PH-8151 Physics Laboratory-I *(Electronics, Optics and Microwaves)*

L	T	P	C
0	0	8	4

Course Outcomes:
After successful completion of the course, the students should be able to

CO1: verify the theoretical formulations/ concepts of physics.

CO2: know the art of recording the observations of an experiment scientifically.

CO3: learn by doing.

CO4: handle and operate the various elements/parts of an experiment.

CO5: understand the importance of physics experiments in engineering & technology.

CO/PO Mapping
S-strong, M-medium and W-weak indicate the strength of correlation

COs	Programme outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	W	W	M	W	W		M	S	S	S	S
CO2	S	S	S	M	S	W	M		M	W	M	M
CO3	S	M	M	W	W	S	S	S	S	M	S	S
CO4	S	S	W		W	M	M	M	M	S	W	
CO5	M	W	S	W	S		S	M		W	M	W

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List of Practical

Electronics:

1. The application of operational amplifier:
   I. as integrator and differentiator
   II. inverting and non-inverting amplifier
2. To study:
   I. RC phase shift oscillator
   II. Wein bridge oscillator
3. To study the characteristics of SCR and TRIAC
4. To study the characteristics of UJT and MOSFET

Optics:

5. To determine the wavelength of He-Ne laser by:
   a) using diffraction method
   b) using Michelson-Morley interferometer
6. To setup polarization by reflection and:
   a) to determine Brewster's angle for glass surface

b) to verify Malus law

7. Based upon Faraday's effect using flint glass square to determine Verdet's constant and also to verify the relationship between Verdet's constant and wavelength of light used.

8. To setup optical fiber kit and to:
   a) study optical coupling
   b) determine the NA of fiber
   c) determine the transmission loss coefficient by the cut-back method
   d) implement the experiment of optical fiber for pressure sensing.

9. To setup experiment for 'Acousto-optic effect' and to
   a) calculate the diffraction efficiency of acousto-optic device
   b) calculate the Bragg angle
   c) calculate the velocity of sound in acousto-optic medium
   d) demonstrate optical communication using acousto-optic modulation

10. To construct/assemble a:
   a) Michelson interferometer and measuring the refractive index of air
   b) Sagnac interferometer
   c) Mach-Zehnder interferometer

11. To setup the holography kit and to
   a) record and reconstruct the hologram
   b) make the holographic grating

12. To study the different modes of He-Ne laser with an oscilloscope by using He-Ne laser mode analyzer.

13. To set up the Laser Raman Spectrometer and to acquire the Carbon Tetra Chloride (CCl_4) spectrum

14. To set the Fourier optics apparatus and to study optical image
   a) addition and subtraction
   b) differentiation

Microwaves:

15. To study the mode characteristics of a reflex Klystron and hence to determine the mode number, transit time, electronic tuning range and electronic tuning sensitivity using micro-ammeter as well as CRO

16. To find the wavelength of microwaves using X-band microwave-bench working in TE_{10} mode and also to determine the VSWR at different loads.

17. To determine the complex permittivity of given liquid at X-band frequency using Von-Hippel's method.

Total: 96 Hrs

Practicals: 96 Hrs

C/BOS

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