



OPTICAL COMMUNICATIONS

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| 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 | Space Communication and Sensing |
| 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 Photodetectors

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-wavelength 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.

Further information

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Sustainable development goals - Agenda 2030

[\\$|bl| legenda sviluppo sostenibile](#)