



Course Code ECE-546	Course Title Fiber Optics	ECTS Credits 8
Department Engineering	Semester Fall or Spring	Prerequisites None
Type of Course Required	Field Engineering	Language of Instruction English
Level of Course 2 nd Cycle	Year of Study 1 st	Lecturer(s) Dr Antonis Hadjiantonis
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisite None

Objectives of the Course:

The main objectives of the course are to:

- introduce optical communications and their evolution over the last decades
- examine light generation and detection
- analyze the various optical transmission limitations (attenuation, dispersion etc.)
- engineer (in terms of choice of equipment, transmission bandwidth and distance) and an optical link by considering dispersion and power limitations
- invoke self-directed study and research

Learning Outcomes:

After completion of the course students are expected to be able to:

1. define the basic limitations of optical transmission and identify the basic elements of a P2P optical communication link
2. evaluate the basic principles of operations of light sources and detectors
3. review Maxwell's equations in cylindrical coordinates
4. diagram how dispersion and attenuation affect transmission length making use of the bandwidth-length product
5. engineer an optical P2P link
6. demonstrate the ability for self-directed study via the review and presentation of a relevant research topic

Course Contents:

1. Introduction to optical fibers and ray theory transmission
2. Optical Waveguides and transmission characteristics of optical fibers. Review of Maxwell equations in cylindrical coordinates. The modal equation.
3. Light sources (the homojunction, the double heterojunction, laser principles)
4. All-optical amplifiers (SOA and EDFA)
5. Optical detectors (PINs)
6. Modulation, noise and detection
7. Overall system design

Learning Activities and Teaching Methods:

Lectures, and directed self-study

Assessment Methods:

Homework, Software Projects, Report (~15 pages), Midterm, Final.
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Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
G. Keiser	Optical Fiber Communications	McGraw Hill	2000	0-07-232101-6

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
J. Palais	Fiber Optic Communications	Prentice Hall	2005	0-13-008510-3
Govind P. Agrawal	Fiber-Optic Communications Systems, 4 th edition	Wiley	2010	978-0-470-50511-3

Further reading: Relevant Journals and Transactions