

ENGINEERING PHYSICS LABORATORY

II Semester: AE / ME / CEs																												
Course Code	Category	Hours / Week			Credits	Maximum Marks																						
AHS105	Foundation	L	T	P	C	CIA	SEE	Total																				
		-	-	2	1	30	70	100																				
Contact Classes: Nil		Tutorial Classes: Nil		Practical Classes: 28			Total Classes: 28																					
<p>I. COURSE OVERVIEW: This lab course provides hands on experience in a number of experimental techniques and develops competence in the instrumentation typically used in physics. This also develops student's expertise in applying physical concepts to practical problem and in learning about experimental techniques with advanced equipments. This laboratory includes experiments involving electromagnetism and optoelectronics.</p> <p>II. OBJECTIVES: The course should enable the students to:</p> <ul style="list-style-type: none"> I To familiarize with the lab facilities, equipment, standard operating procedures. II About the different kinds of functional electric and magnetic materials which paves away for them to use in various technical and engineering applications. III The analytical techniques and graphical analysis to study the experimental data for optoelectronic devices. IV The applications of variation in the intensity of light due to natural phenomena like interference and diffraction. <p>III. COURSE OUTCOMES: After successful completion of the course, students should be able to:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">CO 1 Interpret the least count values of Vernier calipers and Screw guage Apply the concept of hook's law and determine the rigidity modulus of wire.</td> <td style="width: 20%; text-align: center;">Apply</td> </tr> <tr> <td>CO 2 Illustrate principle, working and application of wave propagation and compare results with theoretical harmonics and overtones.</td> <td style="text-align: center;">Understand</td> </tr> <tr> <td>CO 3 Investigate the magnetic field induction produced at various points along the axis of current carrying coil and the magnetic field produced in a coil to verify the Tangent's law.</td> <td style="text-align: center;">Apply</td> </tr> <tr> <td>CO 4 Examine launching of light through optical fiber from the concept of light gathering capacity of numerical aperture.</td> <td style="text-align: center;">Understand</td> </tr> <tr> <td>CO 5 Utilize the method of minimum deviation and adjust the spectrometer to minimum deviation position also determine the dispersive power of prism by using spectrometer.</td> <td style="text-align: center;">Apply</td> </tr> <tr> <td>CO 6 Investigate V-I/L-I characteristics of various optoelectronic devices like Light Emitting Diode, Laser diode to understand their basic principle of functioning</td> <td style="text-align: center;">Apply</td> </tr> </table> <p>IV. SYLLABUS:</p> <p style="text-align: center;">LIST OF EXPERIMENTS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Week-1</td> <td>INTRODUCTION TO PHYSICS LABORATORY</td> </tr> <tr> <td colspan="2">Introduction to physics laboratory. Do's and Don'ts in physics lab.</td> </tr> <tr> <td>Week- 2</td> <td>MEASURING INSTRUMENTS AND TORSIONAL PENDULUM</td> </tr> <tr> <td colspan="2">Batch I: Measurement of thickness of a wire and radius of a disc. Batch II: Determination of rigidity modulus of material of string-Torsional pendulum.</td> </tr> </table>									CO 1 Interpret the least count values of Vernier calipers and Screw guage Apply the concept of hook's law and determine the rigidity modulus of wire.	Apply	CO 2 Illustrate principle, working and application of wave propagation and compare results with theoretical harmonics and overtones.	Understand	CO 3 Investigate the magnetic field induction produced at various points along the axis of current carrying coil and the magnetic field produced in a coil to verify the Tangent's law.	Apply	CO 4 Examine launching of light through optical fiber from the concept of light gathering capacity of numerical aperture.	Understand	CO 5 Utilize the method of minimum deviation and adjust the spectrometer to minimum deviation position also determine the dispersive power of prism by using spectrometer.	Apply	CO 6 Investigate V-I/L-I characteristics of various optoelectronic devices like Light Emitting Diode, Laser diode to understand their basic principle of functioning	Apply	Week-1	INTRODUCTION TO PHYSICS LABORATORY	Introduction to physics laboratory. Do's and Don'ts in physics lab.		Week- 2	MEASURING INSTRUMENTS AND TORSIONAL PENDULUM	Batch I: Measurement of thickness of a wire and radius of a disc. Batch II: Determination of rigidity modulus of material of string-Torsional pendulum.	
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Week-3	MEASURING INSTRUMENTS AND TORSIONAL PENDULUM
Batch I: Determination of rigidity modulus of material of string-Torsional pendulum. Batch II: Measurement of thickness of a wire and radius of a disc.	
Week-4	STEWART AND GEE'S METHOD AND FREQUENCY OF LONGITUDINAL WAVES
Batch I: Magnetic field along the axis of current carrying coil-Stewart and Gee's method. Batch II: Determining frequency of longitudinal waves	
Week-5	STEWART AND GEE'S METHOD AND FREQUENCY OF LONGITUDINAL WAVES
Batch I: Determining frequency of longitudinal waves. Batch II: Magnetic field along the axis of current carrying coil-Stewart and Gee's method.	
Week-6	FREQUENCY OF TRANSVERSE WAVES AND LASER DIFFRACTION
Batch I: Calculating frequency of transverse waves. Batch II: Wavelength of laser source-diffraction grating.	
Week-7	FREQUENCY OF TRANSVERSE WAVES AND LASER DIFFRACTION
Batch I: Wavelength of laser source-diffraction grating. Batch II: Calculating frequency of transverse waves.	
Week-8	SPECTROMETER AND DISPERSIVE POWER
Batch I: Adjustments and minimum deviation in spectrometer. Batch II: Dispersive power of material of prism.	
Week 9	SPECTROMETER AND DISPERSIVE POWER
Batch I: Dispersive power of material of prism. Batch II: Adjustments and minimum deviation in spectrometer.	
Week-10	NEWTON'S RINGS AND OPTICAL FIBER
Batch I: Newton's rings-Radius of curvature of plano convex lens. Batch II: Evaluation of numerical aperture of given fiber.	
Week-11	NEWTON'S RINGS AND OPTICAL FIBER
Batch I: Evaluation of numerical aperture of given fiber. Batch II: Newton's rings-Radius of curvature of plano convex lens.	
Week-12	LED CHARACTERISTICS AND LASER CHARACTERISTICS
Batch I: V-I characteristics of LED. Batch II: Study of L-I characteristics of laser diode.	
Week-13	LED CHARACTERISTICS AND LASER CHARACTERISTICS
Batch I: Study of L-I characteristics of laser diode. Batch II: V-I characteristics of LED.	
Week-14	REVISION
Revision.	
Reference Books:	
1. C. L. Arora, "Practical Physics", S.Chand & Co., New Delhi, 3 rd Edition, 2012. 2. Vijay Kumar, Dr. T. Radhakrishna, "Practical Physics for Engineering students", S M enterprises, 2 nd Edition, 2014. 3. R. K. Shukla, Anchal Srivatsava, "Practical Physics", New age International, 2 nd Edition, 2011.	

