

Course unit title:	Fibre Optics Communication		
Course unit code:	AEEE493		
Type of course unit:	Technical Elective		
Level of course unit:	BSc (1 st Cycle)		
Year of study:	3 or 4		
Semester when the unit is delivered:	Spring		
Number of ECTS credits allocated :	6		
Name of lecturer(s):	Dr Christos Themistos		
Learning outcomes of the course unit:	<ol style="list-style-type: none"> 1. Review the concepts of Lightwave Technology and Optical line transmission. Identify the characteristics of guided electromagnetic waves in optical waveguides such as modes, material dispersion and attenuation. 2. Define the fundamentals of optical waveguides and fibres as key components in optical communication. Distinguish between Single-mode/ Multimode Fibres, Step index/ Grade Index Fibres. Apply the Geometrical-optics and the wave propagation approach to illustrate the basic parameters of the optical waveguide such as Refractive Index, Total Internal Reflection, Losses, Bandwidth. 3. Introduce the concept of optical coupling in optical fibres and optical waveguides. Appraise the use integrated optical devices, such as, LED's, optical sensors, optical polarisers, Couplers, Connectors, Repeaters in optical communication systems. 4. Familiarise with the Optical waveguide structures, TE/ TM modes, Cut-off frequency, Optical Bends. Analyse the fundamental waveguide condition and explain the waveguide optical modes for a slab dielectric waveguide. 5. Propose suitable techniques for modulation, signal routing and timing in typical optical communication systems 		
Mode of delivery:	Face-to-face		
Prerequisites:	None	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	<ul style="list-style-type: none"> • Optical Fibre Communication Technology: Lightwave Technology, Optical line transmission, guided electromagnetic waves in optical waveguides (modes, material dispersion and attenuation). • The Optical Fibre: Single-mode/ Multimode Fibres, Step index/ Grade Index Fibres, Geometrical-optics and the wave propagation approach, Refractive Index, Total Internal Reflection, Losses, Bandwidth. • Coupling of Optical Fibres: Optical coupling in optical fibres and optical waveguides. optical devices in optical communication systems (LED's, optical sensors, optical polarisers, Couplers, Connectors, Repeaters) • The optical waveguide: Optical waveguide structures, TE/ TM modes, Cut-off frequency, Optical Bends. • Optical Communication Systems: Modulation, signal routing and timing in typical optical communication systems\ 		

	<ul style="list-style-type: none"> • Wavelength Division Multiplexing: Coarse and Dense WDM, ITU-T Standard DWDM Telecommunication Windows, Channel Selection.
Recommended and/or required reading:	
Textbooks:	G.P. Agrawal, " Fiber-Optic Communication Systems ", Wiley-Interscience, 2002
References:	N.S.Kapany, " Fibre Optics: Principles and Applications ", Academic Press, 1997 R. A. Shotwell, " Introduction to Fiber Optics ", Prentice Hall, 1996
Planned learning activities and teaching methods:	<p>Students are taught the course through lectures (3 hours per week) in classrooms or lectures theatres, by means of traditional tools or using computer demonstration.</p> <p>Auditory exercises, where examples regarding matter represented at the lectures, are solved and further, questions related to particular open-ended topic issues are compiled by the students and answered, during the lecture or assigned as homework.</p> <p>Topic notes are compiled by students, during the lecture which serve to cover the main issues under consideration and can also be downloaded from the lecturer's webpage. Students are also advised to use the subject's textbook or reference books for further reading and practice in solving related exercises. Tutorial problems are also submitted as homework and these are solved during lectures or privately during lecturer's office hours. Further literature search is encouraged by assigning students to identify a specific problem related to some issue, gather relevant scientific information about how others have addressed the problem and report this information in written or orally.</p> <p>Students are assessed continuously and their knowledge is checked through tests with their assessment weight, date and time being set at the beginning of the semester via the course outline.</p> <p>Students are prepared for final exam, by revision on the matter taught, problem solving and concept testing and are also trained to be able to deal with time constraints and revision timetable.</p> <p>The final assessment of the students is formative and summative and is assured to comply with the subject's expected learning outcomes and the quality of the course.</p>
Assessment methods and criteria:	<ul style="list-style-type: none"> • Assignments 10% • Tests 50% • Final Exam 40%
Language of instruction:	English
Work placement(s):	No