



Code	Subject Title	Cr. Hrs	Semester
PHY-308	Solid State Physics-II	3	VI
Year	Discipline		
3	Physics		

Energy levels in one dimension, effect of temperature on the Fermi-Dirac distribution, free electron gas in three dimensions, heat capacity of the electron gas, experimental electrical resistivity of metals, umklapp scattering, motion in magnetic fields, Hall effect, thermal conductivity of metals, ratio of thermal to electrical conductivity, nanostructures.

Nearly free electron model, origin of the energy gap, magnitude of the energy gap, Bloch functions, wave equation of an electron in a periodic potential, crystal momentum of an electron, solution of the central equation, empty lattice approximation, approximate solution near a zone boundary, number of orbital in a band, metals and insulators.

Band gap, equation of motion, effective mass, physical interpretation of the effective mass, effective masses in semiconductors, silicon and germanium, intrinsic carrier concentration, intrinsic mobility, impurity conductivity, donor states, acceptor states, thermal ionization of donors and acceptors, thermoelectric effects, semimetals, superlattices.

***Books Recommended:***

1. *Solid State Physics* by Blakemore: Cambridge University Press, 1991.
2. *Solid State Physics* by Neil W. Ashcroft and David Mermin: CBS Publ. Co. 1987.
3. *Introduction to Solid State Physics* by C. Kittel 7<sup>th</sup> Edition: John Wiley and Sons Inc. 1996.