Web References:1. <http://www.iare.ac.in>**Course Home Page:****LIST OF EQUIPMENT REQUIRED FOR A BATCH OF 30 STUDENTS:**

S.No	Name of the Component	Qty	Range
1	Melde's arrangement	10	Tuning fork frequency: 80-90Hz, DC coil 4 – 6 V, 2-3 A
2	Weight box	10	1mg-100g
3	Meter scale	10	1m
4	Stewart and Gees's set	10	Coil 2, 50, 200 turns
5	DC Ammeter	10	Digital Meter DC 0-20V
6	Battery eliminator	10	DC 2 A.
7	Laser source with retort and round stand	10	Semiconductor laser 670 nm
8	Grating	20	15000 LPI
9	Measuring tape	10	1m
10	Torsional Pendulum	10	Brass disc 1000gms wt, 1m steel wire with diameter 0.05 cm
11	Stop watch	20	+/- 1s
12	Screw gauge	10	+/- 0.001cm
13	Vernier calipers	10	+/- 0.01cm
14	Newtons travelling microscope	10	X10
15	Sodium Vapour Lamp	20	700 W
16	Transformer Sodium Vapour Lamp	10	1 KW
17	Numerical aperture kit	10	Optical power meter 660 nm
18	Bending loss tubes	10	Dia – 4 cm, 6 cm, 8 cm, 10 cm
19	Spectrometer	10	LC 1', Ramsden eye piece
20	Glass prisms	20	Crown glass prisms, 30mm x 30mm
21	Mercury lamp	20	Mercury bulb 160 W
22	LED boards	10	I/P 0-10V DC, Resistors 1k Ω -4K Ω
23	Digital ammeter	10	Digital Meter DC 0-20 mA
24	Digital voltmeter	10	Digital Meter DC 0-20V
25	Probes	10	Dia – 4 mm
26	Laser Diode boards	10	I/P 0-10V DC, Resistors 1k Ω -4K Ω