



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: - BS02MJCHE1 : General Chemistry-III

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 | BS02MJCHE1 |
| Course Title | General Chemistry-III |
| 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. Explain why the s-block elements are grouped together. Label the alkali metals, alkaline earth metals, and noble gases within the s-block. Describe the reactions and properties of alkali metals and alkaline earth metals. Compare and contrast hydrogen and helium with the other s-block elements.
2. Define and identify alkanes, alkenes, alkynes, and cyclic hydrocarbons and list some properties of hydrocarbons.
3. Understand how the adsorption mechanism takes place on the surface of solids and what the factors effects on adsorption.

Learning Outcomes

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

1. Understand electronic configuration of elements, physical and chemical properties of elements and diagonal relationship of elements.
2. Prepare different inorganic compounds and how to use it.
3. Get idea about the formation of alkene compounds and different elimination reactions.
4. Understand different reaction isotherms and their applications and limitations.
5. Understand catalyst and their uses in different organic reactions.





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| Detailed Contents | | |
|-------------------|---|----------------|
| UNIT | TOPIC/SUB-TOPIC | TEACHING HOURS |
| I | Chemistry of s-block elements <ul style="list-style-type: none">➤ General introduction.➤ Electronic configuration, atomic and ionic radii, ionization potential.➤ Physical and Chemical properties [Reactivity towards air, water, halogen and hydrogen],➤ Special characteristics such as metallic character, polarizing power, hydration energy, Flame coloration,➤ Inert pair effect, relative stability of different oxidation state,➤ Complex formation tendency of s-block elements,➤ Diagonal relationship of (1) lithium with magnesium (2) beryllium with aluminum, anomalous behavior of Li, Be, uses.➤ Preparation, Physical properties and uses of Na_2CO_3, NaHCO_3, NaCl, NaOH, CaO, CaCO_3, Ca(OH)_2 and Plaster of paris.➤ Application of s-block element | 15 |
| II | Chemistry of alkenes and its applications <ul style="list-style-type: none">➤ Hydrocarbons containing Carbon-Carbon π bonds➤ Formation of alkene by Elimination reactions, dehydration of alcohol, dehydrohalogenation of alkyl halide, dehalogenation of vicinal and geminal dihalides➤ Saytzeff's rule and Hofmann eliminations➤ Electrophilic addition reaction and its mechanism (Markownikov/ Anti Markownikov rule).➤ Reactions of alkenes: Oxymercuration-demercuration, Hydroboration oxidation, Ozonolysis, Reduction (catalytic) | 15 |





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| | | |
|--|---|-----------------|
| III | Adsorption and Catalysis <ul style="list-style-type: none">➤ Introduction➤ Characteristics and factors affecting on adsorption➤ Mechanism of Adsorption➤ Types of Adsorptions (physical and chemical)➤ Adsorption isotherm and Freundlich equation with limitations,➤ Langmuir theory of adsorption: assumptions, derivation, modification in equation at very low and high pressure.➤ BET Theory➤ Applications of adsorption.➤ Introduction of catalysis➤ Types of catalysis (homogeneous and heterogeneous)➤ Active centers, Enzyme catalysis and its characteristics. | 15 |
| Unit – IV Practical(s) (if any) | | 30 Hours |
| Volumetric Titration (any four) <ol style="list-style-type: none">1. To determine the strength of NaOH and Na₂CO₃ present in the solution mixture of NaOH and Na₂CO₃ and to find out their percentage composition.2. To determine the strength of NaHCO₃ and Na₂CO₃ present in the solution mixture of NaHCO₃ and Na₂CO₃ and to find out their percentage composition.3. To determine the Normality, g/liter and Molarity of H₂C₂O₄. 2H₂O and H₂SO₄ present in the solution mixture of H₂C₂O₄. 2H₂O and H₂SO₄ by using XN NaOH and YN KMnO₄ Solution.4. To determine the Normality, g/liter and Molarity of H₂C₂O₄. 2H₂O and K₂C₂O₄ present in the solution mixture H₂C₂O₄. 2H₂O and K₂C₂O₄ by using XN NaOH and YN KMnO₄ Solution.5. To determine the amount of Ca⁺² and Mg⁺² ion by EDTA solution from the mixture solution of CaCl₂ and MgCl₂. | | |



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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

