SHAMBHUNATH INSTITUTE OF ENGINEERING & TECHNOLOGY
JHALWA, ALLAHABAD
STUDY SCHEME
(Lecture Plan: 2017-18)

B.Tech: 7th Semester
Paper Code: NEC-701
Subject: Optical Communication
Branch: EC
Faculty Name: Mr. Ajay Dwivedi

Unit No.	Lecture No.	Topics to be covered	Status
Unit 1	**1.**	Overview of optical fiber communication	
	2.	The general system, advantages of optical fiber communications	
	3.	Optical fiber wave guides- Introduction, Ray theory transmission	
	4.	Optical fiber Modes and configuration	
	5.	Optical fiber Modes and configuration	
	6.	Mode theory for circular Waveguides	
	7.	Mode theory for circular Waveguides	
	8.	Step Index fibers, Graded Index fibers	
	9.	Single mode fibers- Cut off wavelength, Mode Field Diameter,	
	10.	Effective Refractive Index	
	11.	Fiber Material and its Fabrication Techniques	
	12.	Numerical session	
Unit 2	**13.**	Signal distortion in optical fibers- Attenuation, Absorption	
	14.	Scattering and Bending losses, Core and Cladding losses	
	15.	Information capacity determination, Group delay	
	16.	Attenuation Measurements Techniques,	
	17.	Types of Dispersion - Material dispersion, Wave-guide dispersion,	
	18.	Polarization mode dispersion	
	19.	Intermodal dispersion, Pulse broadening	
	20.	Overall fiber dispersion in Multi mode and Single mode fibers	
	21.	Fiber dispersion measurement techniques	
	22.	Non linear effects	

	23.	Optical fiber Connectors: Joints, Couplers and Isolators	
	24.	Optical fiber Connectors: Joints, Couplers and Isolators	
Unit 3	**25.**	Optical sources- LEDs, Structures	
	26.	Materials, Quantum efficiency	
	27.	Materials, Quantum efficiency	
	28.	Power, Modulation, Power bandwidth product	
	29.	Laser Diodes- Basic concepts, Classifications	
	30.	Semiconductor injection Laser	
	31.	Semiconductor injection Laser	
	32.	Modes, Threshold conditions	
	33.	External quantum efficiency	
	34.	Laser diode rate equations	
	35.	resonant frequencies,	
	36.	reliability of LED & ILD	
Unit 4	**37.**	Source to fiber power launching - Output patterns, Power coupling	
	38.	Source to fiber power launching - Output patterns, Power coupling	
	39.	Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling	
	40.	Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling	
	41.	Optical detectors- Physical principles of PIN and APD	
	42.	Optical detectors- Physical principles of PIN and APD	
	43.	Detector response time, Temperature effect on Avalanche gain	
	44.	Comparison of Photo detectors. Optical receiver operation	
	45.	Fundamental receiver operation, Digital signal transmission	
	46.	Fundamental receiver operation, Digital signal transmission	
	47.	error sources, Receiver configuration, Digital receiver performance	
	48.	Probability of error, Quantum limit, Analog receivers	
	49.	Probability of error, Quantum limit, Analog receivers	
Unit 5	**50.**	Link Design: Point to Point Links	
	51.	Link Design: Point to Point Links	

	52.	Power Penalities, Error control	
	53.	Power Penalities, Error control	
	54.	Multichannel Transmission Techniques	
	55.	Multichannel Transmission Techniques	
	56.	WDM concepts and component overview	
	57.	WDM concepts and component overview	
	58.	OTDR	
	59.	optical Power meter	
	60.	optical Power meter	

Text Book:

1. John M. Senior, “Optical Fiber Communications”, PEARSON, 3rd Edition, 2010.

2. Gerd Keiser, “Optical Fiber Communications”, TMH, 4th Edition, 2008.

Reference Books:

1. Govind P. Agrawal, “Fiber Optic Communication Systems”, John Wiley, 3rd Edition, 2004.

2. Joseph C. Plais, “Fiber Optic Communication”, Pearson Education, 4th Ed, 2004.