

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Fiber Optic Communication System Design	Course Code	EC5XXX			
Dept./ Specialization	ECE	Structure (LTPC)	3	1	0	4
To be offered for	UG/PG	Status	Core <input type="checkbox"/>		Elective <input checked="" type="checkbox"/>	
Faculty Proposing the course	Dr. Srijith K	Type	New <input checked="" type="checkbox"/>		Modification <input type="checkbox"/>	
Recommendation from the DAC: Yes		Date of DAC	12.11.2021			
External Expert(s)	Prof. Balaji Srinivasan, Professor, EE, IITM Prof. Deepa Venkitesh, Professor, EE, IITM					
Pre-requisite	CoT	Submitted for approval			46 th Senate	
Learning Objectives	Fiber Optic Communication System Design is intended as a senior UG / PG level course that introduces the principles and concepts of fiber optic communication systems and design of optical networks.					
Learning Outcomes	<p>At the end of the course, the learners are expected to do the following:</p> <ul style="list-style-type: none"> • To understand the fundamental principles in optical fiber communication and describe the components and sub-systems in fiber optic communication systems. • To describe modulation, multiplexing and demultiplexing in fiber optic systems. • To perform noise and error analysis on a given fiber optic communication link • To design single-hop and multi-hop fiber optic communication links for a given specification • To understand the fundamentals of optical networks with focus on architecture, topology and protection. 					
Contents of the course (With approximate break-up of hours)	<p>Introduction - Optical fiber characteristics - Single-mode/multi-mode fibers - Fiber Losses - Dispersion (5L+1T) Optical transmitters - Concepts of spontaneous and stimulated emission of light - Lasers - LED - Direct vs external modulation. (6L+2T) Optical Receivers - Photodiodes, Noise in optical receivers - BER (3L+1T) Design of single-hop optical communication links - Power and Rise time budgets (3L+1T) Optical Amplifiers - Principles of amplification - Erbium Doped Fiber Amplifier - Noise figure (5L+2T) Design of multi-hop optical communication links - Wavelength Division Multiplexing systems - WDM components - Impairments due to dispersion and non-linearities (7L+3T) Introduction to coherent communication systems - description of QPSK and 16-QAM modulation- polarisation and space division multiplexing, OSNR requirements, additional impairments (6L+2T) Introduction to Optical Networks - OADM - Optical Transport Network - Protection switching - SONET/SDH - Access Networks - PON (7L+2T)</p>					
Text Book	1. Govind P Agrawal, Fiber Optic Communication Systems, , 3rd Ed., John Wiley, ISBN: 978-0-470-50511-3, 2002.					
Reference Books	<p>1. John M Senior, Optical Fiber Communications: Principles and Practice, 3rd Ed., Pearson, ISBN: 978-8131732663, 2010. 2. Gerd Keiser, Optical Fiber Communication, 5th Ed, McGraw Hill, ISBN: 978-1259006876, 2013. 3. Optical Networks: A practical Perspective, Rajiv Ramaswami, K.Sivarajan and Galen Sasaki, 3rd Ed., Morgan Kaufmann Publishers, ISBN: 978-0123740922, 2010.</p>					