

# AMI23 OPTICAL INSTRUMENTATION

## UNIT-1 LIGHT SOURCING, TRANSMITTING AND RECEIVING:

- 1.1 Concept of Light,
- 1.2 Classification of different phenomenon based on theories of light,
- 1.3 Basic light sources and its Characterization, Polarization ,
- 1.4 Coherent and Incoherent sources, Grating theory, Application of diffraction grating,
- 1.5 Electro-optic effect, Acousto optic effect and Magneto-optic effect.

## UNIT-2 OPTO-ELECTRONIC DEVICES AND OPTICAL COMPONENTS

- 2.1 Photo diode, PIN, PhotoConductors, Solar cells, ,Phototransistors,
- 2.2 Materials used to fabricate LEDs and Lasers Design of LED for Optical communication,
- 2.3 Response times of LEDs ,LED drive circuitry,
- 2.4 Lasers Classification :Ruby lasers, Neodymium Lasers,
- 2.5 He- Ne Lasers, CO2 Lasers, Dye Lasers, Semiconductors Lasers ,Lasers Applications.

## UNIT-3 INTERFEROMETRY

- 3.1 Interference effect, Radio-metry, types of interference phenomenon and its Application,
- 3.2 Michelson's Interferometer and its application Fabry-perot interferometer,
- 3.3 Refractometer, Rayleigh's interferometers, Spectrographs and Mono chromators,
- 3.4 Spectrophotometers, Calorimeters, Medical Optical Instruments

## UNIT-4 HOLOGRAPHY

- 4.1 Principle of Holography, On-axis and Off axis Holography,
- 4.2 Application of Holography, Optical data storage.
- 4.3 Optical Fiber Sensors: Active and passive optical fiber sensor,
- 4.4 Intensity modulated ,displacement type sensors,
- 4.5 Multimode active optical fiber sensor (Micro bend sensor) Single Mode fiber sensor
- 4.6 Phase Modulates and polarization sensors

## UNIT-5 FIBER OPTIC FUNDAMENTALS AND MEASUREMENTS

- 5.1 Fundamental of Fibers, Fiber Optic Communication system,
- 5.2 Optical Time domain Reflecto meter (OTDR),
- 5.3 Time domain dispersion measurement, Frequency Domain dispersion measurement,
- 5.4 Laser Doppler velocimeter,

### Reference books:

1. J. Wilson & J. F. B. Hawkes, "Optoelectronics: An Introduction" PHI/ Pearson
2. Rajpal S. Sirohi "Wave Optics and its Application", Hyderabad, Orient longman Ltd.
3. A. Yariv, "Optical Electronics", C. B. S. Collage Publishing, New York, 1985