APPLIED PHYSICS LABORATORY

I B. TECH- I SEMESTER

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
A4BS10	BSC	-	-	3	1.5	30	70	100

COURSE OBJECTIVES:

The course should enable the students to:

1. To provide an experimental foundation for the theoretical concepts introduced in the lectures.
2. To teach how to make careful experimental observations and how to think about and draw conclusions from such data.
3. To help students understand the role of direct observation in physics and to distinguish between inferences based on theory and the outcomes of experiments.
4. To introduce the concepts and techniques which have a wide application in experimental science but have not been introduced in the standard courses.
5. To teach how to write a technical report which communicates scientific information in a clear and concise manner.

COURSE OUTCOMES:

The student will be able to:

1. To make careful experimental observa ons and draw conclusions from such data.
2. To dis nguish between inferences based on theory and the outcomes of experiments.
3. To write a technical report which communicates scien c informa on in a clear and concise manner.

LIST OF EXPERIMENTS

WEEK-1 LIGHT EMITTING DIODE (LED)

1. Analyze the V-I characteristics of GREEN LED Source by varying input voltage from zero to twovolts. Analyze the graph obtained.
2. Analyze the results obtained for V-I characteristics of RED LED Source by varying input voltage with interval 0.2 volts.
3. Analyze the V-I characteristics of YELLOW LED Source for the resistance of 100Ω. What is theeffect of doubling the resistance on the V-I characteristics.

WEEK-2 SOLAR CELL

1. Study the V-I characteristics of a solar cell for the voltage interval of 0.4 V when the given electricbulb is at a distance of 10cm. Will there be any change if the distance is doubled?
2. Study the P-V characteristics of a solar cell for the voltage interval of 0.3 V for four differentdistances of the given electric bulb. Discuss your observations.
3. Study the P-I characteristics of a solar cell for the given electric bulb for the distances 30 cm. Whatis expected if the distance is doubled?

WEEK-3 OPTICAL FIBER

To determine the numerical aperture and acceptance angle of an optical fiber.

WEEK-4 HALL EFFECT

1. Investigate the deflection of the carriers in the conductor under the function of the magnetic field.Based on this measurement, calculate the density of the carriers and the sign of the charges in theconductor.
2. Verifty the Hall effect in extrinsic semiconducting samples and determine the type of given semiconductor anddensity of majority charge carriers.

WEEK-5 ENERGY GAP OF PN JUNCTION DIODE

1. Using PN junction diode, determine the energy gap of a semiconductor by applying 2V of reverse bias by increasing the temperature from 30-70 degree centigrade. Analyze the obtained results.
2. Evaluate the energy gap of Si PN junction diode by applying 1.5V of reverse bias for values of temperature 70,60,50,40,30 centigrade.
3. Evaluate the energy gap of a semiconductor by applying 0.5V of reverse bias for temperatures at 75, 65, 55,45,35 centigrade.

WEEK-6 THERMISTER

1. Study the variation of Resistance versus Temperature using Thermister. Plot graph between Resistance vs Temperature and analyze the results.
2. Evaluate the Temperature dependent resistance of a given material by using Thermister.

WEEK-7 LCR CIRCUIT

1. To determine the Resonance frequency and Quality factor of a LCR Circuit
2. Study the Resonance frequency of an electrical circuit by varying values of inductance, Capacitance and resistors and analyze the results.

WEEK-8 PIN PHOTO DIODE

To determine the V-I characteristics of PIN photo diode.

WEEK-9 RC CIRCUIT

1. Analyze the time constant of R-C circuitby varying Resistance and Capacitance values in a electrical circuit.
2. Determine the time constant of a given RC circuit by plotting a graph between Charging current versus time.

WEEK-10 TORSIONAL OSCILLATOR

1. Making use of a torsional oscillator of 300gms circular disc, determine the rigidity modulus of given steel wire for 65 cm &55 cm lengths. Analyze the results obtained.
2. Determine the rigidity modulus of the given copper wire for 50,40,30 lengths by using torsional oscillator of 400gms circular disc. Analyze the results obtained.
3. Give your analysis of $L\&T^2$ behavior of a torsional oscillator. You may pick your own values for the analysis.

WEEK-11 LASER - DIFFRACTION GRATTING

1. Using a diffraction grating element of 2500 LPI determine the wavelength of LASER source for first and second order diffraction when the distance between the screen and grating is 50cm. What is your analysis?
2. Determine the wavelength of a LASER source for first three orders of diffraction by maintaining a Distance of 30 cms between grating material and the screen. Use diffraction grating element of15000LPI. What differences do you observe for the three orders.

WEEK-12 MELDE'S EXPERIMENT

1. Determine the longitudinal frequency of tuning fork by using 100cm length of the thread by varying masses of 5gms, 10gms. Discuss your findings.
2. Findout the transverse frequency of tuning fork by using 80cm length of the thread and by varying masses of 10gms and 40gms. Analyze the results obtained.

REFERENCE BOOKS:

1. "Semiconductor Physics and Devices: Basic Principles" by Donald ANeamen.
2. "Optics, Principles and Applications" by K K Sharma.
3. "Principles of Optics" by M Born and E Wolf.
4. "Oscillations and Waves" by Satya Prakash and Vinay Dua.
5. "Waves and Oscillations" by N Subrahmanyam and Brij Lal.

WEB REFERENCES:

1. http://www.*arxiv.org/pdf/1510.00032*
2. http://www nptel.ac.in/courses/122103010/
3. http://www. researchgate.net/.../276417736_Video_Presentations_in_Engineering-Ph...
4. http://www. wileyindia.com/engineering-physics-theory-and-practical.html

Note: Students can perform any 8 experiments