

## Elia Palange

Programme of "Fisica Generale 1" "Fundamental Physics 1"		
<ul style="list-style-type: none"> <li>• Code: I0199</li> <li>• type of course unit: compulsory for the bachelor degree in Industrial Engineering</li> <li>• level of course unit (e.g. first, second or third cycle; sub-level if applicable): first cycle</li> <li>• year of study (if applicable), semester: first year, second semester</li> </ul>		
Number of ECTS credits: 9 (workload of 90 hours of teaching + work at home; 1 credit = 25 hours of total activities)		
<b>Teacher: Prof. Elia Palange</b>		
<b>1</b>	<b>Course objectives</b>	The course introduces the students at the fundamental principles of physics for what concerns the dynamic of material points and of two dimensional rigid bodies and, in the last part of the course, the fundamentals of electrostatic and the notions of electromagnetism until the introduction of the Ohm law. Starting from the study of the kinematic in one and two dimensions and the three principles of the Newtonian mechanics, the students will learn the meaning and the proper use of the conservation laws of energy, momentum and angular momentum, the electric field and potential. Connected to the introduction of these concepts, a large number of problems will be discussed and given to students to be solved. This represents the main goal and the final result of the course since the students must acquire the skills of how the theory can be applied to solve real problems.
<b>2</b>	<b>Course content and Learning outcomes (Dublin descriptors)</b>	<p>The Course discusses the following main topics: kinematics in one and two dimensions; forces and the Newton's laws of motion; type of forces: normal force, frictional forces, tension force, elastic force; work and energy; conservative and non conservative forces; the concept of potential energy; conservation principle of energy; impulse and momentum; conservation of the momentum; angular momentum; rotational dynamics of two-dimensional rigid bodies; moment of inertia; the conservation of the angular momentum; electric forces; electric field; the Gauss' law; electric potential energy; electric potential; capacitors; dielectrics; electromotive force and current; the Ohm's law; pulsed and DC electric circuits.</p> <p>On successful completion of this module, the student should:</p> <ul style="list-style-type: none"> <li>- have profound knowledge of basic notions of fundamental physics;</li> <li>- have acquired the skills of how to use theoretical notions in solving problems in physics;</li> <li>- demonstrate capacity to read and understand other texts on related topics.</li> </ul>
<b>3</b>	<b>Prerequisites and learning activities</b>	prerequisites: mathematics; geometry; the learning activities are focussed on teaching the methods that can be used in solving problems in physics.
<b>4</b>	<b>Teaching methods and language</b>	Lectures and exercises. Language: Italian Reference text book: Elementi di Fisica: meccanica e termodinamica – Elementi di Fisica: elettromagnetismo, by P. Mazzoldi, M. Nigro, C. Voci. Supplementary didactic materials, and solved problems are published by the teacher during the course in the website e-learning@AQ ( <a href="http://www.didattica.univaq.it/moodle/">http://www.didattica.univaq.it/moodle/</a> ).
<b>5</b>	<b>Assessment methods and criteria</b>	Written and oral examination