Birla Institute of Technology & Science, Pilani
Hyderabad Campus

FIRST SEMESTER 2019-2020

Course Handout Part II

Date: 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 G562*
Course Title : *Solid State Chemistry*
Instructor-in-Charge : *Dr. Sounak Roy*

Scope and Objective of the Course: This course emphasizes on the concepts of basic 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, ceramics, polymers, biopolymers and nanocomposites in hydrophobic applications, thermal and mechanical properties of nanomaterials with recent advances in material science and technology will also be covered.

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,	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

	SEM		
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	-	40%	Continuous	Open book
Mid Semester Test	90 min	25%		Closed book
Comprehensive Examination	180 min	35%		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**.

INSTRUCTOR-IN-CHARGE