AMEI-23 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