UNIVERSITÀ DI PAVIA

Anno Accademico 2022/2023

GENERAL PHYSICS 2

Enrollment year	2020/2021
Academic year	2022/2023
Regulations	DM270
Academic discipline	FIS/01 (EXPERIMENTAL PHYSICS)
Department	DEPARTMENT OF MATHEMATICS "FELICE CASORATI"
Course	MATHEMATICS
Curriculum	PERCORSO COMUNE
Year of study	3°
Period	1st semester (29/09/2022 - 13/01/2023)
ECTS	9
Lesson hours	72 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	MACCONE LORENZO (titolare) - 9 ECTS
Prerequisites	Fundamental concepts of Physics, such as force, energy, power, etc. Vectorial and matrix calculus (Matrix algebra). Integral calculus in multiple dimensions.
Learning outcomes	Theory of classical electrodynamics (description of electromagnetic phenomena in vacuum and in materials) and theory of special relativity, including relativistic electrodynamics. The two theories (electrodynamics and relativity) are presented with an axiomatic approach that emphasizes the inductive/deductive approach of physics. The comprehension of physical phenomena will be encouraged, rather than the mere memorization of formulas and concepts. At the end of the course, the student will be able to critically analyze physical phenomena dominated by electromagnetism and be able to give an explanation of them. The student will know the main results of electrodynamics and of the special theory of relativity.

Course contents	1. Introduction to the course: the formal structure of physical theories. 2. Electrostatics in the vacuum and in the presence of material bodies. 3. Magnetostatics in the vacuum and in the presence of material bodies. 4. Electrodynamics. 5. Electromagnetic waves. 6. Special relativity and relativistic electrodynamics. 7. Introduction to electrical circuits. 8. Electrodynamics in terms of differential forms Extended summary Please see the course web page https://qubit.it/people/maccone/fisica2/ where all the topics presented in each lecture are detailed.
Teaching methods	The lectures are blackboard-based (no powerpoint). Some devices based on electrodynamics will be presented (e.g. Electrical motor, hard disk, etc.) Interactions (questions, observations and feedback) are encouraged.
Reccomended or required readings	Textbook: Griffiths, "Introduction to Electrodynamics", Pearson Ed. Mencuccini, Silvestrini, "Fisica II", Liguori Editore (relativity is missing) Mazzoldi, Nigro, Voci, "Fisica Volume 2", Seconda Edizione Edises (not to be confused with "Elementi di Fisica, elettromagnetismo e onde" by the same Authors which is not recommended).
Assessment methods	Oral examination. The student can choose a topic to begin the examination (also among the optional topics). During the exam the student must prove he/she has comprehended the subject and is capable of autonomous realaboration of the concepts. The examination is structured in a way to discourage the mere memorization of the subject.
Further information	Web site for the course, where the topics of all lectures are given: http://www.qubit.it/people/maccone/fisica2
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile