Second Semester 2015-16
Course Handout (Part II)

Date: 6/01/2016

In addition to Part I (General Handout for all courses appended to the Time Table), this portion gives further specific details regarding the course.

Course No.: PHY F341

Course Title: Solid State Physics

Instructor-in-charge: MANJULADEVI. V

Scope and Objective:

This is an introductory course on Solid State Physics. It aims at providing physical as well as mathematical understanding of a wide range of phenomena associated with crystalline matter. Its objective is to lay the foundation for a working understanding of solids through fundamental theoretical concepts.

Text Book:

Introduction to Solid State Physics, C. Kittel, 8th ed., Wiley (2005)

Reference Book:

Solid State Physics, N W Ashcroft and N D Mermin, 1st ed., Thomson (1976)

Solid State Physics Essential Concepts, David W. Snoke, Pearson Education, Inc, (2009)

Course Plan:

No of Lectures	Learning Objectives	Topics to be covered	Reference to text book
2	Crystal Structure	Bravais Lattices, Miller Indices	Chapter 1
3	Diffraction of waves by crystals	Bragg Law, Reciprocal Lattice, Laue Equations, Brillouin Zones	Chapter 2

2	Point Defects and Dislocations	Frenkel and Schottky defects, Burgers Vectors, Grain Boundaries	Chapter 20 & 21
2	Crystal Vibrations	Monatomic and Diatomic Crystals	Chapter4
3	Thermal Properties	Einstein and Debye Models of Heat Capacity	Chapter 5
4	Free Electron Fermi Gas	Density of States, Heat Capacity, Electrical Conductivity, Hall Effect	Chapter 6
4	Nearly free electron Model	Energy Bands, Bloch Functions, Kronig-Penney Model.	Chapter 7
4	Semiconductors Crystals	Intrinsic Carrier Concentration, Mobility, Donor and Acceptor States, p-n junctions,	Chapter 8
6	Superconductivity	Experimental Survey, Theoretical Survey, High-Temperature Superconductors	Chapter 10
2	Diamagnetism and Paramagnetism	Langevin diamagnetism equation, paramgnetism, Hund rules, Paramagnetic susceptibility	Chapter 11
2	Dielectrics and Ferroelectrics	Dielectric constant, Polarizability, Ferroelectric crystals, Antiferroelectricity, Piezoelectricity	Chapter 16
3	Surfaces and interfaces	Surface Crystallography, Films, Ultrathin films	Chapter 17 & Class Notes
3	Nanostructures	nanostructures-properties and applications	Chapter 18 & Class Notes

Evaluation Scheme:

EC No.	Component	Duration	Weightage (%)	Date & Time	Nature
1	Mid-Sem Test	90 minutes	30	17/3 2:00 -3:30 PM	Closed/Open Book
2	Tutorial Tests/Assignments		30		Closed/Open Book
4	Comprehensive Examination	3 hours	40	11/5 FN	Closed Book

Chamber Consultation Hour: To be announced in the class

Notices: All notices will be displayed on Physics Department Notice Board

Make-up Policy: Make-up will be given only in genuine cases.

Instructor-in-charge

PHY F341