UNIVERSITÀ DI PAVIA

Anno Accademico 2019/2020

PHOTONICS

Enrollment year	2017/2018
Academic year	2019/2020
Regulations	DM270
Academic discipline	FIS/03 (MATERIAL PHYSICS)
Department	DEPARTMENT OF ELECTRICAL,COMPUTER AND BIOMEDICAL ENGINEERING
Course	ELECTRONIC AND COMPUTER ENGINEERING
Curriculum	Elettronica
Year of study	3°
Period	2nd semester (02/03/2020 - 12/06/2020)
ECTS	6
Lesson hours	45 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	CRISTIANI ILARIA (titolare) - 6 ECTS
Prerequisites	Knowledge of electromagnetic theory with particular reference to the wave propagation equation. In addition, knowledge of all subjects treated in Physics II is particularly recommended
Learning outcomes	The course aims to provide the basic information about Photonics that will be developed and deepened mainly in the courses of the Laurea Magistrale in Electronics with specialization in Photonics Particularly the relevant topics of electromagnetic theory will be treated to understand the operation of the components and devices to be used in the field of frequencies relevant for to photonic techniques. The ultimate aim is to give students the tools and information they need to apply to the basic design of components and experiments in photonics

	During the course, several approaches to the solution of the exercises will be presented, so as to develop in students the ability to independently choose the most direct solving strategy in order to obtain also practical design tools
Course contents	The course program deals with the description of the main topics that are basis for the components and devices in the photonics field with particular attention to laser sources. - Principle of operation of light sources - Principle of operation of laser sources - Basic properties of Gaussian beams as a model for the beam emitted by lasers - main components that can be used to manipulate laser beams. - Birefringent materials. - modulators based on electro-optic and acousto-optic effects - principles of integrated optics and fiber optics.
Teaching methods	Lectures (hours/year in lecture theatre): 24 Practical class (hours/year in lecture theatre): 30 Practicals / Workshops (hours/year in lecture theatre): 11 During the lessons the various topics of the course will be presented to the students paying attention to illustrating both basic concepts and practical applications Periodically, after explaining a complete and self-consistent set of concepts, there will be dedicated exercises to show how the learned concepts allow for the basic design of photonic components, devices and experimental set-ups.
Reccomended or required readings	V. Degiorgio, I. Cristiani. Photonics. Springer. The course program is fully covered by the content of this text B.E.A. Saleh, M.C. Teich. Fundamentals of Photonics. Mc Graw-Hill. This text is very wide and rich. It is recommended for those who want to deepen some of the course topics.
Assessment methods	Written test followed by an oral exam The written test has a duration of 2 hours. It is intended to test students' ability to use the information acquired for the quantitative design of components and devices. The oral exam lasts about 25 minutes, it is intended to test the student's knowledge of the physical principles on which operation of the main devices and components is based. In addition, knowledge of the most relevant physical phenomena for photonic frequencies is studied
Further information	Written test followed by an oral exam The written test has a duration of 2 hours. It is intended to test students' ability to use the information acquired for the quantitative design of components and devices. The oral exam lasts about 25 minutes, it is intended to test the student's knowledge of the physical principles on which operation of the main

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Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile