRIPTION – ACADEMIC YEAR 2024/2025

Course title	Physics I
Course code	42145
Scientific sector	FIS/01
Degree	Bachelor in Industrial and Mechanical Engineering
Semester	II
Year	I
Academic Year	2024/25
Credits	8
Modular	//

Total lecturing hours	60
Total lab hours	0
Total exercise hours	30
Attendance	Recommended
Prerequisites	Lectures and exercises of Mathematical Analysis I and Geometry
Course page	

Specific educational objectives	The student should understand the basic principles of mechanics and thermodynamics and be able to apply them.

Lecturers	Franco Cacialli franco.cacialli@unibz.it Leonardo Colletti Leonardo.Colletti@unibz.it
Scientific sector of the lecturers	PHYS-03/A PHYS-06/B
Teaching language	English
Office hours	After consultation and agreement with lecturer
Teaching assistant (if any)	-
Office hours	-
List of topics covered	1. Measurement and vectors: units, dimensions of physical quantities. 2. Kinematics: Average and instantaneous velocity and acceleration. Uniformly accelerated movement. 3. Dynamics: The three Newtonian axioms, work, energy, conservation of energy, oscillation, momentum. 4. Statics: Static equilibrium, stress-strain, Young's modulus. 5. Fluidics: Ideal fluids, Pascal's and Archimedes' principles, Bernoulli's equation. 6. Thermodynamics: Thermal extension, kinetic gas theory, heat, ideal gases, first and second laws of

	thermodynamics, thermodynamic cycles, entropy.
Teaching format	The lessons are divided into theoretical classroom lessons and exercises on the blackboard.

Learning outcomes (ILOs)	The learning outcomes need to refer to the Dublin Descriptors: <u>Knowledge and understanding</u> Knowledge and understanding of physical laws of: 1. Mechanics 2. Thermodynamics <u>Applying knowledge and understanding</u> 3. Ability to apply knowledge for solving given problems, including solving them with numerical data, approximating significant numbers, and taking care of the notation of units. <u>Making judgements</u> 4. Ability to judge plausibility of results. <u>Communication skills</u> 5. Maturing of technical-scientific terminology. <u>Ability to learn</u> 6. Learning skills to independently study and apply methods of physics for specific applications beyond topics covered in this lecture.

Assessment	**Formative assessment** Not foreseen **Summative assessment** **Form** | **Length /duration** | **ILOs assessed** Written | 120 minutes | 1-6
Assessment language	English
Evaluation criteria and criteria for awarding marks	The written exam consists of two parts: A first part (problem 1) with a series of general and/or conceptual questions, as well as a second part (problems 2-5) consisting of several (mostly) quantitative problems, distributed over all the topics listed above. Judged will be: • the correctness of the approach and the mathematical steps of the solution, the calculation of numerical results and the correct use of physical quantities. • The correctness of the provided answers and arguments presented, and the terminology used.

Required readings	Blackboard
Supplementary readings	1. Physics for Scientists and Engineers with Modern Physics, Douglas C. Giancoli, Pearson, 4th edition, 2008. Other languages: - Physik, Douglas C. Giancoli, Pearson Studium, Pearson Deutschland GmbH, 3. Auflage, 2010 (based on the 3rd edition "Physics for scientists and engineers with modern physics", 2000). - Fisica. Con fisica moderna, Douglas C. Giancoli, terza edizione, 2017 (based on the 7th edition "Physics. Principles with applications", 2014). 2. Fundamentals of Physics, Halliday, Resnick, Walker, Wiley-VCH, 10th edition, 2013. Other languages: - Physik, Halliday, Resnick, Walker, Wiley-VCH, 3. Auflage, 2018 (based on the 10th edition of the English version) - Fondamenti di Fisica, Halliday, Resnick, Walker, CEA; 7 edizione, 2015 (based on the 10th edition of the English version) 3. Physics for Scientists and Engineers. With Modern Physics, Paul A. Tipler, Gene Mosca, W.H. Freeman, 2008. Other languages: - Physik für Wissenschaftler und Ingenieure, Paul A. Tipler, Gene Mosca, Spektrum Akademischer Verlag, 2015 (based on the 6th edition of the English version, 2008.) - Corso di Fisica I - Meccanica, Onde, Termodinamica, Paul A. Tipler, Gene Mosca, Zanichelli, 4 edizione, 2009 (based on the 6th edition of the English version, 2008.)