Birla Institute of Technology & Science, Pilani
Hyderabad Campus

FIRST SEMESTER 2020-2021

Course Handout Part II

Date: 17-08-2020

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 : ***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)

4. **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	Understanding of	Crystal Structures – Descriptive Crystal	TB Ch 7 & 8

	crystallographic defects	Chemistry, Factors influencing the crystal structures	
12-13	1D, 2D, 3D defects and Solid solutions, Vegard's Law	Crystal Defects and Non-Stoichiometry	TB Ch 9
14-16	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
20-23		Electronic properties and band Theory: Metals, Semiconductors, Inorganic Solids, Color	TB Ch 14
24-27		Electrical Properties	TB Ch 15
28-33		Magnetic Properties	TB Ch 16
34-37		Optical Properties: Luminescence, Lasers	TB Ch 17
38-42	Synthesis, properties and new developments of nanomaterials	Nanomaterials Chemistry	RB-A Ch 1-5

5. Evaluation Scheme:

Component	Duration (minutes)	Weightage (%)	Date & Time	Nature of Component
Test 1	30	15	September 10 –September 20 (During scheduled class hour)	Open book
Test 2	30	15	October 09 –October 20 (During scheduled class hour)	Open book
Test 3	30	15	November 10 – November 20 (During scheduled class hour)	Open book
Assignment + Presentation	-	20	-	Open book
Comprehensive Examination	120	35	TBA	Open book

6. Chamber Consultation Hour: Will be announced in class.
7. Notices: Will be updated in CMS
8. Make-up Policy: Make up would be considered only for **genuine reasons**.
9. 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