Semester Lecture Plan

Name of the college: Government College of Arts, Science and Commerce, Sanquelim – Goa**.**

Name of Faculty: Ms. Rosalina Desilva	**Subject:** Chemistry	
Paper code: CHC-109 Section B	**Program/Course:** TY B.Sc.	**Division:** A
Academic year: 2024 - 2025	**Semester:** VI	**Total Lectures:** 30

Course Objectives: To teach the students important features of transition metal complexes,stability of complexes and factors affecting the stability, reaction mechanisms and kinetics. To understand the properties and reactions of some non-aqueous solvents. Also study the symmetry elements and operations in various molecules

Course Learning Outcome: The student will be able to explain mechanisms in metal complexes w.r.t. the factors affecting the stability of complexes. The students can relate the properties of various non-aqueous solvents with the universal solvent, water and also explain the reactions that are feasible in various solvents. The students will explain the symmetry in nature with their information of symmetry in molecules and also the uses of symmetry.

Month	Lectures From:	To:	No. of lectures allotted	Topic, Subtopic to be covered	Learning outcome	ICT Tools	Reference books
December	09/12/24	14/12/24	01	Topic 1: Reaction kinetics and mechanism: Recapitulation-transition metal complexes. Introduction-Stability of complexes: thermodynamic and kinetic stability	The student will be able to define stability of complexes and differentiate between thermodynamic and kinetic stability	Smart-board	**1.** F. Albert Cottton, Geoffrey Wilkinson and Paul L. Gaus, *Basic inorganic chem.* 3rd Edn. Wiley India **2.** .James E. Huheey, Ellen A. Keiter, Richard L.Keiter and Okhil K. Medhi, *Inorganic Chemistry, Principles of Structure*

							and Reactivity. 4th Edn. Pearsons **3.** K. V. S. Laxmi Devi, N. C. Patel, S.S. Dhume, A. Venkatachalam, S. P. Turakhia, Chhaya Dixit and R. A. Mirji, College Inorganic Chemistry for T.Y. B. Sc. 21st Edn, Himalaya Publishing House.
December	16/12/24	21/12/24	02	Relation between Thermodynamic and kinetic stability Factors affecting stability of complexes w.r.t. metal	Students will be able to relate the stability of complexes with the nature of a given metal.	Smart board	
January	02/01/24	04/01/24	01	Factors affecting stability of complexes w.r.t. ligand Lability and inertness- Taube's classification	Students will be able to: relate stability of complexes with the nature of ligands, and explain lability of a complex based on the electronic configuration	Smart board	

January	06/01/25	11/01/25	02	Kinetics of octahedral complexes , Mechanism of ligand substitution in Octahedral complexes: Dissociative and Displacement mechanisms	The student will be able to explain two possible mechanisms in ligand substitution reactions of octahedral reactions	Smart board	
January	13/01/25	18/01/25	02	Acid Hydrolysis in octahedral complexes	The student will be able to explain the mechanisms involved in substitution of a ligand with water	Smart Board	
January	20/01/25	25/01/25	02	Base Hydrolysis and Annation Reactions Trans-effect w.r.t. square planar platinum complexex	The student will be able to differentiate between acid and base hydrolysis and annation reactions The student will be able to relate to trans-effect and synthesis of trans platinum complexes		
January - February	27/01/25	01/02/25	02	Topic No 2:	General relation between	Smart Board	.Concise Inorganic Chemistry by: J.D.Lee

				Acids, Bases and non-aqueous solvents: Introduction **ASSIGNMENT**	substances-acids, bases and solvent		2.Inorganic Chemistry by Langford and Shriver.
February	03/02/25	08/02/25	02	Bronsted theory, Lux-Flood solvent systems. Lewis concept of Acids and bases	Define acids on the basis of various theories	Smart board	
February	10/02/25	15/02/25	02	Classification of solvents physical properties of solvents. General characteristics and levelling effect	Classify solvents based on specific features. Explain various properties of solvents.	Smart board	
February	17/02/25	22/02/25	02	Reactions in non-aqueous solvent w.r.t. liquid ammonia	Explain acid-base redox/ammonolysis/complexometric/precipitation reactions	Smart board	
February March	24/02/25	01/03/25	02	Reactions in non-aqueous solvent w.r.t. liquid sulphur dioxide	Explain acid-base redox/ammonolysis/complexometric/precipitation reactions	Smart board	
March	03/03/25	08/03/25	02	Reactions in non aqueous solvent w.r.t. liquid HF	Explain acid-baseredox/ammonolysis/complexometric/precipitation reactions	Smart board	

March	10/03/25	15/03/25 **15/03/25**	01 **ISA**	Topic No. 3: Symmetry and Term Symbols: Introduction, symmetry elements and Operations **WRITTEN TEST**	The student will be able to explain the phenomenon of symmetry in nature Define terms w,r,t, symmetry	Smart board	1.Chemical Applications of Group Theory byF. A. Cotton ,Wiley India 2.Group Theory and its chemical applications by: P. K. Bhattacharya, Himalaya publication.
March	17/03/25	22/03/25	02	Determination of Point groups and its applications	Explain the concept of point groups	Smart board	
March	24/03/25	29/03/25	02	Determination of Point groups and its applications	Point groups and molecules	Smart board	
March April	31/03/25	05/04/25	02	Application to various molecules.	Point groups and molecules	Smart board	
April	07/04/25	11/04/25	01	Application to various molecules.			

