UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

PHYSICS II

Enrollment year	2020/2021
Academic year	2021/2022
Regulations	DM270
Academic discipline	FIS/03 (MATERIAL PHYSICS)
Department	DEPARTMENT OF ELECTRICAL,COMPUTER AND BIOMEDICAL ENGINEERING
Course	ELECTRONIC AND COMPUTER ENGINEERING
Curriculum	PERCORSO COMUNE
Year of study	2°
Period	1st semester (27/09/2021 - 21/01/2022)
ECTS	9
Lesson hours	76 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	AGNESI ANTONIANGELO (titolare) - 9 ECTS
Prerequisites	Concepts and methods from 1st year courses. In particular: vector calculus identities, derivatives, theorems on gradient, divergence and curl (Stokes and Gauss).
Learning outcomes	Learning of electromagnetism principles and laws, stationary and time-dependent, including simple analysis methods. The student should be able to calculate electric and magnetic fields of simple charge/current distributions, applying such concepts to simple devices like capacitors and inductors. He should be able to analyze simple e.m. induction phenomena with time-varying fields and circuit shapes. Basic e.m. wave properties should be understood: polarization, intensity, refraction/reflection, interference and geometrical optics.
Course contents	Electric phenomena in vacuum

	Coulomb force; electric field, potential energy and electric potential Electrical phenomena in dense media Conductors, capacitors, dielectrics, electric current Magnetic phenomena in vacuum Lorentz force, magnetic field, Biot-Savart law, Ampère law, induction Magnetism in the matter Fields M and H Electromagnetic waves in vacuum Maxwell equations, energy, power and intensity of the field, radiation pressure Interference, diffraction and polarization Waves in dense media Reflection, refraction, optics.
Teaching methods	Lectures (hour/year): 64 Exercise classes (hour/year): 12 Practical activities (hour/year): 0 Lectures are based on explanations and practical examples, using the blackboard. Exercise classes consists in solution of problems and exam exercises on the blackboard, encouraging students' active participation.
Reccomended or required readings	Reference textbooks: Serway (easier, more intuitive), ISBN 9788879598248 or Mazzoldi-Nigro-Voci (more complete and formal, more difficult overall), ISBN 8879591525. There are many equivalent textbooks, however. See the course's website. Brief lectures videos prepared by the teacher (2016/17) and covering the whole course are available on the e-learning platform KIRO, including notes and useful links: see http://www.unipv.it/fis/fisica2/EleInfoBio/index.pdf (some topics have been dropped or treated in a simpler way in later years).
Assessment methods	Final exam will be written, with optional oral (24/30 maximum possible score for written exam). The written exam lasts 2h and consists of 6 exercises. Correct solution of 2-3 of them normally is sufficient for a positive exam. The oral exam starts with a revision of the written part, then further questions on general topics of the course will be asked, their complexity depending on the student's preparation. Oral exam takes usually 15-20 minutes. While written exams in physical classroom will be impossible due to COVID emergency, the exam will be only oral: 30 min max, questions on 4 main topics (E, B static fields, e.m. induction, waves/optics).
Further information	
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile