DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Period /Week	Academic Year	Semester commencement date
23EC5E02	Optical Communication	V	ECE	5	2025-26	09-07-2025

COURSE OUTCOMES

After completion of the course student are able to

1	Choose necessary components required in modern optical communications systems. (K3)
2	Illustrate about electromagnetic modes in waveguides and the amount of light lost going through an optical system, dispersion of optical fibers. (K4)
3	Use different types of photo detectors and optical test equipment to analyze optical fiber and light wave systems. (K4)
4	Choose the optical cables for better communication with minimum losses and demonstrate optical fiber experiments in the laboratory. (K3)

Unit No	Out Come/ Bloom's Level		Topics/Activity	Reference Text book	Contact Periods	Delivery Method
1.	CO1: Choose necessary components required in modern optical communications systems. (K3)	UNIT I				Chalk & Talk, PPT, Active Learning & Tutorial
		1.1	Overview of optical fiber communication - Historical development	T1	1	
		1.2	The general system, advantages of optical fiber communications	T1	2	
		1.3	Optical fiber waveguides- Introduction	T1	1	
		1.4	Ray theory transmission	T1	1	
		1.5	Total Internal Reflection	T1,R1	1	
		1.6	Acceptance angle	T1,R1	1	
		1.7	Numerical Aperture,skew rays	T1,R1	1	
		1.8	Cylindrical fibers- Modes, V-number,	T1,R1	1	
		1.9	Mode coupling,step index fibers	T1,R1	1	
		1.10	Single mode fibers-Cutoff wave length, Mode Field Diameter,	T1,R1	1	
		1.11	Effective Refractive Index,	T1,R1	1	
		1.12	Related Problems	T1	1	
		1.13	Class Test 1		1	

				TOTAL	**14**	
2.	CO2: Illustrate about electromagnetic modes in waveguides and the amount of light lost going through an optical system, dispersion of optical fibers. (K4)	**UNIT-II**				Chalk & Talk, PPT, Active Learning & Tutorial
		2.1	Fiber materials:- Glass, Halide	T1	1	
		2.2	Active glass, Chalgenide glass	T1	1	
		2.3	Plastic optical fibers	R3	1	
		2.4	Signal distortion in optical fibers-Attenuation, Absorption, Scattering and Bending losses	T1	1	
		2.5	Core and Cladding losses	T1	1	
		2.6	Informationcapacity Determination	T1	1	
		2.7	Group delay	T1	1	
		2.8	Types of Dispersion:- Material dispersion	T1	2	
		2.9	Wave-guidedispersion	T1	1	
		2.10	TPolarization-Mode dispersion	R3	1	
		2.11	Intermodal dispersion	T1	1	
		2.12	Pulse broadening in Graded index fiber, Related problems.	T1	1	
		2.13	Class Test 2		1	
				TOTAL	**14**	
3.	CO3: Use different types of photo detectors and optical test equipment to analyze optical fiber and light wave systems. (K4)	**UNIT III**				Chalk & Talk, PPT, Active Learning & Case study
		3.1	Optical fiber Connectors-Connector types	T1	2	
		3.2	Single mode fiber connectors	T1	2	
		3.3	Connector return loss	R2	2	
		3.4	FiberSplicing-Splicing technique	T1	2	
		3.5	Splicing technique mode fibers	T1	1	
		3.6	Fiber alignment and joint loss-Multimode fiber joints	T1	2	
		3.7	Class Test 3		1	
				TOTAL	**12**	
		UNIT IV				
		4.1	Optica sources-LEDs, Structures,Materials, Quantum efficiency, Power	T2	1	

4.	CO4: Understand the functioning, multiple access schemes, protocols, capabilities and application of various wireless communication networks.(K2)	4.2	Modulation, Power bandwidth product,Injection Laser Diodes	T2	1	Chalk &Talk,PPT, Active Learning & Project based learning
		4.3	Modes,Threshold conditions	T2	2	
		4.4	Externalquantum efficiency,Laser diode rate equations	T2,R1	1	
		4.5	Resonant frequencies, Reliability of LED&ILD, Optical detectors	T2	2	
		4.6	Physical principles of PIN and APD.	T2	1	
		4.7	Detector response time,	T2,R1	2	
		4.8	Comparison of Photo detectors, Related problems.	T2	1	
		4.9	Class Test 4		1	
				TOTAL	**12**	
5.	CO4: Choose the optical cables for better communication with minimum losses and demonstrate optical fiber experiments in the laboratory. (K3)	**5. MULTIPLE ACCESS SCHEMES**				Chalk & Talk, PPT, Active Learning & Tutorial
		5.1	Source to fiber power launching - Output patterns, Power coupling	T2	1	
		5.2	Power launching, Euilibrium Numerical Aperture	T2	1	
		5.3	Laser diode to fiber coupling, Optical receiver operation	T2	1	
		5.4	Fundamental receiver operation, Digital signal transmission, error sources	T2,R3	1	
		5.5	Receiver configuration, Digital receiver performance	T2,R3	1	
		5.6	Probability of Error, Quantum limit, Analog receivers	T2,R3	1	
		5.7	Optical system design - Point-to-point links- Component choice and considerations	T2,R3	1	
		5.8	Link power budget, Rise time budget with examples, Line coding in Optical links,	T2,R3	1	
		5.9	WDM, Necessity, Principles, Measurement of Attenuation and Dispersion, Eye pattern.	T2,R3	1	
		5.11	Class Test 5		1	
	Content Beyond Syllabus	5.12	SONET	T1	1	
				TOTAL	**11**	
				TOTAL NO. OF CLASSES PROPOSED PER PERIODS	**63**	

Text Books:

S.No.	AUTHORS/BOOK TITLE/EDITION(latest)/PUBLISHER/YEAR OF PUBLICATION
1	GerdKeiser, Optical Fiber Communications,McGraw-HillInternationaledition,3rdEdition,2000.
2	JosephC.Palais,Fiber Optic Communications, 4thEdition, Pearson Education, 2004
Reference Books:	
S.No.	**AUTHORS/BOOK TITLE/EDITION(latest)/PUBLISHER/YEAR OF PUBLICATION**
1	Fiber Optic Communications–D.K.Mynbaev ,S.C.Gupta and Lowell L.Scheiner,PearsonEducation,2005
2	S.C.Gupta, Optical Fiber Communication and its Applications,PHI,2005
3	Govind P.Agarwal,Fiber Optic Communication Systems ,JohnWiley,3rdEdiition,2004
Web Details:	
1	/https://onlinecourses.nptel.ac.in/noc21_ee42
2	https://www.edx.org/learn/engineering/purdue-university-fiber-optic-communications

		Name	Signature with Date
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