Even Semester (VI) Teaching Plan

Name of the college: Government College of Arts, Science and Commerce, Sanquelim – Goa**.**

Name of Faculty: Ms. Rosalina Desilva	**Subject:** Chemistry	
Paper code: CHC-109	**Program/Course:** TY B.Sc. Practicals	**Division:** A
Academic year: 2024 - 2025	**Semester:** VI	**Total Lectures:** 40

Course Objectives: To teach the students to prepare metal complexes in the laboratory and also analyse the same quantitatively by using volumetry. To familiarize the students with volumetric methods of analysis by analysing various metal salts, complexes, water samples and alloys.

Course Learning Outcome: The student will be able prepare various metal complexes and determine the purity of the same w.r.t. percent yield. They will be able to analyse various samples in different forms by quantitative methods of analysis like volumetric analysis.

Month	Lectures From: To:	No. of lectures allotted	Topic, Subtopic to be covered	Learning outcome	ICT Tools	Reference books
December Week 1	09/12/24 to 13/12/24	4+4	Preparation of Complexes: 1.Tetrammine copper sulphate 2.Trisethylene diamine nickel chloride	The student will be able to 1. Weigh accurately compounds for preparations 2. Prepare metal complexes and 3. Calculate percentage yield of product	Chalk and Board	1. Vogel's Textbook of Quatitative Chemical Analysis by: G.H.Jeffrey, J. Basset, J. Mendham, R.C. Denney-5th Edition 2. Experiments in applied Chemistry by S. Ratan 3. Practical Chemistry by O.P.Pandey, D.N. Bajpai and S. Giri
December Week 2	16/12/24 to 21/12/24	4	Volumetry Estimation of Cobalt	The student will be able to 1.Prepare standard solutions 2.Carry out titrations 3.Write reactions and name the reactions 4.Interpret data and calculate volumes in terms of gm/L	Chalk and Board	

December Week 3	06/01/25 to 11/01/25	4+4	Volumetry Estimation of copper from the complex by iodometry and nickel from the complex by EDTA	The student will be able to 1.Prepare standard solutions 2.Carry out titrations 3.Write reactions and name the reactions 4.Interpret data and calculate volumes in terms of gm/L	Chalk and Board	
January Week 4	13/01/25 to 18/01/25	4+4	Volumetry Estimation of iron	The student will be able to 1.Prepare standard solutions 2.Carry out titrations 3.Write reactions and name the reactions 4.Interpret data and calculate volumes in terms of gm/L	Chalk and Board	
January Week 5	20/01/25 to 25/01/25	4+4	Volumetry Estimation of iron mixture	The student will be able to 1.Prepare standard solutions 2.Carry out titrations 3.Write reactions and name the reactions 4.Interpret data and calculate volumes in terms of gm/L	Chalk and Board	
January Week 6	27/01/25 **to** 01/02/25	4+4	Volumetry Estimation of silver nitrate	The student will be able to 1.Prepare standard solutions 2.Carry out titrations 3.Write reactions and name the reactions 4.Interpret data and calculate volumes in terms of gm/L	Chalk and Board	
February Week 7	03/02/25 to 08/02/25	4+4	Volumetry Estimation of Aluminium	The student will be able to 1.Prepare standard solutions 2.Carry out titrations 3.Write reactions and name the reactions 4.Interpret data and calculate volumes in terms of gm/L	Chalk and Board	
February	10/02/25 15/02/25	4+4	Volumetry Estimation of nitrite	The student will be able to 1.Prepare standard solutions 2.Carry out titrations	Chalk and Board	

Week 8				3.Write reactions and name the reactions 4.Interpret data and calculate volumes in terms of gm/L		
February Week 9	17/02/25 to 22/02/25	4+4	Volumetry Estimation of alkalinity	The student will be able to 1.Prepare standard solutions 2.Carry out titrations 3.Write reactions and name the reactions 4.Interpret data and calculate volumes in terms of gm/L	Chalk and Board	
February Week 10	24/02/25 to 01/03/25	4+4	Volumetry Estimation of Manganese	The student will be able to 1.Prepare standard solutions 2.Carry out titrations 3.Write reactions and name the reactions 4.Interpret data and calculate volumes in terms of gm/L	Chalk and Board	
March Week 11	03/03/25 To 08/03/25	4+4	Volumetry Estimation of Cobalt / Repetition	The student will be able to 1.Prepare standard solutions 2.Carry out titrations 3.Write reactions and name the reactions 4.Interpret data and calculate volumes in terms of gm/L	Chalk and Board	
March Week 12	10/03/25 To 15/03/25	4+4	Repetition			
March Week 13	17/03/25 To 22/03/25	4+4	Repetition			
March Week 14	24/03/25 To 29/03/25	4+4	Repetition			