

Module No.	Unit No.	Topics	Hrs.
1.0		Optical Fiber and their properties	10
	1.1	Historical development, general system, advantages, disadvantages, and applications of optical fiber communication, optical fiber waveguides, Ray theory, cylindrical fiber (no derivations), single mode fiber, cutoff wave length, and mode field diameter. Wave guiding principles, Theory of optical wave propagation, Types and classification of optical fibers, loss and bandwidth	
2.0		Transmission Characteristics of Optical Fiber	12
	2.1	Attenuation, absorption, linear and nonlinear scattering losses, bending losses, modal dispersion, waveguide dispersion, dispersion and pulse broadening, dispersion shifted and dispersion flattened fibers. General Overview of nonlinearities , Stimulated Raman Scattering, Stimulated Brillouin Scattering , Self Phase modulation , Cross –Phase modulation , Four wave mixing and its mitigation , Solitons. Measurements of attenuation, dispersion and OTDR	
3.0		Optical Sources	06
	3.1	Working principle and characteristics of sources (LED, LASER), Tunable lasers Quantum well lasers , Charge capture in Quantum well lasers, Multi Quantum well Laser diodes, Surface Emitting Lasers: Vertical cavity Surface Emitting Lasers	
4.0		Optical Detectors	06
	4.1	Working principle and characteristics of detectors (PIN, APD), Material requirement for RCEPD ,Resonant cavity enhancement (RCE) Photo Detector ,Noise analysis in detectors, coherent and non-coherent detection, receiver structure, bit error rate of optical receivers, and receiver performance	
5.0		Fiber Optic Components	08
	5.1	Fiber fabrication (VAD,MCVD), fiber joints, fiber connectors, splices Couplers, multiplexers, filters, fiber gratings, Fabry Perot filters, switches and wavelength converters, Optical amplifiers, basic applications and types, semiconductor optical amplifiers, EDFA.	
6.0		Optical Link	06
	6.1	Introduction, Point to point links, system considerations, link power budget, and rise time budget. RF over fiber, key link parameters, Radio over fiber links, microwave photonics.	
		Total	48