Birla Institute of Technology & Science, Pilani
Hyderabad Campus

FIRST SEMESTER 2019-2020

Course Handout Part II

01-08-2019

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. : *CHEM F326*
Course Title : *Solid State Chemistry*
Instructor-in-Charge : *Dr. Sounak Roy*

Scope and Objective of the Course: This course emphasis the concepts in solid state chemistry through the comprehensive survey of different synthetic techniques, their characterization, and their properties. Focus will be given on the structure-property relationship of materials. Introduction to nanomaterials with recent advances in material science and technology is also provided.

Textbooks:

1. 'Solid State Chemistry and its Applications', Anthony R. West, Wiley-India Edition 2007.

Reference books

1. 'Nanomaterials Chemistry – Recent Developments and New Directions', Edited by C.N.R.Rao, A. Mueller, A.K.Cheetham, Wiley-Vch Edition 2007.
2. Materials Science and Engineering-an Introduction by William d.callister, jr. Seventh Edition, John Wiley (2007)
3. Material Science and Engineering by V. Raghavan, Fifth Edition, Prentice-Hall of India private Limited (2004)

Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
1	What is Solid State Chemistry?	Introduction to solid state chemistry	TB Ch 1
2-5	Understanding a wide range of materials synthetic strategy	Preparative Methods	TB Ch 2
6-8	Learning various characterization techniques like Thermal Analysis, XRD, XPS, TEM, SEM	Characterization of Inorganic Solids	TB Ch 3, 4 & 5
9-11		Crystal Structures – Descriptive Crystal Chemistry, Factors influencing the crystal structures	TB Ch 7 & 8

12-13	Crystal Defects and Non-Stoichiometry	Crystal Defects and Non-Stoichiometry	TB Ch 9
14-16	1D, 2D, 3D defects, Evaluating the importance of defects	Solid Solutions	TB Ch 10
17-18	Magnetic, electronic, electrical and optical properties of solid materials arising out of structural properties and their application	Ionic Conductivity and Solid Electrolytes	TB Ch 13
20-22		Electronic properties and band Theory: Metals, Semiconductors, Inorganic Solids, Color	TB Ch 14
23-36		Electrical Properties	TB Ch 15
27-31		Magnetic Properties	TB Ch 16
32-34		Optical Properties: Luminescence, Lasers	TB Ch 17
36-42	Synthesis, properties and new developments of nanomaterials	Nanomaterials Chemistry	RB-A Ch 1-5

Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Assignment + Presentation	-	20%	Continuous	Open book
Mid Semester Test	90 min	35%	4/10, 3.30 -- 5.00 PM	Closed book
Comprehensive Examination	180 min	45%	12/12 AN	Closed book

Chamber Consultation Hour: Will be announced in class and notified in Notice board.

Notices: Will be announced in class and notified in Notice board.

Make-up Policy: Make up would be considered only for **genuine reasons**.

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

INSTRUCTOR-IN-CHARGE