

## FIBER OPTIC COMMUNICATIONS

<b>Course Code</b>	19EC4602A	<b>Year</b>	III	<b>Semester</b>	II
<b>Course Category</b>	Program Elective-III	<b>Branch</b>	ECE	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	Engineering Physics, Analog Communications, Digital Communications
<b>Continuous Internal Evaluation:</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

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### Course Outcomes

Upon successful completion of the course, the student will be able to

<b>CO1</b>	Identify the basic components of Fiber Optic Communication system. (L3).
<b>CO2</b>	Illustrate different types of Optical Sources, Optical Amplifiers and Optical Detectors. (L2).
<b>CO3</b>	Apply the concepts of Wavelength Division Multiplexing (L3)
<b>CO4</b>	Analyse the modulation characteristics and effect of noise (L4).
<b>CO5</b>	Build fiber optic system (L3).

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### Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)

Note: 1- Weak correlation    2-Medium correlation    3-Strong correlation

\* - Average value indicates course correlation strength with mapped PO

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	2										2
CO2	2	3	3	2										2
CO3	2	3	3	2										2
CO4	2	3	3	2										2
CO5	2	3	3	2										2
Average* (Rounded to nearest integer)	2	3	3	2										2

### Syllabus

Unit No.	Contents	Mapped CO
I	<b>Introduction to Fiber Optic Communications-</b> Block Diagram, Advantages. <b>Optic Fiber Waveguides:</b> Ray theory, Step – Index Fiber, Graded – Index Fiber, Attenuation, Pulse Distortion and Information Rate in Optic Fibers	CO-1
II	<b>Light Sources and Detectors :</b> Light-Emitting Diodes-Surface Emitting LEDs, Edge Emitting LEDs. Laser Principles, Distributed – Feedback Laser Diode, Optical Amplifiers, Principles of Photo detection, Photomultiplier, Semiconductor Photodiode, PIN Photodiode, Avalanche Photodiode.	CO-1, CO-2

III	<b>Couplers and Connectors:</b> Principles, Fiber end Preparation, Splices, Connectors, Source Coupling, Distribution Networks, Directional Couplers, Star Couplers, Switches, Fiber Optical Isolator, Wavelength-Division Multiplexing.	CO-1, CO-3
IV	<b>Modulation, Noise and Detection:</b> Light-Emitting-Diode Modulation and Circuits, Laser-Diode Modulation and Circuits, Analog-Modulation Formats, Digital-Modulation Formats, Optic Heterodyne Receivers, Thermal and Shot Noise, Signal-to-Noise Ratio, Modal Noise, Amplifier Noise, Laser Noise	CO-4
V	<b>System Design and Fiber Optical Applications:</b> Analog System Design, Digital System Design, Applications of Fiber Optics.	CO-1, CO-5

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#### Learning Resources

##### Text Books

1. Optical fiber Communication, Gerd Keiser, Mc Graw Hill. 3rd Edition , 2003
2. Joseph. C. Palais, "Fiber Optic Communications", Pearson Education, Asia, 2002.

##### Reference Books

1. Howes M.J., Morgan, D.V , "Optical Fiber Communication", John Wiely.1992
2. John M.Senior, "Optical Fiber Communication: Principles and Practice", Pearson Education, 2nd edition, 2006
3. John Powers , "Fiber Optic Systems" Irwin Publications, 1997

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