



# 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: - BS04MJCHE1 Organic Chemistry-II

#### Teaching and Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage (%)			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
3	-	1	4	35	15	35	15

Programme Name	B.Sc.
Semester	IV
Course Code	BS04MJCHE1
Course Title	Organic Chemistry-II
Course Content Type (Th./Pr.)	Theory & Practical
Course Credit	3 + 1
Sessions+ Lab. Per Week	3 +2
Total Teaching/Lab. Hours	45 Theory Hours + 30 Practical Hours
* 2 Laboratory = 1 Session	

#### Learning Objectives

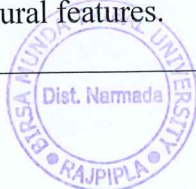
1. Identify and differentiate between the structures of alcohols, phenols, ethers, and epoxides.
2. Recognize the functional groups present in these compounds and their significance.
3. Define polynuclear aromatic hydrocarbons (PAHs) and explain their structural characteristics.
4. Differentiate between PAHs and other hydrocarbon compounds, including mononuclear aromatic compounds.
5. Identify common PAHs and their structural formulas (e.g., naphthalene, anthracene, phenanthrene)
6. Correctly name aldehydes and ketones using IUPAC rules.
7. Understand the mechanism of nucleophilic addition to the carbonyl group.

#### Prerequisites (if any)

#### Learning Outcomes

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

1. Recognize and differentiate between alcohols, phenols, ethers, and epoxides based on their functional groups and structural features.





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2. Draw and interpret the structural formulas of a variety of alcohols, phenols, ethers, and epoxides.
3. Recognize and differentiate between alcohols, phenols, ethers, and epoxides based on their functional groups and structural features.
4. Draw and interpret the structural formulas of a variety of alcohols, phenols, ethers, and epoxides.
5. Define polynuclear aromatic hydrocarbons and describe their structural characteristics, including the concept of fused aromatic rings.
6. Draw and identify the structures of common PAHs (e.g., naphthalene, anthracene, phenanthrene, pyrene).
7. Clearly define what polynuclear aromatic hydrocarbons are and describe their structural characteristics.
8. Identify and illustrate the structures of common PAHs, including both simple and complex fused ring systems.
9. Recognize the industrial and biological relevance of aldehydes and ketones (e.g., solvents, intermediates in synthesis, fragrances)
10. Understand their roles in metabolic pathways (e.g., pyruvate, acetone bodies).

#### Detailed Contents

UNIT	TOPIC/SUB-TOPIC	TEACHING HOURS
I	<b>Alcohol, Phenol, Ethers &amp; Epoxides</b> <ul style="list-style-type: none"><li>➤ Introduction,</li><li>➤ IUPAC Nomenclature of alcohols, Phenols and Ethers</li><li>➤ Physical properties of alcohol, phenol ethers and epoxide.</li><li>➤ Preparation and Chemical Reactions of Alcohol, Ether and Epoxides</li><li>➤ Preparation of Phenol by Dow process and Cumene process,</li><li>➤ Chemical properties of phenol or electrophilic substitution reactions of phenol,</li><li>➤ Reimer-Tiemann reaction with mechanism, Kolbe-Schmitt reaction with mechanism with mechanism, Fries reaction with mechanism.</li></ul>	15





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II	<b>Chemistry of Carbonyl Compounds (Aldehydes &amp; Ketones)</b> <ul style="list-style-type: none"><li>➤ Definitions</li><li>➤ Nomenclature</li><li>➤ Physical Properties</li><li>➤ Preparations of Aldehyde and Ketone</li><li>➤ Preparations of Aldehyde by Oxidation method</li><li>➤ Nucleophilic Addition reactions: Additions to Cyanide, Alcohols, Grignard reaction, Amines</li><li>➤ Reduction to hydrocarbons</li><li>➤ Cannizaro reaction, Aldol Condensation, Cross-Aldol Condensation</li><li>➤ Halogenation of Ketones</li><li>➤ Derivatives and Synthesis of Carbonyl Compounds</li></ul>	15
III	<b>Polynuclear Aromatic hydrocarbons</b> <ul style="list-style-type: none"><li>➤ Nomenclature, Structure and Synthesis of Naphthalene, Anthracene, Phenanthrene and It's Derivatives.</li><li>➤ Reactions:<ul style="list-style-type: none"><li>• Oxidation,</li><li>• Reduction,</li><li>• Sulfonation,</li><li>• Nitration,</li><li>• Halogenation</li><li>• Fridel Craft Reaction and Electrophilic Substitution Reaction (ESR) of Naphthalene.</li></ul></li></ul>	15
<b>Text Book(s)</b>		
<b>Reference Books</b>		
<ol style="list-style-type: none"><li>1. Principles of Inorganic chemistry – Puri, Sharma &amp; Kalia</li><li>2. Concise Inorganic Chemistry - J. D. Lee</li><li>3. Advanced Inorganic Chemistry- Cotton and Wilkinson</li><li>4. Basic Inorganic Chemistry - Gurdeep &amp; Chatwal</li><li>5. Organic Chemistry (Volume I, II &amp; III) by S.M. Mukherji, S.P. Singh and R.P. Kapoor</li><li>6. A Text Book of Organic Chemistry (II Edition) by Raj K. Bansal</li><li>7. Organic chemistry by Morrison and Boyd, 6th Ed.</li><li>8. Organic reaction mechanism by R. K. Bansal, 3rd Ed.</li><li>9. Organic chemistry by S. M. Mukherji, S. P. Singh and R. P. Kapoor. Vol. II.</li></ol>		





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Web Resources	
Required Software(s) (if any)	
Practical(s) (if any)	
<b>Organic Preparation</b> <ol style="list-style-type: none"><li>1. Nitration of Acetanilide</li><li>2. Acetanilide from Aniline(Green Preparation)</li><li>3. Benzoic Acid from Benzil (Green Preparation)</li><li>4. 1,5-Diphenyl-penta-1,4-diene-3-one from Benzaldehyde and Acetone(Green Preparation)</li><li>5. Diels-Alder reaction between furan and maleic acid (Green Preparation)</li></ol>	30

**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

