Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NCYD524	Solid State Materials: Chemistry & Engineering	3	0	0	3

Course Objective
• With this course students will learn the concepts involved in the syntheses, structure and physical properties of crystalline solids along with their characterizations and applications.
Learning Outcomes
• Identify and apply suitable strategies for synthesizing crystalline solids in polycrystalline and single crystal forms. • Correlate and Predict structure composition-properties (magnetic, electrical and optical) in crystalline solids. • Characterize solids with X-Ray, microscopic and thermal techniques.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Crystal Structures and Crystal Chemistry, Bonding in Solids, Defect Chemistry and its applications in various fields. Electrical, Magnetic and Optical Properties of solids, Structure Property Relationship, Superconductors.	14L	This unit will be helpful in learning the basic structure of different materials and their useful properties. This module will present a complete idea of structure-property relationship.
2	Synthesis, Processing and Fabrication Methods of solids, Nucleation and Growth in Solution, Solid State Reaction, ChimieDouce Methods, Gas-Phase Methods, Crystal Growth, Recent advances in solid state materials.	14L	The students will learn regarding the synthesis methods of different types of materials and also the process of solidification.
3	Characterization of Solids: Crystallography and Diffraction Techniques, Optical and Electron Microscopy Techniques, Spectroscopic Techniques, Thermal Techniques	14L	In this unit, students will learn the fundamentals of the crystal system as well as the crystal structures of solids by using different diffraction techniques.
TOTAL		**42**	

Text Books:

1. Solid State Chemistry and its Applications, Second Edition, Anthony R. West, 2014, Wiley.

Reference Books:

1. Metallic Nanostructures: From Controlled Synthesis to Applications, YujieXiong, Xianmao Lu, 2015, Springer.
2. Materials Science and Engineering: An Introduction, William D. Callister, Jr. David G. Rethwisch, 2013, Wiley.