



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. (Zoology) Programme

Subject Code & Name: - BS02MIZOO1 Basic 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	37.5 %	12.5 %	37.5 %	12.5 %

Programme Name	B.Sc. (Zoology)
Semester	II
Course Code	BS02MIZOO1
Course Title	Basic 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	

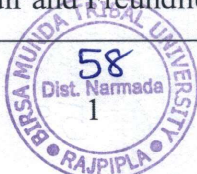
Learning Objectives

1. Understand how the adsorption mechanism takes place on the surface of solids and what the factors effects on adsorption.
2. To understand physical trends of elements and their chemical properties.
3. To get information about oxidation states and anomalous properties of elements.
4. To understand concept of hybridization, MO theory and its applications.

Learning Outcomes

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

1. Understand different reaction isotherms and their applications and limitations.
2. Understand catalyst and their uses in different organic reactions.
3. Students can calculate electronegativity, oxidation state and metallic radii.
4. Understand how enzyme works as a catalyst and its applications in different chemical reactions.
5. Understand*behavior of Langmuir and Freundlich isotherms.





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Detailed Contents		
UNIT	TOPIC/SUB-TOPIC	TEACHING HOURS
I	Periodicity <ul style="list-style-type: none">➤ Study of modern periodic table, electronic configuration in periodic table, Periodicity in atomic properties and its causes, Magic number➤ Explanation of general trends of periodic properties<ul style="list-style-type: none">(1) Atomic radii (covalent, metallic and van der Waals radii)(2) Calculation of Ionic radii by Pauling method(3) Ionization potential(4) Electron gain enthalpy(5) Electronegativity➤ Calculation of Electronegativity by Mulliken and Pauling method.➤ Periodic Trends in Chemical Properties,<ul style="list-style-type: none">(a) Periodicity of Valence or Oxidation States(b) Anomalous Properties of Second Period Elements, Periodic Trends and Chemical Reactivity	15
II	Chemical bonding <ul style="list-style-type: none">➤ Basics of Covalent bond, Ionic bond, Co-ordinate covalent bond and H-bonding➤ octet rule and its limitation➤ Lewis Structure, Bond Length, Bond order, Bond Angle Geometry and its shapes of Molecule➤ Valence bond theory and its limitations➤ Sidgwick Powell rule and VSEPR theory,➤ Concept of hybridization: sp, sp^2, sp^3, sp^3d & sp^3d^2➤ MO theory and its application➤ Energy level diagrams of B_2, C_2, N_2, O_2, F_2, CO, and NO calculation of bond order and magnetic properties.	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.➤ Applications of adsorption.➤ Introduction of catalysis➤ Types of catalysis (homogeneous and heterogeneous)➤ Active centers, Enzyme catalysis and its characteristics.➤ Basic concept of acid-base theory : Arrhenius, Lowry-Bronsted and Lewis	15
Unit – IV Practical(s)		30 Hours
Organic qualitative analysis <p>Identification of Aromatic Hydrocarbons or Compounds containing a functional group (other than multiple bond) using Physical and Chemical tests. (Minimum 06 compounds covering all the chemical nature must be given)</p> <p>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, methylaniline, dimethylamine Neutral: Acetone, Ethyl methyl ketone, Ethyl acetate, naphthalene, anthracene, nitrobenzene, benzamide, urea, thiourea, chloroform, acetanilide, benzanilide, carbon tetra chloride, chloroform, chlorobenzene, bromobenzene.</p> Volumetric Titration (any three) <ol style="list-style-type: none">1. To determine the strength of NaOH and Na_2CO_3 present in the solution mixture of NaOH and Na_2CO_3 and to find out their percentage composition.2. To determine the strength of NaHCO_3 and Na_2CO_3 present in the solution mixture of NaHCO_3 and Na_2CO_3 and to find out their percentage composition.3. To determine the Normality, g/liter and Molarity of $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ and H_2SO_4 present in the solution mixture of $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ and H_2SO_4 by using XN NaOH and YN KMnO_4 Solution.		





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4. To determine the Normality, g/liter and Molarity of $H_2C_2O_4$, $2H_2O$ and $K_2C_2O_4$ present in the solution mixture $H_2C_2O_4$, $2H_2O$ and $K_2C_2O_4$ by using XN NaOH and YN $KMnO_4$ Solution.
5. To determine the amount of Ca^{+2} and Mg^{+2} ion by EDTA solution from the mixture solution of $CaCl_2$ and $MgCl_2$.

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

