UNIVERSITÀ DI PAVIA

Anno Accademico 2020/2021

OPTICAL COMMUNICATIONS

Enrollment year	2020/2021
Academic year	2020/2021
Regulations	DM270
Academic discipline	ING-INF/01 (ELECTRONICS)
Department	DEPARTMENT OF ELECTRICAL,COMPUTER AND BIOMEDICAL ENGINEERING
Course	ELECTRONIC ENGINEERING
Curriculum	Photonics
Year of study	1°
Period	2nd semester (08/03/2021 - 14/06/2021)
ECTS	9
Lesson hours	77 lesson hours
Language	English
Activity type	WRITTEN TEST
Teacher	ANNOVAZZI LODI VALERIO (titolare) - 4 ECTS GIULIANI GUIDO - 5 ECTS
Prerequisites	Basic knowledge of electromagnetic theory, optics and electronics from the courses of the First Level Degree in Electronics and Telecommunications; basic knowledge on lasers and photodetectors.
Learning outcomes	This course is a survey on optical communications, and provides information on the propagation medium (the fiber), lasers and detectors, passive components,optical amplification, and telecommunication systems.
Course contents	Optical Fiber, Emitters and Photodetectors, Passive components, Networks, Measurements Optical Fibers Single-mode and multi-mode fibers, specialty fibers. Geometrical and

	optical parameters. Modal theory of fibers. Attenuation. Dispersion. Emitters and Photodetcters Lasers and LEDs for optical communications. Laser/fiber coupling. Photodiodes for optical communications. Passive components Connectors and splices. Coupled-mode theory. Couplers; mirrors and resonators with couplers. Retarders and polarizer. Isolators and circulators. Modulators. Bragg gratings and filters. Arrayed waveguide devices. Telecommunication systems Point to point interconnections. Networks. Power budget. Electro-optic repeater. Optical amplifiers. Multi-wawelength transmission (WDM). Coherent detection. Measurements? Measurements on fibers and on devices for optical communications: power, attenuation, return loss, geometrical parameters, dispersion and frequency response. OTDR, BER tester.
Teaching methods	The course includes frontal lessons, during which the course topics are carried out including several examples, using overhead projection of transparencies and Powepoint presentations. The course is completed by some laboratory activity, where optical devices and measurement instrumentation for optical networks are shown.
Reccomended or required readings	Gerd Keiser. Optical fiber Communications. McGraw Hill. For reference only. Dispense di Comunicazioni ottiche dalle lezioni dei prof. Silvano Donati, Valerio Annovazzi Lodi, Guido Giuliani. CUSL (in Italian). Copies of transparencies (on the Kiro web site).
Assessment methods	A written examination, including both numerical exercises and theoretical questions, will test the candidate's knowledge on modern optical networks and their components and subsystems presented in the course, as well as its ability to perform simple numerical evaluations on optical signal transmission.
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Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile