

Lecture Plan

Name of the college: Government College of Arts, Science & Commerce, Sankhali, Goa		
Name of Faculty: Dr. Sagar Narayan Patil	Subject: Organic Chemistry II	
Paper code: CHC-300	Program/Course: T.Y.BSc.	Division:
Academic year: 2026 - 2027	Semester: V	Total Lectures: 30
Credits: 3		
Course Objectives: • To predict aromaticity and mechanism for electrophilic aromatic substitution of benzene. • To understand the stereochemical reactions. • To acquire knowledge of carbohydrate and amino acid chemistry. • To understand and apply enolate chemistry. • To understand Infrared spectroscopy and solve problems based on it. • To understand mechanism of different name reactions and rearrangements.		
Expected Course Outcome: At the end of the course students will be able to: CO-1 To recall fundamental concepts of aromaticity, stereochemistry, natural products and principles of infrared (IR) spectroscopy. CO-2 To explain the mechanisms of electrophilic aromatic substitution, natural product syntheses, stereochemical transformations and named organic reactions. CO-3 To apply mechanistic knowledge of Organic Chemistry to predict products and describe functional group identification using IR spectroscopy. CO-4 To analyze complex name reactions, rearrangements and correlate analytical data to deduce molecular structures and reaction pathways.		
Learning Outcome: At the end of the course students will be able: LO1: Identify aromatic, antiaromatic, and non-aromatic compounds and explain organic reaction stereochemistry. LO2: Apply enolate chemistry to predict and explain reaction mechanisms. LO3: Write mechanisms for key name reactions and molecular rearrangements.		

LO4: Interpret IR spectra to determine functional groups in organic compounds. LO4: to evaluate and explain the practical applications of solvent extraction, chromatographic techniques, and electroanalytical methods.

Month	Lectures From	Lectures To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise /Assignment	ICT Tools	Reference books
June	20-06-2026	30-06-2026	02	1. Aromaticity and electrophilic substitution reactions: Huckel's rule of Aromaticity ($4n+2$) Rule, $4n$ Rule for antiaromaticity,		Smart board, Power point presentation, Google classroom	[1-5]
July	01-07-2026	31-07-2026	08	Electrophilic Aromatic substitution (w.r.t Benzene): Mechanism of Nitration, Sulphonation, Halogenation, Friedel – Crafts alkylation and acylation. Reactivity and orientation of activating, deactivating groups (ortho, para and meta effects) with examples. 2. Infra-Red Spectroscopy in Organic Chemistry Principle of IR Spectroscopy (Hooke's law), types of molecular vibrations (Stretching and bending). Functional group region and Fingerprint region.	ISA I	Smart board, Power point presentation, Google classroom	[1-5]
August	07-08-2026	07-08-2026	04	3. Chemistry of Natural Products -I Amino Acids and Peptides: Terms: Zwitterion, Isoelectric point and Electrophoresis. Preparation of Amino Acids: Strecker synthesis, Gabriel's phthalimide. Synthesis of simple peptides (upto dipeptides) Bergmann's method.		Smart board, Power point presentation, Google classroom	[1-5]
	14-08-2026	28-08-2026	04	Carbohydrates: Classification and General Properties, Glucose and Fructose (open chain and cyclic structure), Determination of configuration of monosaccharides, absolute configuration of Glucose and Fructose, Mutarotation, Osazone formation, Killiani Fischer synthesis.		Smart board, Power point presentation, Google classroom	[1-5]

September	01-09-2026	30-09-2026	08	4. Infra-Red Spectroscopy in Organic Chemistry Applications of IR Spectroscopy: Functional group analysis, detection of purity of sample, establishing the identity of an unknown molecule, Effect of H-bonding, conjugation, resonance and ring size on IR absorptions. To study the progress of a reaction. Problems based on IR spectroscopy (ketone, aldehyde, ester, acid & alcohol). 5. Chemistry of Enolates Chemistry of Enolates. Definition of enolate ion, acidity of carbonyl compounds, pka values, generation of enolate ion, role of bases in enolate ion formation, alkylation of carbonyl compounds with reference to cyclohexanone, acetone, ethylacetoacetate, malonic ester	ISA II	Smart board, Power point presentation, Google classroom	[1-5]
October	03-10-2026	13-10-2026	02	Claisen condensation for preparation of ethylacetoacetate (reaction and mechanism). Keto-enol tautomerism of ethylacetoacetate. Malonic ester synthesis of carboxylic acids, ethylacetoacetate synthesis of ketones. Alkylation of 1,3-dithianes. Alkylation via enamine synthesis.	ISA III	Smart board, Power point presentation, Google classroom	[1-5]
	20-10-2026	31-10-2026	01	Revision			

References:

1. Carey, F., Organic Chemistry, 4th ed., McGraw Hill, New York, USA, 2000.
2. Bruice, P. Y., Organic Chemistry, 3rd ed., Pearson Education, Asia, 2014.
3. McMurry, J., Fundamentals of organic chemistry, 7th ed., Cengage Learning India Edition, Noida, India, 2013.
4. Morrison, R.T., Boyd, R.N. and Bhattacharjee, S. K., Organic Chemistry, 7th ed., Pearson, 2010.
5. Sykes, P., A guidebook to mechanism in organic chemistry, 6th ed., Longman Scientific & Technical, England, UK, 1985.

* Assessment Rubrics	
Component	Max Marks
ISA	15
Practical	25
Semester End Exam	60