

## UEI833: OPTICAL INSTRUMENTATION

L	T	P	Cr
3	1	0	3.5

**Course Objectives:** To make the students able to understand different aspects of optical instrumentation.

**Light Sourcing, Transmitting and Receiving:** Concept of light, classification of different phenomenon based on theories of light, basic light sources and its characterization, polarization, coherent and incoherent sources, grating theory, application of diffraction grating, electro-optic effect, acousto-optic effect and magneto-optic effect.

**Opto –Electronic devices and Optical Components:** Photo diode, PIN, photo-conductors, solar cells, phototransistors, materials used to fabricate LEDs and lasers design of LED for optical communication, response times of LEDs, LED drive circuitry, lasers classification ruby lasers, neodymium lasers, CO<sub>2</sub> lasers, dye lasers, semiconductor lasers, laser applications.

**Interferometry:** Interference effect, radiometry, types of interference phenomenon and its application, michelson's interferometer and its application refractometer, rayleigh's interferometers, spectrographs and monochromators, spectrophotometers, calorimeters, medical optical instruments

**Optical Fiber Sensors:** Active and passive optical fiber sensor, intensity modulated, displacement type sensors, multimode active optical fiber sensor (micro bend sensor) single mode fiber sensor-phase modulates and polarization sensors

**Fiber optic fundamentals and Measurements:** fundamental of fibers, fiber optic communication system, optical time domain reflectometer (OTDR), time domain dispersion measurement, frequency domain dispersion measurement.

### Course Learning Outcomes (CLO):

After the successful completion of the course the students will be able to:

1. explain the basic concepts of optical transmitting and receiving
2. describe different opto- electronic devices
3. elucidate different methods of interferometry
4. describe selection of the appropriate optical fiber sensors for industrial application

### Text Books:

1. J.Wilson & J F B Hawkes, *Opto Electronics: An Introduction*, Prentice Hall of India, (2011), 3<sup>rd</sup> ed.
2. Rajpal S. Sirohi, *Wave Optics and its Application*, (2001), 1<sup>st</sup> ed.
3. A Yariv, *Optical Electronics*/C.B.S. Collage Publishing, New York, (1985)
4. Pollock, *Fundamentals of OPTOELECTRONICS*, (1994)

### Evaluation Scheme:

S.NO.	Evaluation Elements	Weightage
1	MST	30
2	EST	45
3	Sessional (May include Assignments//Quizzes/Lab Evaluations)	25