



बिरसा मुंडा ट्रायबल युनिवर्सिटी

Birsa Munda Tribal University

राजपिपला, जि० नर्मदा Rajpipla, Dist. Narmda

Established by Tribal Development Department, Govt. of Gujarat

School of Science

B.Sc. (Chemistry) Programme

Subject Code & Name: - BS05MJCHE1 & Organic Chemistry-III

Teaching and Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
4	-	-	4	50	-	50	-

Programme Name	B.Sc.
Semester	V
Course Code	BS05MJCHE1
Course Title	Organic Chemistry-III
Course Content Type (Th./Pr.)	Theory
Course Credit	4
Sessions+ Lab. Per Week	4
Total Teaching/Lab. Hours	60 Hours
* 2 Laboratory = 1 Session	

Learning Objectives

1. To understand the structures of primary, secondary, and tertiary amines and amides and their classification based on nitrogen bonding.
2. Study the synthesis and properties of carboxylic acid derivatives, such as amides, esters, and acid anhydrides
3. To study the three-dimensional arrangement of atoms, including chirality, enantiomers, and diastereomers.
4. Learn how chiral molecules interact with polarized light and methods for separating them.
5. Use of techniques like IR (Infrared), and UV-Vis (Ultraviolet-Visible) to determine the structure of organic compounds.
6. Identify functional groups, such as carbonyls and amines, based on characteristic absorption bands.

Prerequisites (if any)

Learning Outcomes

On the Completion of this course, students will able to:

1. Understand and analyze the structure, properties, and reactivity of organic molecules, as well as identify those using advanced techniques





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2. Reactions and derivatives of carboxylic acid predict products for reactions involving carboxylic acids, including salt formation, esterification (Fischer esterification), reduction to alcohols, and preparation of acid derivatives (acid chlorides, anhydrides, amides).
3. The learning outcomes for conformational isomerism, substituted cyclohexanes, and specialized chirality types (axial, planar, helicity) focus on understanding 3D molecular shapes, their interconversion, stability, and optical properties.
4. After studying Infrared (IR) and Ultraviolet-Visible (UV-Vis) spectroscopy, students will be able to interpret spectral data to determine the structure of unknown organic compounds and use these methods for quality control in chemical and pharmaceutical analyses

Detailed Contents

UNIT	TOPIC/SUB-TOPIC	TEACHING HOURS
I	Amines and amides Introduction, Nomenclature, Physical properties and structure of amines, Basicity of amines (amines and amides, Solubility of amines in aqueous solvents, Preparation of amines Gabriel Synthesis, Hoffman and Curtius rearrangement, Reaction of amines, Synthesis using diazonium salt, Coupling reaction, Hoffmann and cope elimination, Preparation and reactions of amides	15
II	Carboxylic acids and their derivatives Introduction, Structure, Nomenclature, Physical Properties, Acidity Of Carboxylic Acid, Preparation Of Carboxylic Acid Alkenes Oxidation Of Primary Alcohol, Alkyl Benzene, Grignard Reagent Hydrolysis of Nitriles, Malonic Ester Synthesis, Nitrile Synthesis Reaction of Carboxylic Acid, Decarboxylation, Conversion To Acid Chloride, Esters, Amides, Reduction, HVZ Reaction, Ring Substitution In Aromatic Acid.	15
III	Stereochemistry Confirmation of ethane, propane and n-butane, KLYNE-PRELOG terminology for torsion angles, Conformation of cyclohexane, Characteristics of chair conformation, Ring Inversion, Mono substitute cyclohexane: Transition states and intermediates, Conformational free energy, Isolation and characterization of conformers, Determination of conformational free energy, Di substitute cyclohexane: 1,1- disubstituted cyclohexanes, disubstituted cyclohexanes, 1,3- disubstituted cyclohexanes, 1,4- disubstituted cyclohexanes, Stereoisomerism: Axial chirality, planar chirality and helicity.	15



बिरसा मुंडा ट्रायबल युनिवर्सिटी Birsā Mūṇḍā Drāyabala Yūnīvārsīṭī

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IV	Basic principle of organic spectroscopy IR Spectroscopy: Introduction to IR Spectroscopy, Electromagnetic Spectrum and IR Region, Principle of IR Absorption, Types of Molecular Vibrations, Vibrational Frequency and Factors Affecting It, IR Spectrum and Functional Group Region, Instrumentation of IR Spectroscopy. UV-Spectroscopy: Types of electronic transitions, Basic Principal of Istrumentation, Effect of conjugation, Concept of Chromophore and Auxochrome, Bathochromic, Hypsochromic, Hyper chromic and Hypochromic shifts, Woodward-fisher rules, Problems of conjugated enes, enones and aromatic ketones, aldehydes, a esters using empirical rules, Numericals.	15
Text Book(s)		
Reference Books		
1. Stereochemistry of Organic Compounds, Principles and Applications, Vth Edition, D Nasipuri, New Age International Publishers 2. Stereochemistry of Organic Compounds by P.S. Kalsi, New Age International Publishers 3. Organic Spectroscopy by J. B. Yadav, New Age International Publishers 4. Fundamentals of Analytical Chemistry by Skoog, West, Holler 5. Organic chemistry by Morrison Boyd and Bhattacharjee, VIIth Edition, Pearson Education Inc. 6. Organic reaction mechanism by V. K. Ahluwalia, Rakesh kumar Parashar, Narosa Publication House New Delhi		
Web Resources		
1. Google books, INFLIBNET, Google Web		
Required Software(s) (if any)		
Practical(s) (if any)		

L:: Lecture, **T::** Tutorial , **P::**Practical

CCE:: Continuous and Comprehensive Evaluation

(CCE Theory includes Mid Semester Examination, Assignment, MCQ quizzes, Seminar, Reflective notes, class participation, case analysis and presentation, slip tests (announced/ surprised), attendance etc. or any combination of these)

PWE:: Practical Work Examination

(PWE includes Laboratory practical work, project work, viva simulation exercise work etc.)

SEE:: Semester End Evaluation

