

Lecture Plan

Name of the college: Government College of Arts, Science & Commerce, Sanquelim, Goa		
Name of Faculty: Dr. Dipesh Sakharam Harmalkar	Subject: Basic Concepts in Chemistry (Minor)	
Paper code: CHC-111	Program/Course: F.Y.BSc.	Division:
Academic year: 2024 - 2025	Semester: II	Total Lectures: 30
Credits: 4		
Course Objectives: <ul style="list-style-type: none">• To define the terms and state laws involved in thermodynamics and chemical equilibrium.• To solve numerical based on chemical energetics and chemical equilibrium.• To understand the development of periodic table and periodic trends.• To explain the theories of acids and bases.• To understand IUPAC nomenclature of organic compounds.• To understand the types of organic reactions, reactive intermediates and importance of selected organic compounds.		
Expected Course Outcome: <p>At the end of the course students will be able to:</p> <p>CO1. Define basic terms in organic chemistry, thermodynamic terms, Identify different solution concentration measures and key laws. Recall the classification of elements in the periodic table and outline acid-base theories.</p> <p>CO2. Explain the thermodynamic terms and describe Raoult’s law, Henry’s law, and deviations in solution behavior, classification of organic compound, IUPAC nomenclature rules, and concepts of aromaticity. Summarize the development and structure of the periodic table, and describe acid-base theories.</p> <p>CO3. Apply thermodynamic equations, and use concentration and solubility laws to solve numerical problems. Le Chatelier’s principle and use IUPAC rules to name organic compounds.</p> <p>CO4. Analyze the relationships between various thermodynamic parameters and evaluate the factors affecting equilibrium. Compare and evaluate the periodic trends and the various acid-base theories. Examine organic reaction mechanisms.</p>		
Learning Outcome: <ul style="list-style-type: none">• At the end of the course students will be able to:		

- Define essential concepts in organic chemistry and thermodynamics, identify solution concentration measures and key laws, and describe acid-base theories and the periodic table classification.
- Explain thermodynamic principles such as Raoult's and Henry's laws and solution behavior deviations. Analyze organic compound classifications, IUPAC naming rules, periodic trends, and acid-base theories.
- Apply thermodynamic equations and solution concentration principles to solve numerical problems. Utilize IUPAC rules for naming organic compounds and predict outcomes using Le Chatelier's principle.
- Evaluate the relationships among thermodynamic parameters, factors influencing equilibrium, and acid-base behavior. Compare periodic trends and assess organic reaction mechanisms critically.

Month	Lectures From	Lectures To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/Assignment	ICT Tools	Reference books
December	09-12-2024	31-12-2024	02	Carbon, IUPAC nomenclature of organic compounds, and aromaticity: Valency of carbon-structure of methane, sp ³ hybridisation; Selected functional group of organic compounds with IUPAC nomenclature (alkanes, alkenes, alkynes, alcohols, ethers, Carboxylic acids)		Smart board, Power point presentation, Google classroom.	[1-3]
January	01-01-2025	21-01-2025	06	Carbon, IUPAC nomenclature of organic compounds, and aromaticity: Selected functional group of organic compounds with IUPAC nomenclature (thiol, amine, amides, halides, nitriles, nitro compounds aldehydes and ketones). nomenclature of benzenoids (halo, nitro, alkyl), naphthalene and anthracene compounds. Concept of aromaticity, Huckel's Rule.		Smart board, Power point presentation, Google classroom, Google quiz	[1-3]
	22-01-2025	31-01-2025	03	Solutions: (Ways of expressing concentration: Molarity, Normality, Molality Mole fraction, parts per million) Solutions of gases in Liquids: Factors influencing the solubility of gases. Henry's law. Numerical problems	ISA I: Assignment	Smart board, Power point presentation, Google classroom	[4-5]
February	01-02-2025	28-02-2025	08	Types of organic reactions and structure, properties and uses of selected organic compounds: Types of organic reactions with two examples of each: addition, elimination, oxidation, reduction and rearrangement reaction. Structure and stability of intermediates carbocation, carbanion, free radical. Structure, properties and uses of the following selected organic compounds. Ethanol, acetone, ethyl acetate,	ISA II: Written test	Smart board, Power point presentation, Google classroom, Google quiz	[1-3]

				formaldehyde, acetylene, benzoic acid, n-butane, chloroform, diethyl ether, cresol, benzaldehyde, aniline, urea, glucose, lauric acid. Preparation of ethanol, benzoic acid, acetone,			
March	01-03-2025	07-03-2025	02	Types of organic reactions and structure, properties and uses of selected organic compounds: Preparation of acetylene, ethyl acetate, diethyl ether.		Smart board, Power point presentation, Google classroom	[1-3]
	08-03-2025	31-03-2025	05	Chemical Equilibrium Free energy change in a chemical reaction. Thermodynamic derivation of the law of chemical equilibrium. Definition of ΔG and ΔG° , Le Chatelier's principle. Relationships between K_p , K_c and K_x for reactions involving ideal gases.	ISA III: Quiz	Smart board, Power point presentation, Google classroom	[4-5]
April	01-04-2025	11-04-2025	04	Chemical Equilibrium: Relationships between K_p , K_c and K_x for reactions involving ideal gases.; Revision		Smart board, Power point presentation, Google classroom	[4-5]

References:

- [1] Morrison, R.T. & Boyd, R.N. Organic Chemistry, Pearson, 2010.
- [2] Bahl, A. & Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010.
- [3] Singh, J. & Yadav, L. Undergraduate Organic Chemistry, Vol 1, 6th edition, 2004.
- [4] A. Bahl, B.S Bahl and G.D. Tuli, Essentials of Physical Chemistry, S. Chand Publication. 2009.
- [5] Puri, Sharma and Pathania, Principles of Physical Chemistry. 47th edition. 2020.

* Assessment Rubrics	
Component	Max Marks

ISA	20
Semester End Exam	80