

Lecture Plan		
Name of the college: Government College of Arts, Science and Commerce, Sanquelim- Goa		
Name of Faculty: Ankita M. Vernekar	Subject: Chemistry	
Paper code: CHC-302	Program: T Y BSc	Division: A
Academic year: 2025 - 2026	Semester: V	Total Lectures: 30
Course Objectives: : To develop a strong foundation in electrochemistry and quantum mechanics by understanding fundamental concepts, applyi mathematical models, and performing related problem-solving and experimental analysis.		
Expected Course Outcome:		
1. Explain and apply concepts of conductivity, ionic mobility, transference number, and EMF in electrochemical systems. 2. Analyze and solve numerical problems related to conductometric titrations, solubility product, and concentration cells. 3. Interpret quantum mechanical principles including de Broglie hypothesis, uncertainty principle, and Schrödinger equation. 4. Apply quantum mechanical models to simple systems such as free particles and particles in a box to determine energy quantisation.		
Student Learning Outcome:		
1. Explain and apply concepts of conductivity, ionic mobility, transference number, and EMF in electrochemical systems. 2. Analyze and solve numerical problems related to conductometric titrations, solubility product, and concentration cells. 3. Interpret quantum mechanical principles including de Broglie hypothesis, uncertainty principle, and Schrödinger equation. 4. Apply quantum mechanical models to simple systems such as free particles and particles in a box to determine energy quantisation.		

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
June	20/06/2025	28/06/2025	1	Phases, components and degrees of freedom of a system, criteria of phase equilibrium.	Define and identify phases, component and Degree of freedom	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
July	30/06/2025	05/07/2025	2	Phase diagrams of one-component systems (water, sulphur and CO ₂)	Study phase diagram	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
July	07/07/2025	12/07/2025	2	two component systems involving eutectics, congruent and incongruent melting points (Zn-Mg, Ag-Pb, NaCl- H ₂ O).	Study phase diagram	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
July	14/07/2025	19/07/2025	2	two component systems involving eutectics, congruent and incongruent melting points (Zn-Mg, Ag-Pb, NaCl- H ₂ O).	Study phase diagram	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
July	21/07/2025	26/07/2025	2	Introduction to Raoult's law. Colligative properties- Lowering of vapour pressure,	Understand the different colligative properties.	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan

July/ August	28/07/2025	02/08/2025	2	depression in freezing point, elevation in boiling point. Osmosis and osmotic pressure.		Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
August	04/08/2025	09/08/2025	2	Experimental methods and determination of molecular weight.	Explain method to determine molecular weight through colligative property	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
August	11/08/2025	16/08/2025	2	Nernst Distribution Law – Statement. Distribution constant, factors affecting distribution constant, validity of distribution law, modification of distribution law when molecules undergo a) association b) dissociation.	Explain and solve problems on Nernst distribution law	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
August	18/08/2025	23/08/2025	2	Application of distribution law - solvent extraction, determination of association, dissociation in one solvent or both the solvent. (Numericals are expected)	Give application of Nernst distribution law	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
August	25/08/2025	30/08/2025	CHATURTHI BREAK				
September	01/09/2025	06/09/2025	2	Forms of solids, symmetry elements, unit cells, crystal systems, Bravais lattice.	Understand crystal systems	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition.

September	08/09/2025	13/09/2025		Laws of crystallography - Law of constancy of interfacial angles, Law of rational indices.	State laws of crystallography	Power point presentation/ Smart board	2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
September	15/09/2025	20/09/2025	2	Miller indices, X-Ray diffraction by crystals, Bragg's law.	Find miller indices	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition.
September	22/09/2025	27/09/2025	2	Determination of lattice parameters using powder method. Structures of NaCl, KCl and CsCl (qualitative treatment only).	Explain structure of KCl and NaCl	Power point presentation/ Smart board	2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
September/ October	29/09/2025	04/10/2025	2	The Origin of the periodic table, Mendeleev's Periodic table, Modern/Long form of Periodic table and Periodic classification of elements into s, p, d, and f-block	Explain the different periodic table	Power point presentation/ Smart board	Puri, Sharma and Kalia, Principles of Inorganic Chemistry, 33 rd Edition, Vishal Publishing Co. (2018).
October	06/10/2025	11/10/2025	2	Periodicity, and magic numbers. Valence Electronic configurations. Periodic properties of the elements and their trends: Atomic radii, van der Waal's radii, Ionic radii and Covalent radii, shielding or screening effect, Effective nuclear charge, Slater rules.	Explain periodic trend	Power point presentation/ Smart board	Puri, Sharma and Kalia, Principles of Inorganic Chemistry, 33 rd Edition, Vishal Publishing Co. (2018).

October	13/10/2025	18/10/2025	2	Ionization Energy, Successive ionization energies and factors affecting ionization energy. Electron Affinity. Electronegativity: Pauling's and Allred-Rochow's scale.	Solve numericals on electronegativity and ionisation energy	Power point presentation/ Smart board	Puri, Sharma and Kalia, Principles of Inorganic Chemistry, 33 rd Edition, Vishal Publishing Co. (2018).
October	21/10/2024	21/10/2024	2	Calculation of electronegativity (Pauling's Method), Factors affecting electronegativity, applications of electronegativity	Explain factors affecting electronegativity	Power point presentation/ Smart board	Puri, Sharma and Kalia, Principles of Inorganic Chemistry, 33 rd Edition, Vishal Publishing Co. (2018).

Assessment Rubrics

Component	Max Marks
ISA 1	7.5
ISA 2	7.5
Practical	-
Project	-
Semester End Exam	45