

Semester	AUG 2022
Open to semester	7,13,21
Course code	<b>CH4173/CH6324</b>
Course title	<b>Solid State Chemistry</b>
Credits	3 /4
Course Coordinator & participating faculty (if any)	Partha Hazra
Nature of Course	Lectures
Pre-requisites	Basic Physical Chemistry covered during 1st and 2nd semester
Objectives (goals, type of students for whom useful, outcome etc)	This course is designed to provide the fundamental knowledge of the crystal structure, properties, characterization, and synthesis of solids. The course will lay the foundation for understanding the relationship between the internal structure of matter and the properties of materials that make them attractive for applications. Apart from the familiarity with the structure – property correlations, students would be exposed to some of the most recent developments across the spectrum of solid state and materials
Course contents (details of topics /sections with no. of lectures for each)	<p>1. Foundation of Crystal (8h)  Fundamentals of lattice, unit cell, atomic coordinate, Bravais Lattices, crystal's direction and planes, types of closed packed structures, symmetry operations and symmetry elements, point group, space group and crystal structures, factors which influences crystal structures.</p> <p>2. Crystal Diffraction by X-rays, neutrons and electrons (8h)  Introduction to electron diffraction. Structure determination by X-ray diffraction, Bragg's law, modern X-ray powder diffraction techniques and their applications. Concept of Reciprocal lattice, Ewald Sphere. Single crystal X-ray diffraction technique, and their application towards the structure determination, phase problem in crystallography.</p> <p>3. Electronic Properties and Band theory of solids (8h)  Introduction - metals, insulators and semiconductors, electronic structure, k space and Brillouin zones, band structure of metals, insulators and semiconductors. Concept</p>

	of hole and electron. Concept of effective mass and band
Evaluation /assessment	End-Sem Examination-45% Mid-Sem Examination-45% Others-10%
Suggested readings (with full list of authors, publisher, year, edn etc.)	Text Book (s) 1. Basic Solid State Chemistry by A. R. West, second edition, John Wiley & Sons, Ltd, 1999. 2. Solid State Chemistry and its applications by A. R. West, John Wiley & Sons, Ltd, 2007. 4. Introduction to Solid State Physics by Charles Kittel; John Wiley and Sons, 8th