

1.	Title of the Course	Electrochemistry and Chemistry of Solids
2.	Course Number	CY6101
3.	Status of the Course	Core
4.	Structure of Credits	3-0-0-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Chemistry
8.	To take effect from	July 2020
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	<b>Course Objective:</b> To provide a thorough background in electrochemistry and solid-state chemistry that imparts knowledge on advanced materials for energy applications. Several applications in solutions, surfaces and in solids will also be covered in detail.	
12.	<b>Course Content:</b> Electrode potentials; Electrochemical cells and thermodynamics; Kinetics of electrode processes; Mass transport; Double layers: zeta and overpotential, Faradaic and Non-Faradaic processes; Laplace transforms and microelectrodes; Homogeneous and heterogeneous reactions; Conductivity and Conductance; Different potential scan techniques including cyclic voltammetry; Spectrochemical and photo-electrochemical methods; Industrial electrochemistry: electrodes as sensors; Concept of Solids: unit cell, lattice and basis, Bravais lattices; Symmetry: Schonies and Hermann-Mauguin notations, point and space groups; Defects and voids; Lattice planes, Miller indices, X-ray diffraction: Bragg's law; Introduction to single-crystal and powder X-ray, electron-density maps, electron microscopy; Crystal structures of elements and compounds; Band structure: electrical conductivity, optical properties.	
13.	<b>Text book(s):</b> 1. Bard A J and Faulkner L R, <i>Electrochemical Methods: Fundamentals and Applications</i> , Willey (2001). 2. West A R, <i>Solid State Chemistry and its Applications</i> , Willey (2014).	
14.	<b>Reference(s):</b> 1. Ashcroft N W and Mermin N D, <i>Solid State Physics</i> , Harcourt (1976). 2. Bockris J, Reddy A K N and Gamboa-Aldeco M E, <i>Modern Electrochemistry</i> , Springer US (2000). 3. Kittel C, <i>Introduction to Solid State Physics</i> , John Willey and Sons (2012). 4. Skoog D A, Crouch S R and Holler F J, <i>Principles of Instrumental Analysis</i> , Thomson Brooks/Cole (2006).	