

**GOVERNMENT POLYTECHNIC, PUNE**  
(An Autonomous Institute of Govt. of Maharashtra)

<b>Programme</b>	:	<b>Diploma in ET/CE/EE//ME/MT/CM/IT/DDGM</b>
<b>Programme Code</b>	:	<b>01/02/03/04/05/06/07/08/16/17/21/22/23/24/26</b>
<b>Name of Course</b>	:	<b>Optical Communication</b>
<b>Course Code</b>	:	<b>ET 484</b>

**Teaching Scheme:**

	<b>Hours /Week</b>	<b>Total Hours</b>
<b>Theory</b>	<b>03</b>	<b>48</b>
<b>Practical</b>	<b>02</b>	<b>32</b>

**Evaluation Scheme:**

	<b>Progressive Assessment</b>	<b>Semester End Examination</b>			
		<b>Theory</b>	<b>Practical</b>	<b>Oral</b>	<b>Term work</b>
<b>Duration</b>	<b>Two class tests, each of 60 minutes</b>	<b>3 Hrs.</b>	<b>3 Hrs.</b>	<b>3 Hrs</b>	<b>--</b>
<b>Marks</b>	<b>20</b>	<b>80</b>	<b>--</b>	<b>25</b>	<b>25</b>

**Course Rationale:**

This subject is introduced with view that the students are made familiar with optical devices & to gain knowledge of fiber optic Communication Systems.

**Course Objectives:**

After studying this course, the student will be able to

•	To Understand fiber optic Technology.
•	To Understand working of optical fiber.
•	To Understand working of optical sources & detectors
•	To Understand working Principle of optical Communications.

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**Course Content:**

Chapter No.	Name of Topic/Sub topic	Hrs	Marks
<b>1.</b>	<b>Fiber Optic Communication</b>		
	1.1 Light Wave Spectrum 1.2 History of Fiber Optic. 1.3 Advantage & disadvantages of Fiber optic communication. 1.4 Application of FOC in Industrial, Defense, Commercial Field. 1.5 Block Diagram of Fiber Optic Communication.	<b>02</b>	<b>10</b>
<b>2.</b>	<b>Fiber Optic Cables &amp; Ray Theory</b>		
	2.1 Basic Optical Laws & Definition: Reflection, Refraction, Refractive index, Snell's law, Numerical aperture, acceptance angle, acceptance cone, critical angle 2.2 Construction of Fiber Optic Cable. 2.3 Single mode, multimode, step index and graded index fiber. 2.4 Fiber materials	<b>08</b>	<b>14</b>
<b>3.</b>	<b>Losses in Optical Fiber</b>		
	3.1 Attenuation and absorption 3.2 Absorption loss, scattering loss 3.3 Bending loss- Micro bending and macro bending 3.4 core and cladding losses. 3.5 Dispersion-Material, chromatic and waveguide dispersion, Intramodal and Intermodal dispersion 3.6 Block diagram & working of OTDR.	<b>08</b>	<b>14</b>
<b>4.</b>	<b>Splices and connectors</b>		
	4.1 Fiber material. 4.2 Fiber alignment and joint losses 4.3 Splicing techniques 4.4 Connectors. 4.5 Couplers.	<b>10</b>	<b>14</b>
<b>5.</b>	<b>Optical Sources &amp; Optical Detector.</b>		
	5.1 LED:-surface emitting & edge emitting LED – Construction, working principle, characteristics 5.2 Laser:-fabry-perot resonator cavity, Structure & Characteristics of laser diode. 5.3 Photo detectors- Principle of photo detectors, types of Photo detectors -PIN, APD & their characteristics.	<b>12</b>	<b>16</b>
<b>6.</b>	<b>Fiber Optics Communication System.</b>		
	6.1 Basic system components. 6.2 Power launching and coupling. 6.3 Optical analog communication system - basic block diagram. 6.4 Optical digital communication systems - basic block diagram. 6.5 Repeaters 6.6 Time and power budget. 6.7 Long haul communication.	<b>08</b>	<b>12</b>

