



बिरसा मुंडा ट्रायबल युनिवर्सिटी Birsa Munda Tribal University

राजपिपला, जि. नर्मदा Rajpipla, Dist. Narmada
Established by Tribal Development Department, Govt. of Gujarat

School of Science

B.Sc. (Chemistry) Programme

Subject Code & Name: - BS02MJCHE2 General Chemistry-IV

Teaching and Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
3	-	1	4	37.5 %	12.5 %	37.5 %	12.5 %

Programme Name	B.Sc. (Chemistry)
Semester	II
Course Code	BS02MJCHE2
Course Title	General Chemistry-IV
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	

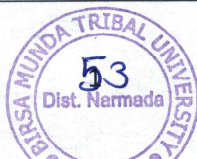
Learning Objectives

1. Infer the general trends in the chemistry of P-block elements.
2. Explain the trends in physical and chemical properties of group 13 and 14 elements.
3. To get idea about the formation of alkynes and reactions of alkynes.
4. To identify the substances may or may not be aromatic.
5. Interpret the concept of aromaticity and the main properties of aromatic compounds · associate polarization of a bond with electronegativity.
6. Established the ionic equilibrium between acids, bases and salts

Learning Outcomes

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

1. Classify the properties of oxides of p-block elements and their chemical behavior.
2. How to synthesize different inorganic compounds like Borax, Boric acid, Boron halides etc. and their applications.
3. Understand about nucleophilic addition reaction and aromatic behavior of organic compound.
4. Understand about ionic equilibrium of acids, basics and salts.
5. Get information about hydrolysis constant, equilibrium constants and solubility product of water.
6. Explain the buffer solution and types of buffer solutions.





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Detailed Contents		
UNIT	TOPIC/SUB-TOPIC	TEACHING HOURS
I	Chemistry of p block elements (group 13 and 14) <ul style="list-style-type: none">➤ Introduction of Oxides➤ Properties of oxides, Classification of oxides based on their chemical behavior and based on their oxygen content,➤ Study of the following compounds with emphasis on structure, bonding, preparation, properties and uses; Borax, Boric acid, Boron nitrides, Borohydrides (diborane), Boron halide and Aluminum halide acidity comparison➤ Allotropes of carbon➤ Some important compounds of carbon and silicon	15
II	Chemistry of alkanes and its application & aromaticity <ul style="list-style-type: none">➤ Formation of alkynes: Dehydrohalogenation of vicinal and geminal dihalides, Dehalogenation of tetrahalides➤ Reactions of alkynes: Acidity, electrophilic addition reactions like halogenation, hydrohalogenation, hydration, hydroboration, addition of carbene and catalytic hydrogenation. Nucleophilic addition reaction with hydrogen cyanide and alcohols.➤ Alkylation of terminal alkynes.➤ Criteria for aromatic, non-aromatic and antiaromatic compounds, applications of Huckel's rule to simple annulene, cyclic carbocation/anion.	15



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III	Ionic Equilibrium <ul style="list-style-type: none">➤ Classification of equilibrium➤ factor affecting of equilibrium➤ Common ion effect of acid and base➤ Determination of equilibrium Constant➤ Concept of acid base theory: Arrhenius, Bronsted-Lowry, Lewis➤ Types of electrolytes,➤ Dissociation constants of weak acids and bases, and its Numerical➤ Hydrolysis of salts: Definition of hydrolysis of salts, Salts of strong acids and bases,➤ Relation among K_h, K_a, or K_b and K_w,➤ Buffer solutions: Definition and types of buffer solutions, Buffer action, Derivation of Henderson Hasselbalch equation,➤ Numerical	15
Unit – IV Practical(s)		30 Hours
<p>Organic qualitative analysis (organic spotting) Identification of Aromatic Hydrocarbons or Compounds containing a functional group (other than multiple bond) using Physical and Chemical tests. (Minimum 08 compounds covering all the chemical nature must be given) Examples: Carboxylic acids: Aliphatic acids like oxalic and succinic acid, Aromatic acids: Benzoic acid, cinnamic acid and phthalic acid Phenols: α-naphthol, β-naphthol, Resorcinol Bases: Aniline, N,N dimethyl aniline, N,N diethyl aniline Neutral: Acetone, Ethyl methyl ketone, Ethyl acetate, naphthalene, anthracene, nitrobenzene, benzamide, urea, thiourea, chloroform, acetanilide, carbon tetra chloride, chloroform.</p>		



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Reference Books

1. Basic Inorganic Chemistry – Gurdeep & Chatwal.
2. Inorganic Chemistry - J. N. Gurtu & H. C. Khera
3. Principles of Inorganic chemistry- B. R. Puri, L. R. Sharma and K. C. Kalia; Vallabh publications, Delhi.
4. Coordination chemistry-Ajai Kumar ; Aaryush Education, U.P.
5. Organic Reaction Mechanism, including Reaction Intermediates, V. K. Ahluwalia
6. Organic Chemistry, Vol-1, Jagdamba Singh, L. D.S. Yadav, Pragati Prakashan, 8th edition-2013
7. Organic Chemistry by Morrison and Boyd.
8. Essentials of Physical Chemistry, B. S. Bahl, G. D. Tuli and Arun Bahl, S. Chand & Co.
9. Physical Chemistry, 7th edition P. C. Rakshit
10. Elements of Physical Chemistry, B. R. Puri, L. R. Sharma and Madan Pathania, Vishal Publishing Co. Jalandhar.
11. Organic Chemistry- Nimai Tewari Volume I & II

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

