

Pasquale Carelli

Programme of "Fisica Generale II" "Fundamental Physics II"	
<ul style="list-style-type: none"> • code • type of course unit: compulsory for the bachelor degree in industrial engineering • level of course unit: 1ST CYCLE IN INDUSTRIAL ENGINEERING • 2ND YEAR , 1ST SEMESTER 	
Number of ECTS credits: 9 (workload of 90 hours of teaching + work at home; 1 credit = 25 hours of total activities)	
Teacher: Prof. Pasquale Carelli	
1	<p>Course objectives</p> <p>The course introduces the students at the fundamental principles of physics for what concerns the electromagnetism: electrodynamics, magnetism, Maxwell's equations, electromagnetic waves and thermodynamics. The electrostatic will be treated in depth after the course of Fundamental Physics I, and it will be the base to introduce Maxwell laws and their connections with electromagnetism. Calorimetry and thermodynamics laws will be discussed too. Connected to the introduction of these concepts, a large number of problems will be studied and given to students to be solved. This represents the main goal and the final objective of the course, since the students must acquire those skills which allow them to apply the theory to solve real problems.</p>
2	<p>Course content and Learning outcomes (Dublin descriptors)</p> <p>The Course is based on the following main topics: Local form of first Maxwell equation, electrostatics with matter, Poisson equation, microscopic form of Ohm and Joule law, 1st and 2nd Laplace equation, circuits and magnetism, Ampere's law, Lenz's and Faraday's law, RL transitory, displacement current, resonating circuit, Maxwell's equations and Electromagnetic wave, Poynting's vector. Thermodynamics, temperature, heat, first Law of Thermodynamics, mechanical work, internal energy, calorimetry, simple transformation, ideal and real gases, process in gases, cyclic processes, second Law of Thermodynamics, reversible and irreversible processes, Carnot's theorem, absolute temperature, Clausius's theorem, Entropy.</p> <p>On successful completion of this module, the student should:</p> <ul style="list-style-type: none"> - Have a deep knowledge of basic notions of Electromagnetism and Thermodynamics; - have acquired the skills of how to use theoretical notions in solving problems in physics; - demonstrate capacity to read and understand other texts on related topics.
3	<p>Prerequisites and learning activities</p> <p>prerequisites: mathematics; geometry; mechanics, basic electrostatics. The learning activities will be focused on teaching the methods that can be used in solving problems in physics.</p>
4	<p>Teaching methods and language</p> <p>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 will be published by the teacher during the course in the website: http://sites.google.com/site/fisica2aquilaingegneria/</p>
5	<p>Assessment methods and criteria</p> <p>Written and oral examination</p>