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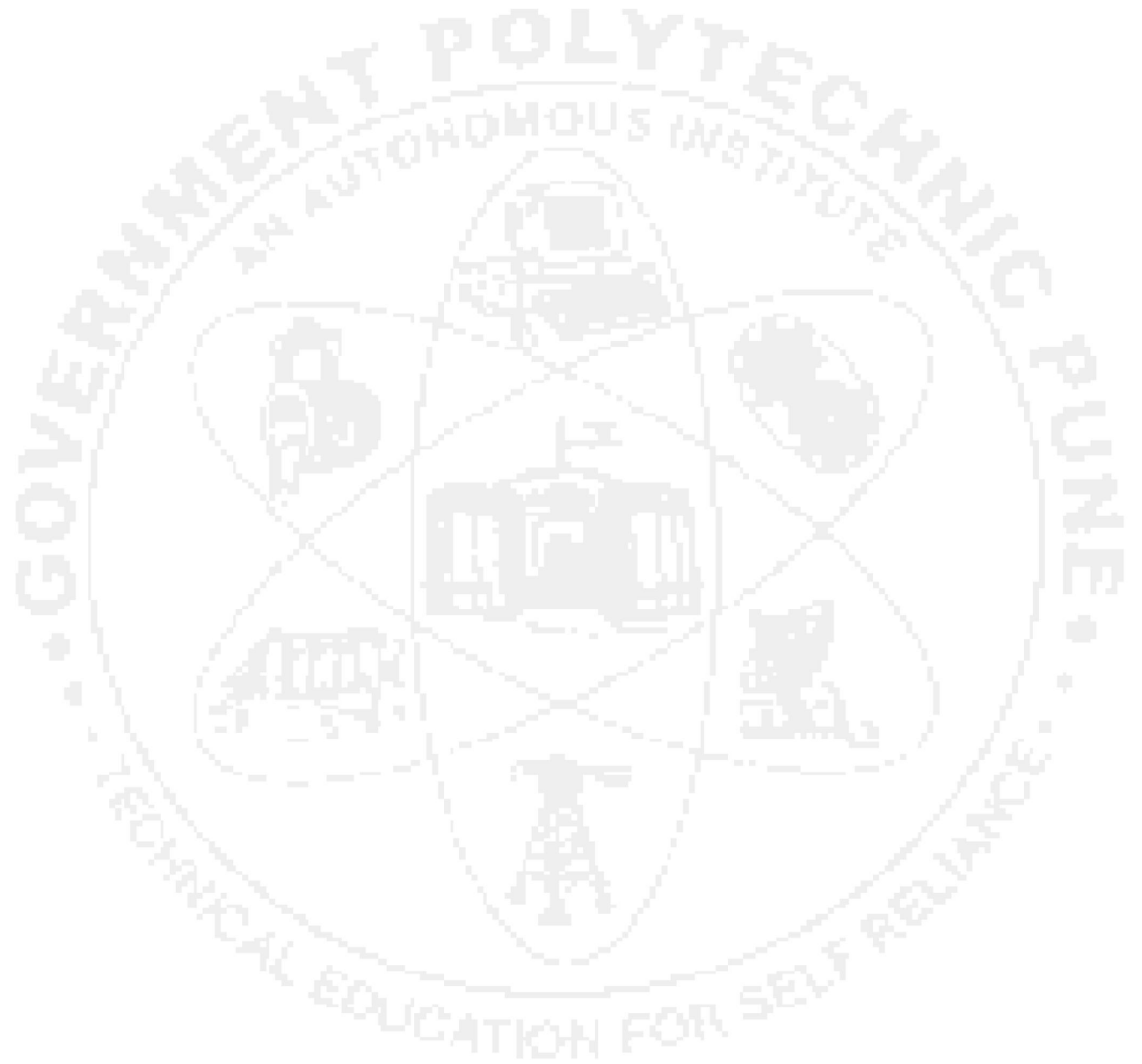
	6.8 WDM.		
		<b>TOTAL</b>	<b>48</b>
			<b>80</b>

**List of Practical/Experiments/Assignments:**

Sr. No.	Name of Experiment/Assignment
1.	Setting of fiber optic analog links
2.	Setting of fiber optic digital links.
3.	Measurement of bending losses
4.	Measurement of propagation losses
5.	Measurement of NA
6.	Measurement of optical power using optical power meter.
7.	To study different types of Fibers
8.	To study different type of components
9.	Verify the characteristics of LED.
10.	Verify the characteristics of Photo Diode.
11.	Attenuation measurement in given FOC.
12.	Visit Industry to see Use of OTDR (Demonstration)
13.	Visit Industry to see Use of Splicing Technique (Demonstration)

**Instructional Strategy:**

Sr. No.	Topic	Instructional Strategy
1.	Fiber Optic Communication	Class room teaching & Laboratory work
2.	Fiber Optic Cables & Ray Theory	Class room teaching & Laboratory work
3.	Losses in Optical Fiber	Class room teaching & Laboratory work
4.	Splices and connectors	Class room teaching , Laboratory work , Simulation & Presentation on PC
5.	Optical Sources & Optical Detector.	Class room teaching & Laboratory work
6.	Fiber Optics Communication System.	Class room teaching , Simulation & Presentation on PC



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**Text Books:**

Sr. No	Author	Title	Publication
1.	Keiser	Optical Fiber Communication	Tata McGraw-Hill International
2.	John Senior	Optical Fiber Communication	Prentice Hall of India
3.	A. Selverajan	Optical Fiber Communication	Tata McGraw-Hill
4.	Kennedy	Principle of communication	Mcgraw Hill

**Reference Books:**

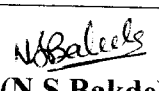
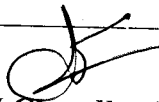

Sr. No	Author	Title	Publication
1.	Sinior	Optical fiber Communication	PHI
2.	Roddy coolen	Electronics Communication	PHI

**Learning Resources:** Reference Books, Manuals and Journals of Devices, Components Brochures, Notes, Websites

**Specification Table:**

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	Fiber Optic Communication	06	02	02	10
2.	Fiber Optic Cables & Ray Theory	08	03	03	14
3.	Losses in Optical Fiber	08	03	03	14
4.	Splices and connectors	07	03	04	14
5.	Optical Sources & Optical Detector.	08	02	06	16
6.	Fiber Optics Communication System.	06	02	04	12
<b>Total</b>		<b>43</b>	<b>15</b>	<b>22</b>	<b>80</b>

**Prepared By :**

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