Semester	**VI**
Course	**Major**
Paper Code	
Paper Title	**Lab 5 (Modern Physics Lab) & Lab 6 (Solid State Physics)**
No. of Credits	**4**
Theory / Practical / Composite	**Practical**
Minimum No. of preparatory hours per week a student has to devote	4
Number of Modules	2
Syllabus	**Module A - Modern Physics Lab [36 L]** 1. To study the characteristics of Photo-electric effect using a photo cell: effects of intensity variation and frequency variation on *photo-current versus voltage* plots. 2. To determine the Planck's constant using LEDs of at least 4 different colours. 3. To determine the value of e/m by Bar magnets (Thomson's method). 4. Franck-Hertz experiment: to demonstrate the discreteness of energy levels of atoms. 5. Verification of Stefan's law. 6. To investigate the negative resistance region in the I-V characteristics of the tunnel diode. 7. To determine the work function of the material of filament of a directly heated vacuum diode. 8. Study of frequency characteristics of a piezoelectric crystal. **Module B - Solid State Physics Lab [36 L]** 1. To measure the Dielectric Constant of a Dielectric Material. 2. To measure the magnetic susceptibility of solids. 3. To draw the B-H Hysteresis curve of a Ferromagnetic material & determine its energy loss. 4. To measure the resistivity of a semiconductor with temperature by four-probe method and to determine its band gap. 5. To investigate the magnetic field between the pole pieces of an electromagnet using a ballistic galvanometer and calibration of a Hall probe. 6. To study temperature coefficient of a semiconductor (NTC thermistor)

	7. Study of the dispersion relation of the mono/di-atomic lattice and comparison with theory and determination of the cutoff frequency of the monoatomic lattice. 8. To determine the band gap of Ge/Si by studying the variation of reverse saturation current of a p-n junction diode as a function of temperature.
Learning Outcomes	**By performing these experiments, the students will acquire knowledge and develop necessary skills regarding:** 1. The construction & use of a setup/circuitry involving a photo cell, for the measurement of photo current for different voltages applied across the cell. 2. The circuit construction and implementation of an experimental scheme to determine the Planck's constant using LEDs of different colours. 3. The use of a magnetometer and CRO to determine charge/mass of an electron (Thomson's method). 4. The use of a setup to perform Franck-hertz experiment to demonstrate the discreteness of energy levels of atoms.

	5. The application of a setup, involving the concept of blackbody radiation, for the verification of Stefan's law. 6. The use of an experimental arrangement, having a temperature variation unit, and also electrical measurements, to determine the band gap of a semiconductor by studying the variation of reverse saturation current of a p-n junction diode as a function of temperature. 7. The use of a setup to determine the band gap of a semiconductor by four-probe method. 8. The construction & use of an experimental arrangement to determine the work function of the material of filament of a directly heated vacuum diode.	
Reading/Reference Lists	1. Advanced Practical Physics by B. Ghosh & K.G Majumdar 2. Practical Physics by Chattopadhyay & Rakshit 3. Laboratory Manual of Physics by Dr. Madhusudan Jana	
Evaluation		CA: 95 Attn: 5
Paper Structure for Theory Semester Exam	Not Applicable	