

Branch Name:	B.Sc. Chemistry
Program Code:	SC103
Course Name:	PHYSICAL CHEMISTRY- I
Course Code:	2SC1030503
Pre-requisite Course:	Basic fundamental of Physical chemistry

Course Objectives:

1. To meet the growing demand of Specialization and Advanced Courses in applied science.
2. To make student understand about different terms use in physical chemistry.
3. To develop an actual understanding of the X-rays diffraction.
4. To learn about the history, classification and functionality of polymeric materials.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	--	-	3	70	30	-	-	100

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	<u>Electro Motive Force</u> Chemical Cell • Without Transference • with Transference • Verification concentration Cell and Its EMF equation Electrolyte concentration cell • Concentration cell without Transference Cell • Concentration with transference cell • amalgam Concentration • Gas Concentration Cell Liquid-Liquid junction Potential Application of EMF measurements Determination • Degree of hydrolysis of Salt, • Solubility of sparingly soluble salt • Stability constant of complex • Dissociation constant of weak acid Numericals	15	33
2	<u>X-Ray Diffraction</u> • Crystal shapes and point groups • Lattice and Unit cells, Miller Indices • X-ray diffraction • Diffraction by crystal • Single Crystal Diffraction • Powder Crystal Method • X-ray diffraction and Unit cells	18	33

	• Dimensions and the contents of the unit cell • Ionic radii • Covalent radii • Van der Waals radii • Lattice energies in ionic crystals		
3	Numericals Macromolecules Classification of polymers Stereo regular polymer Polymerization reaction • Addition polymerization, (Polyethylene, Polystyrene, PVC) • Condensation Polymerization (Nylon-66, Dacron) Mechanism of polymerization • Free radical chain polymerization • Anionic polymerization • Cationic polymerization • Kinetics of free radical chain polymerization Degree of Polymerization Molar mass of polymer • Number Average Molar Mass • Weight average Molar Mass Determination of molar mass of Macro molecules • Viscosity Method • Light Scattering method Numerical	15	33

Text Books:

1. Physical Chemistry” by P. Atkins and J. de Paula

2. Physical Chemistry” by I. N. Levine

Reference Books:

1. Physical Chemistry: G. M. Barrow, 5th Edition, McGraw-Hill education, India.
2. Advanced Physical Chemistry: Gurdeep Raj, 35th Edition (2009), Goel / Krshina Publishing House.
3. Principles of Physical Chemistry: Puri, Sharma and Pathania, 42nd Edition, Vishal Publishing Company
4. Polymer Science: Gowariker, Viswanathan and Sreedhar, 1st Edition (2012 reprint) New Age International
5. Essentials of Nuclear Chemistry: Arnikar, 4th Edition (2012 reprint), New Age International.
6. Physical Chemistry: Atkins, 9th Edition. Oxford University Press.
7. Advanced Physical chemistry: Gurtu and Gurtu, 11th Edition ,PragatiPrakashan.
8. Physical chemistry: Levine, 6th Edition, McGraw-Hill education, India
9. Physical Chemistry by G.M.Barrow.
10. Solid state chemistry and its application by Anthony R.West

List of Open Source Software/learning website:

- 1) <https://www.slideshare.net/rajenderkarnekanti/emf-of-the-cell>
- 2) <https://www.slideshare.net/afrinajasy/application-of-emf-measurement>
- 3) <https://www.slideshare.net/gopinathkarnam/x-ray-diffraction>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Define the polymer and E.M.F of the cell, Explain the shape of crystal.	1 Remember
CLO2	Classification of macromolecule and concentration cells.	2 Understanding
CLO3	Uses of cell in find out the E.M.F and Discover the point group of crystal.	3 Applying
CLO4	Categories the Diffraction by crystal through different methods. Categories the different polymer according to their types.	4 Analyzing
CLO5	Calculate the value of monomer in polymer and lattice energy in crystal	5 Evaluate
CLO6	Modify the macromolecule by the synthesis of polymerization.	6 Create

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Programme Outcomes (POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CLO1	H	L							
CLO2			M		L				
CLO3					M				L
CLO4				M		L			
CLO5				H				L	
CLO6							H		

H: High, M: Medium, L: Low