Lecture Plan

Name of the college: Government College of Arts, Science and Commerce, Sanquelim- Goa

Name of Faculty: Dr. Sagar Narayan Patil	**Subject:** Chemistry	
Paper code: CHC-100 ;Fundamentals of Chemistry	**Program: FYBSc**	**Division: -**
Academic year:June 2024- 2025	**Semester: I**	**Total Lectures: 30**

Course Objectives:

● To study the postulates of kinetic theory of gases and understand the deviations of real gases from ideal behaviour. ● To study the surface tension and viscosity of liquids. ● To introduce the concepts of atomic structure. ● To understand the basic concepts in organic chemistry. ● To understand the preparation and reactivity of alkanes, alkenes and alkynes.

Student Learning Outcome:

1. Identify the properties of liquid and gases. 2. Explain the applications of liquid and gases. 3. Elucidate the atomic structure based on Quantum theory. 4. Identify the use of curved arrow notations in organic reaction mechanisms. 5. Understand various methods of preparation and reactions of alkanes, alkenes and alkynes.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
June	25/06/2023	27/06/24	2	Introduction Fundamentals of Organic Chemistry Basic Organic Chemistry, Physical chemistry	Structures and problems, theories	PPT/ Smart Board	1. A. Bahl and G. D Tuli Essentials of physical chemistry ,S. Chand Publications 2020 2. 2. Puri, Sharma, Pathania Principles of

							Physical Chemistry ,Vishal publishing Co. 2021 3. 3. G. W. Castellan Physical Chemistry 4th Edition Addison-Wesley Publishing Co.2004 15. Finar, I. L. Organic Chemistry (Vol. I & II), E.L.B.S., 5th Edition. 2001. 16. Morrison, R.T. & Boyd, R.N. Organic Chemistry, Pearson, 2010.
July	01/07/2024	31/07/2024	9	Gaseous state Postulates of Kinetic Theory of gases and deviation from ideal behaviour, Vander Waal's equation of state. Critical phenomenon; PV isotherms of real gases, continuity of states, the isotherms of Vander Waal's equation relation between critical constants and Vander Waal's constants. Law of corresponding states, reduced equation of state. Molecular velocities: root mean square, average and most probable velocities, Qualitative discussion of Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter. Numerical problems. .	**ISA-I preparation** Assignment	Smart Board	Listed as above
August	01/08/2024	31/08/2024	9	Fundamentals of Organic Chemistry Basic Organic Chemistry Curved arrow	**ISA-II preparation**	Smart Board	Listed as above

				notation, drawing electron movement with arrows, half and double headed arrows, in organic reaction mechanisms. Physical Effects, Electronic Displacements: Inductive Effect, Mesomeric effect, Resonance and Hyperconjugation. Cleavage of Bonds: Homolysis and Heterolysis. Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles. Reactive Intermediates: Carbocations, Carbanions and free radicals. Strength of organic acids and bases: Comparative study with emphasis on factors affecting pKa values. Aromaticity: Benzenoids and Hückel's rule	Assignment		
Septembe r	02/9/2024	30/09/2024	8	Liquid State Surface Tension, Units of Surface Tension, Determination of Surface Tension by Capillary Rise Method and stalagmometer method. Viscosity, Units of Viscosity, Poiseuille equation, Measurement of Viscosity by Ostwald Method, Effect of Temperature on Viscosity of a Liquid. Numerical problems.			Listed as above
October	01/10/2024	22/10/2024	6	Aliphatic Hydrocarbons: Functional group approach for the following reactions (Preparations & reactions) to be studied in context to their structure Alkanes: Preparation: Wurtz reaction, Kolbe's synthesis, Reactions: Free	revisions problems therein	Smart Board	2. G. Chatwal and S. Anand, Instrumental Methods of Chemical Analysis 5th edition (reprint 2003), Himalaya publication.

				radical Substitution: Halogenation. Alkenes: Preparation: Elimination reactions: Dehydration of alcohols and dehydrohalogenation of alkyl halides Reactions: Addition of HX (Markownikoff's and anti-Markownikoff's addition) Alkynes: Preparation: Acetylene from CaC2 and conversion into higher alkynes; by dehalogenation of tetra halides and dehydrohalogenation of vicinal-dihalides. Reactions: formation of metal acetylides, addition of HX and bromine.			3. Vogels Textbook of Quantitative Inorganic Analysis 4th edition ELBS.

Practical Plan

Name of the college: Government college of Arts Science and commerce Sanquelim Goa.

Name of Faculty: Dr. Sagar Narayan Patil	**Subject:** Chemistry	
Paper code: CHC-100; Fundamentals of Chemistry	**Program: F.Y.B.Sc**	**Division: -**
Academic year: June 2024- 2025	**Semester: I**	**Total Practical's/Labs: 15**

Credits: 01

Course Objectives:-• To understand and develop the problem-solving skills and hands on experience with reference to concepts studied in theory (ion exchange chromatography, colorimetry, statistical data).

Student Learning Outcome:

Students will be able to • Understand the concepts based on ion exchange chromatography, colorimetry and to estimate acidic and basic radicals quantitatively. • Develop skills to prepare different plates of thin la chromatography. • Solve numericals based on statistical data obtained from experimental results.

Month	Practicals/Labs Scheduled Date	No. of Practical's/Labs planned	List of Experiments	Reference books
July	01/07/2024-29/07/2024	4	10. Determination of solubility and chemical nature of both solids and liquids. Water insoluble (Acid//phenol/ Base/Neutral) and water soluble (Acid/Neutral) of given compound. (8 compounds to be analysed)	R.K. Bansal, Laboratory Manual in Org Chemistry, New Age International, 5thE 2016.
August	02/08/2024-30/08/2024	5	1. Determination of surface tension of two unknown liquids or dilute solutions by stalagmometer method. 2. Determination of viscosity of two unknown liquids or dilute solutions by using Ostwald's viscometer. 3. Study of the variation of viscosity of an aqueous solution with concentration of solute.	A.I. Vogel, A.R. Tatchell, B. S. Furniss, Hannaford, Vogel's Textbook of Practic Chemistry, 5th Ed., Prentice Hall; 2011.
September	06/09/2024-27/09/2024	4	4. Pre-Lab session (Laboratory safety, concept of normality and molarity and stoichiometric calculations) 5. Calibration of Burette and Pipettes. 6. To prepare 100 mL of standard 0.1 M K2Cr2O7 solution and carry out dilution to 0.05, 0.01, 0.005, and 0.001 M in 100 mL standard flasks 7. Volumetry: To prepare 100 ml of 0.1 N KHP solution and standardize the given approximate 0.1 N NaOH solution.	A.I. Vogel, A.R. Tatchell, B. S. Furniss, Hannaford, Vogel's Textbook of Practic Chemistry, 5th Ed., Prentice Hall; 2011.

October	04/10/2024-18/10/2024	3	. Gravimetric analysis: Determination of percentage composition of the given mixture ZnO + ZnCO3 9. Purification of organic compounds: i) Recrystallization of Benzoic acid by using water as solvent and determination of melting point. Revision/repetition/ Journal certification	As above