	National Institute of Technology Meghalaya An Institute of National Importance	**CURRICULUM**

Programme	**Bachelor of Technology in Electronics and Communication Engineering**	Year of Regulation	**2018-19**
Department	**Electronics and Communication Engineering**	Semester	**VIII**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
EC 426	**Fiber Optics Communication**	**3**	**0**	**0**	**3**	**50**	**50**	**100**	**200**

Course Objectives		Course Outcomes		
	To develop the student's ability to analyze the different kind of losses, signal distortion in fiber optical communication and other signal degradation factors		CO1	Able to identify, formulate, and solve engineering problems in the area fiber optics communication
	To familiarize students with the fiber optical source materials, LED structures and Laser diodes		CO2	Able to understand basic terminology, concepts and take the lead in fiber optic discussions and what are its requirements
	To familiarize students with the fiber optical receivers such as PIN photodiode and APD diodes, noise performance in photo detector receiver operation and configuration		CO3	Able to analyse the operation of LEDs, laser diodes and PIN photo-detectors (spectral properties, bandwidth and circuits) and apply in optical systems
	To familiarize students with operational principles of WDM and measurement analysis		CO4	Able to measure the amount of light lost going through an optical system and different optical amplifiers

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
1	CO1	**3**	**2**	**2**	**1**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	**2**	**2**	**-**
2	CO2	**2**	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	**-**	**2**	**-**
3	CO3	**1**	**2**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**2**	**3**	**2**	**-**
4	CO4	**-**	**3**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**2**	**3**	**3**	**-**

SYLLABUS

No.	Content	Hours	COs
I	**Introduction** Elements of fiber optic communication; Nature of light, Basic optical laws; Fiber types; Fiber fabrication	**07**	**CO1**
II	**Signal Degradation In Optical Fibers** Attenuation, Absorption losses, scattering losses, bending losses, Signal dispersion in fibers, non-linear effects in fiber	**05**	**CO1, CO2**
III	**Optical Sources** Laser diode, principle and operation of light emitting diode, Comparison Between LED and LD	**05**	**CO2, CO3**
IV	**Photo Detectors and Receiver System** PIN diode, Avalanche photodiode, fundamental receiver operation; System performance evaluation criteria, Eye Diagram, BER, OSNR, and Q-Factor	**06**	**CO2, CO3**
V	**Power Launching & Coupling, Digital Links** Source to fiber power launching, lensing schemes for coupling improvement, fiber slicing; fiber to fiber joints; The concept of digital link, point to point link, Power penalties	**07**	**CO4**
VI	**WDM Concepts and Components** Principles of WDM, WDM System Configuration, Types of WDM System, WDM Components, Applications of WDM Systems.	**04**	**CO1, CO4**
VII	**Optical amplifiers and measurements** Principle of Optical Amplification, Erbium Doped Fiber Amplifiers, Raman Amplifiers, Semiconductor Optical Amplifiers, Refractive Index Measurements, Attenuation Measurement, Dispersion Measurement, OTDR Field Applications	**05**	**CO4**
	Total Hours	**39**	

Essential Readings

1. Gerd Kaiser, "Optical Fiber Communication", McGraw Hill, 5th edition, 2013.
2. *Senior J. M., "Optical Fiber Communication - Principle And Practice", PHI, 2nd Ed., 15th Indian Reprint, 2003.*

Supplementary Readings

1. Agrawal G.P., "Fiber Optic Communication Systems", John Wiley & Sons, 4th Ed., 2010.
2. Mynbave and Scheiner, "Fiber Optics Communications Technology", Pearson Education, 1ST Indian Ed., 2001.
3. Ramaswami Rajiv and Sivarajan K. N., "Optical Networks A Practical Perspective", Elsevier, Morgan Kaufmann Publishers, 3rd Ed:, 2009.