



**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 communication systems. (K3)	<b>UNIT I</b>				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	



# SWARNANDHRA

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 SEETHARAMPURAM, W.G.DT., NARSAPUR-534290, (Andhra Pradesh)

		<b>TOTAL</b>		<b>14</b>	
2.	CO2: Illustrate about electromagnetic modes in waveguides and the amount of light lost going through an optical system, dispersion of optical fibers. (K4)	<b>UNIT-II</b>			
		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	Information capacity Determination	T1	1
		2.7	Group delay	T1	1
		2.8	Types of Dispersion:- Material dispersion	T1	2
		2.9	Wave-guided dispersion	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
		<b>TOTAL</b>		<b>14</b>	
3.	CO3: Use different types of photo detectors and optical test equipment to analyze optical fiber and light wave systems. (K4)	<b>UNIT III</b>			
		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	Fiber Splicing- 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
		<b>TOTAL</b>		<b>12</b>	
		<b>UNIT IV</b>			
		4.1	Optical sources-LEDs, Structures, Materials, Quantum efficiency, Power	T2	1

Chalk & Talk, PPT, Active Learning & Tutorial

Chalk & Talk, PPT, Active Learning & Case study





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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	External quantum 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	
		<b>TOTAL</b>			<b>12</b>	
5.	CO4: Choose the optical cables for better communication with minimum losses and demonstrate optical fiber experiments in the laboratory. (K3)	<b>5. MULTIPLE ACCESS SCHEMES</b>				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	
<b>TOTAL</b>					<b>11</b>	
<b>TOTAL NO. OF CLASSES PROPOSED PER PERIODS</b>					<b>63</b>	
<b>Text Books:</b>						



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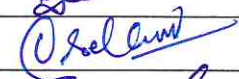
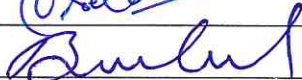
S.No.	AUTHORS/BOOK TITLE/EDITION(latest)/PUBLISHER/YEAR OF PUBLICATION
1	Gerd Keiser, Optical Fiber Communications, McGraw-Hill International edition, 3rd Edition, 2000.
2	Joseph C. Palais, Fiber Optic Communications, 4th Edition, Pearson Education, 2004

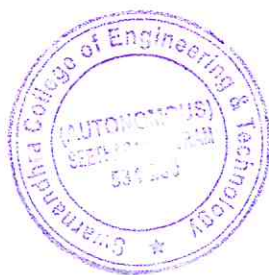
## Reference Books:


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1	Fiber Optic Communications–D.K. Mynbaev, S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005
2	S.C. Gupta, Optical Fiber Communication and its Applications, PHI, 2005
3	Govind P. Agarwal, Fiber Optic Communication Systems, John Wiley, 3rd Edition, 2004

## Web Details:

1	<a href="https://onlinecourses.nptel.ac.in/noc21_ee42">https://onlinecourses.nptel.ac.in/noc21_ee42</a>
2	<a href="https://www.edx.org/learn/engineering/purdue-university-fiber-optic-communications">https://www.edx.org/learn/engineering/purdue-university-fiber-optic-communications</a>

	Name	Signature with Date
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