

Course Type	Course Code	Name of Course	L	T	P	Credit
DE	ECD409	Fiber Optics and Laser Instrumentation	3	0	0	9

Course Objective

The objective of the course is to present an introduction to Fiber optics and laser instrumentation. It emphasizes on understanding of the basic knowledge, how fiber optic will be used for communication as well as sensing applications. It also give an idea how Laser will be used in instrumentation and measurement to meet the demand of industry.

Learning Outcomes

Upon successful completion of this course, students will:

- have a broad understanding of optical fiber as a transmission line as well as a sensor.
- have a high-level understanding of different types of fiber optics sensor.
- be able to design fiber optic sense network to measure the different type of physical parameter.
- be able to know the different application of Laser in the field of instrumentation and measurement which will be helpful to full fill the requirement of Industry, medicine and society.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction: Introduction to optical fibers; Overview of an optical fiber communication; Transmission characteristics of optical fiber.	8	This will help student to understand the basic of optical fiber and its application in high speed communication system.
2	Optical Fiber Sensors: Intrinsic, extrinsic, and interferometric fiber optic sensors for the measurement of strain, temperature, pressure, displacement, velocity, acceleration, acoustic sensors, sensors for measurement of magnetic field and current, humidity, pH, rotation, gyroscope.	10	This unit will help student in understanding the how optical fiber can be used as modern sensor which has advantage over conventional electronic/electrical sensor.
3	Optical Sensors for Remote Detection: Magnetic and electric field measurements based on - Intensity, Phase, Polarization, Frequency, Wavelength modulation.	5	This unit will help student to design fiber optics sensor system to measure and control some physical as well as electrical parameter from remote distance.
4	Optical Devices and Equipment: Optical source and detector, Optical time domain reflectometer (OTDR), Optical spectrum analyzer, Optical power meter.	7	This unit will help student in understanding the construction working and operation of basic optical devices and equipment used in instrumentation and measurement.
5	Laser Instrumentation: Applications of laser for the measurement of distance, velocity, acceleration, current and voltage. Medical applications of Lasers.	8	This will help student how the optical components like laser can be used in commercial application.
6	Industrial Applications of Laser: Application of laser in material processing and design.	4	This will help student how the optical components like laser can be used for industrial applications.

Text Books:

1. Senior J.M, "Optical Fibre Communication - Principles and Practice", Prentice Hall of India

Reference Books:

1. Keiser G, "Optical Fiber Communication", Tata McGraw Hill, New Delhi.
2. John F. Read, "Industrial Applications of Laser", Academic Press.
3. Monte Ross, "Laser Applications", Tata McGraw Hill.