



**MANGALORE UNIVERSITY**  
**Department of Physics**  
**MSc Physics**

**PHP 513: CONDENSED MATTER PHYSICS - PRACTICALS II**

**Course outcome**

CO1 To the study the properties of semiconductor using resistivity measurement techniques like four-point probe and van der Pauw techniques, demonstrate the magnetoresistance effect in semiconductors, Hall effect using Hall bar and van der Pauw geometry.

CO2 The student will be able to setup experiments for electrical study of samples of high and low resistivity.

CO3 Will be able to estimate the energy gap of semiconductors with simple experiments like current-voltage characteristic of the semiconductor diode, optical absorption or photoconductivity of semiconductor thin films.

CO4. Student will be able to determine p-n junction properties by capacitance voltage measurement.

CO5 Will be able to study thermoelectric properties of thin films and nanostructures.

1. Magnetoresistance of semiconductor
2. Hall effect
3. Determination of Fermi energy of metals
4. Thermionic emission
5. Determination of energy gap of a semiconductor using p-n junction diode
6. Capacitance of p-n junction diode
7. Thermoelectric effect
8. Photodetectors
9. Characteristic of solar cell
10. Energy gap by four probe method  
(Additional experiments may be included)

### Reference Books:

1. Silsbee R H & Drager J 'Simulation for Solid State Physics' (Cambridge 1997)
2. Jerrard H G & Mc Neill D B 'Theoretical and Experimental Physics' (Chapman & Hall 1960)
3. Wooster W A & Breton A 'Experimental Crystal Physics', II Edn. (Clarendon Press 1970)
4. Wieder H H 'Lab notes on Electric and Galvanomagnetic measurements' (Elsevier 1979).

