



General information	
Academic subject	Physics 1
Degree course	Scienze Ambientali (L32)
Academic Year	1 year, 2nd semester
European Credit Transfer and Accumulation System (ECTS)	6
Language	Italian
Academic calendar (starting and ending date)	1st March – 6th June
Attendance	Strongly recommended

Professor/ Lecturer	
Name and Surname	Giovanni Francesco Ciani
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Telephone	
Department and address	Dipartimento di Scienze della Terra e Geoambientali
Virtual headquarters	Teams code : 4ld2mep
Tutoring (time and day)	online on Teams (it is recommended to contact the teacher for an agreement) in presence possibly after the lessons upon request

Syllabus	
Learning Objectives	<i>Knowledge and understanding</i> <i>The student must demonstrate fundamental concepts related to:</i> <i>o kinematics and dynamics of the material point;</i> <i>o dynamics of point systems;</i> <i>o fluid mechanics</i> <i>o thermodynamics.</i>
Course prerequisites	<i>There are no prerequisite courses for Physics I, but some elementary knowledge of algebra and trigonometry is required, however.</i>
Contents	INTRODUCTION: Physical quantities and units of measurement. Vectors and physical vector quantities. Scalar product and vector product. KINEMATICS OF THE MATERIAL POINT: Kinematics of rectilinear motion. Velocity. Acceleration. Uniformly accelerated motion. Free fall of bodies. Harmonic motion. Projectile motion. Circular motion. DYNAMICS OF THE MATERIAL POINT: Concept of force. Newton's laws. Weight force. Boundary reactions. Particle in motion on smooth inclined plane. Static friction force and dynamic friction force. Particle in motion on an inclined plane with friction. Tension of an ideal wire. Simple pendulum. Work of a force. Work of the weight force and of the binding reactions. Conservative forces and potential energy. Gravitational potential energy. Kinetic energy theorem. Mechanical energy theorem and conservation of mechanical energy theorem. Elastic force. Elastic potential energy. SYSTEMS OF PARTICLES: Center of mass of a system of particles. Motion theorem of the center of mass. Total momentum of a system of particles. Conservation of momentum of a system of particles. GRAVITATION: Law of universal gravitation. Kepler's laws. FLUID MECHANICS: Fluids. Density. Pressure. Stevin's Law. Principle of Pascal. Principle of Archimedes. Equation of continuity. Bernoulli's theorem.

	THERMODYNAMICS: Thermal equilibrium. Zero principle of thermodynamics and concept of temperature. Heat capacity, specific heat and latent heat. Ideal gas. Thermal expansion. Conduction, convection and radiation. Elementary work of a fluid in an elementary thermodynamic transformation. Reversible and irreversible transformations. Plan pV for the perfect gas. First principle of thermodynamics. Isobaric, isochoric, isothermal and adiabatic transformations for a perfect gas. Carnot cycle. Calculation of the efficiency of Carnot cycle. Second principle of thermodynamics.
Books and bibliography	1) Halliday, Resnick, "Fondamenti di Fisica: Meccanica-onde-termodinamica", Casa Editrice Ambrosiana (CEA), ISBN 978-8808-18298-2 2) D.C. Giancoli, "Fisica Principi e applicazioni", Casa Editrice Ambrosiana, ISBN 978-8808-08773-7
Additional materials	<i>The book is strongly recommended and will be paired with slides and notes from lectures and tutorials + Lecture notes + Lecture materials provided in class</i>

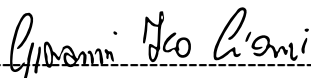
Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
	36	30	84
ECTS			
	4	2	
Teaching strategy			
Teaching will use lectures and face-to-face exercises that will be done with .ppt slides and blackboard.			
Expected learning outcomes			
Knowledge and understanding on:	The student must demonstrate fundamental concepts related to: <ul style="list-style-type: none"> o kinematics and dynamics of the material point; o dynamics of point systems; o fluid mechanics o thermodynamics. 		
Applying knowledge and understanding on:	The student should be able to apply the knowledge gained to the description, understanding, and explanation of physical phenomena.		
Soft skills	<ul style="list-style-type: none"> - Autonomy of judgment The student must be able to independently identify a logical path between causes and effects in physical processes. - Communication skills The student must have acquired the ability to use language appropriate to the description and interpretation of physical phenomena. - Learning skills The student must demonstrate that he/she has acquired the tools to solve problems that arise in various physical applications. 		

Assessment and feedback

Methods of assessment	<p><i>The objective of the exam is to verify the level of knowledge and deepening of the topics of the course program and the ability to reason developed by the student.</i></p> <p><i>The exam consists of a written test and a possible oral test. The evaluation of the exam is expressed in thirtieths (minimum grade 18). The written test consists of three problems and three questions on the topics of the course. In order to pass the written test it is necessary to solve at least one problem and to answer exhaustively at least two questions. The oral test consists of an interview with some questions related to the topics of the course. Students who pass the written test with a grade lower than 18/30 must take the oral test reinforced with 1 exercise. Students who pass the written test with a grade of at least 18/30 may not take the oral test. In this case, the exam grade will be equal to the grade given in the written test.</i></p>
Evaluation criteria	<p>Knowledge and Comprehension Skills: The student should be able to remember and especially comment on formulas related to the physical processes studied.</p> <p>- Applied Knowledge and Ability to Understand: The student must be able to know how to solve problems related to the physical processes studied.</p>
Criteria for assessment and attribution of the final mark	<p>The grade on the examination will also take into account the evaluation obtained by the student in any waivers during the course and his or her active participation in in-class exercises. An excellent grade will be the result of the fulfillment of most of the evaluation criteria analytically described above</p>
Additional information	

Bari, 20 January 2022

Firma



(Prof.)