

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
<b>Total</b>		<b>42</b>

### 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