

1. Subject Code: **EP-308**
2. Contact Hours :
3. Examination Duration (Hrs.) :
4. Relative Weight :
5. Credits :
6. Semester :
7. Subject Area :
8. Pre-requisite :
9. Objective :
10. Details of Course:

Course Title: **Laser and Instrumentation**

L : 3 T : 1 P : 0

Theory : 3 Practical : 0

CWS : 25 PRS : 0 MTE : 25 ETE : 50 PRE : 0

4

EVEN

DEC-3

Basic knowledge LASER Physics,
Quantum Mechanis & Optics

- *1. Acquire fundamental understanding of the basic Physics behind optoelectronic devices.
- 2. Develop basic understanding of light emitting diodes.
- 3. Develop detailed knowledge of laser operating principles and structures.
- 4. Acquire in depth understanding of photo detectors

S.No.	Contents	Contact Hours
1.	Laser Physics: Various common laser systems and applications, fabrication of lasers, optical amplifications, laser rate equations, gain coefficient, line broadening, optical resonators, Q-switchings, mode locking and pulse compression.	10
2.	Nonlinear Optics: Nonlinear optical susceptibilities, harmonic generation, frequency conversion, phase matching	8
3.	Photonic Devices: Optical detectors, photomultiplier tubes, monochromator, CCD.	8
4.	Analytical Instruments: Spectrophotometers, FTIR, fluorescence and Raman Spectrometer, X-ray diffractometer, scanning electron microscopy, atomic force microscopy. Low Temperature: Gas liquefiers, Cryo-fluid path, liquid He cryostat design, low temperature measurement.	8
5.	Laboratory Component: Physical parameter measurement using different sensor; low pressure generation and measurement	8
Total		42

11.Suggested Books

S.No.	Name of Books/ Authors	Year of Publication/ Reprint
1.	Principles of Lasers by O. Svelto/Plenum Press	1998
2.	Non Linear Optics by R. W. Boyd Academic Press	2003/
3.	Modern Electronic Instrumentation and Measurement Techniques by A. D. Helfrick and W. D. Cooper/Prentice-Hall of India	1996
4.	Principles of Measurement Systems by J. P. Bentley/Longman	2000
5.	Experimental Techniques in Low Temperature Physics by G. K. White/Clarendon	1993
6.	Vacuum Technology by A. Roth	1990/Elsevier
7.	Principles of Instrumental Analysis by D. A. Skoog, F. J. Holler and T. A. Nieman/Saunders Coll. Publ.	1998