

# 19HS116 ENGINEERING PHYSICS (D)

Hours Per Week :

L	T	P	C
2	0	2	3

Total Hours :

L	T	P	WA/RA	SSH/HS	CS	SA	S	BS
30	-	30	10	45	-	10	-	10

## COURSE DESCRIPTION AND OBJECTIVES:

This course provides seamless consolidation of basic principles of Physics and applications. It emphasizes on modern technological advancement relevant to latest developments in the fields of science, engineering and technology.

## COURSE OUTCOMES:

Upon completion of the course, student will able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Analyse the magnetic materials and to apply principles of quantum mechanics.	1
2	Evaluate the energy band gap in semi conductors.	4
3	Understand the relevant applications of Super conductors upon their classification.	3
4	Apply the characteristics of Lasers to realize their applications.	5
5	Apply the knowledge of Optical fibres to grasp their immediate applications.	12

## SKILLS:

- ✓ Evaluate the relation between electricity and magnetism.
- ✓ Realize the phenomeon of geometrical and physical optics.
- ✓ Compute and analyse semiconducting and dielectric materials.



Source :

<https://tme.uconn.edu/wp-content/uploads/sites/1326/2016/12/ep.jpg>

- UNIT - I** **L-06**  
 Dia, Para and ferromagnetism-classification: Weiss molecular field theory and ferromagnetism. Curie-Weiss law. Wave particle quality, de-Broglie concept, uncertainty principle. Wave function. Time independent Schrodinger wave equation, Qualitative explanation of Zeeman effect, Stark effect and Paschan Back effect, Raman spectroscopy.
- UNIT - II** **L-06**  
 Bands in solids: Effective mass. Distinction between metals. Insulators and semiconductors. Intrinsic and extrinsic semiconductors, law of mass action. Determination of energy gap in semiconductors. Donor and acceptor levels.
- UNIT - III** **L-06**  
 Superconductivity: Critical magnetic field. Meissner effect. Isotope effect. Type-I and II superconductors, Josephson's effect DC and AC, Squids: Introduction to high T<sub>c</sub> superconductors.
- UNIT - IV** **L-06**  
 Spontaneous and stimulated emission: Einstein A and B coefficients. Population inversion, He-Ne and Ruby lasers. Semiconductor diode Laser, Holography- Applications.
- UNIT - V** **L-06**  
 Optical fiber: Physical structure, basic theory. Mode type, input output characteristics of optical fiber and applications. Illumination: laws of illumination, luminous flux, luminous intensity, candle power, brightness.

## LABORATORY EXPERIMENTS

**LIST OF EXPERIMENTS** **TOTAL HOURS-30**

1. To find the frequency of A.C. supply using an electrical vibrator.
2. To obtain hysteresis curve (B-H curve) on a C.R.O. and to determine related magnetic quantities.
3. To study the variation of magnetic field with distance along the axis of a current carrying circular coil and to detuning the radius of the coil.
4. To determine the energy band gap in a semiconductor using ap-n Junction diode.
5. To determine the slit width from Fraunhofer diffraction pattern using laser beam.
6. To find the numerical aperture of optical fiber.
7. To study the variations of thermo EMF of a copper-constantan thermo-couple with temperature.
8. To find the wave length of light by prism.
9. To find the low resistance using Carey Foster bridge without calibrating the bridge wire.
10. To determine dielectric constant of material using De Sauty's bridge.
11. To determine the value of specific charge (e/m) for electrons by helical method.
12. To study the induced EMF as a function of velocity of the magnet.
13. To set up the fiber optical analog and digital link.
14. To study the phase relationships in L.R. circuit.
15. To study LCR circuit.
16. Practical examinations.

### TEXT BOOKS:

1. Brijlal and Subrahmanyam. "Text Book of optics". S. Chand and Co., New Delhi.
2. Sarkar Subir Kumar. "Optical State Physics and Fiber Optics". S. Chand and Co., New Delhi.
3. M.N Avadhanulu and P. G Kshir Sagar, "Engineering Physics", S. Chand and Co., New Delhi.

### REFERENCE BOOK:

1. Gupta S L, Kumar and V Sharma R C. "Elements of Spectroscopy". Pragati Prakasam, Meeruth.
2. Saxena B S and Gupta R C. "Solid State Physics". Pragati Prakasam, Meeruth.
3. Srivastava B N. "Essentials of Quantum Mechanics". Pragati Prakasam, Meeruth.
4. Vasudeva D N. "Fundamentals of Magnetism and Electricity". S. Chand and Co., New Delhi.