

SEMESTER I

ENVIRONMENTAL STUDIES

1. Course Description

Program: BSC
Course Code: U24/EVS/AECC/101
Course Type: AECC
No. of credits: 2

Max. Hours: 30
Hours per week: 2
Max. Marks: 50

2. Course Objectives:

- To Understand the principles of ecology and environmental issues
- To acquire the skills needed and develop a sense of responsibility to actively participate in its protection and improvement

3. Course Outcomes:

On completion of the course the student will be able to:

CO 1: Gain knowledge and develop in-depth understanding of the basics of ecological principles, conservation of biodiversity, renewable energy resources and water conservation

CO 2: Enhanced analytical capability to undertake and participate in finding solutions for various environmental issues and concerns of national and global importance to achieve environmental protection and sustainable development

4. COURSE CONTENT

UNIT - I: Ecosystem, Biodiversity & Natural Resources (15 hrs.)

1. Definition, Scope & Importance of Environmental Studies
2. Structure of Ecosystem – Abiotic & Biotic Components, Ecological Pyramids
3. Definition of Biodiversity, Genetic, Species & Ecosystem Diversity, IUCN Red list, Hotspots of Biodiversity, Threats and Conservation of Biodiversity (*In situ & Ex situ*)
4. Renewable Energy Resources – Solar, Wind and Biomass
5. Water Conservation, Water Footprint, Rain Water Harvesting
6. Environmental Ethics

UNIT – II: Environmental Pollution, Global Issues & Legislation (15 hrs.)

1. Causes, Effects and Control Measures of Air and Water Pollution
2. Solid and Plastic Waste Management, Zero Waste Management
3. Global Warming & Ozone Layer Depletion, Carbon Footprint
4. Environmental Laws and Acts-Wildlife Protection Act, Forest Act, Air Act, Water Act
5. People's Participation in Environmental Protection- Silent Valley, Bishnois of Rajasthan
6. Disaster Management-Flood, Earthquake and Cyclones
7. Environmental Management
8. Role of Information Technology in Environmental Protection and Health

Field visit:

1. Visit to Solar Plant in your Locality/City
2. A Glimpse of Biodiversity in Hyderabad/ Visit to National Parks and a Walk-Through Campus
3. Visit to a Nearby Lake

5. REFERENCES:

Books:

- Text book of Environmental Studies for undergraduate courses (second edition) by Erach Bharucha
- Environmental Studies by Dr. J.P. Sharma
- Perspectives in Environmental Studies – Anubha Kaushik & C.P. Kaushik
- A text book of Environmental Studies by Dr. D. K. Asthana and Dr. Meera Asthana
- Environmental Science by Dr. Syeda Azeem Unnisa

Magazines:

- **Terra Green (a monthly digital magazine on environmental issues)**
- Down to Earth, Centre for Science &
- Environment Survey of the Environment published by The Hindu

E-Resources:

- <https://www.cseindia.org/>
- <https://www.ugc.gov.in/oldpdf/modelcurriculum/env.pdf>

6. Syllabus Focus

a) Relevance to Local, Regional, National and Global Development Needs

Local /Regional/ National /Global Development Needs	Relevance
Local needs	<p>Develop a critical understanding of Environmental issues and concerns. Inculcate the environmental ethics and work for sustainable future</p> <p>Utilise the potential application of Methods of Solid Waste Management in the Waste management concerns</p> <p>Involve in community development through extension and organising programs.</p>
Regional needs	Creates awareness on pollution and threats to biodiversity in the Ecosystem
National needs	Have an over view of mitigation measures of disaster management. Explain major conservation strategies taken in India. Apply the Knowledge of role of information technology in protection of the environment.
Global needs	Environmental studies is globally relevant to monitor environmental issues and for the sustainable development. It deals with issues and challenges of environment management in the changing climate scenario.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development, Entrepreneurship Development, Employability	Unit II Solid Waste Management	Demonstration of Composting, Vermicomposting and the preparation of Bio-Enzymes. Awareness on scope of green entrepreneurship and employability related to Solid waste management

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiential learning	Field trips, Documentary watching, Demonstrations, Student volunteering days, Plantation drives, Clean up drives
2.	Participative Learning	Seminars, Workshops, Guest lectures, Group Discussion, Library reference, Presentations and Competitions, Demonstrations by students
3.	Problem Solving	Case Studies, Projects

8. Course Assessment Plan

a) Weightage of Marks in Internal Assessments and End Semester Examination

CO	Internal Assessments IA -40%	End Semester Examination-60%
CO1	Field Visit report/Case Study/ Poster making/ Presentations/Eco Friendly product making/Model making	Written Exam
CO2		

b) Model Question Paper- End Semester Exam

ENVIRONMENTAL STUDIES

Course Code: U24/EVS/AECC/101

Time: 1 Hour

Max. Marks: 30

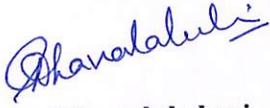
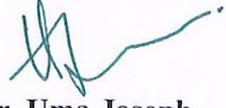
Answer any five of the following:

5X6=30

1. Define environmental studies and mention the importance of environmental studies.
2. "Biomass is an important source of energy", Discuss.
3. Explain the rooftop rainwater harvesting system with the help of a diagram.
4. Identify the reasons for water pollution in your region and suggest measures to reduce the water pollution.
5. Discover the initiatives taken by swachh cities in solid waste management.
6. Comment on "Silent Valley- A people's movement that saved a forest."
7. List out the changes you would make in your lifestyle to reduce your carbon footprint.

c) Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks
I	15	CO 1	3	6
II	15	CO 2	4	6

Prepared by	Checked & Verified by	Approved by
 G. Dhanalakshmi Head, Dept. of Environmental Studies	 G. Dhanalakshmi, Head, Dept. of Environmental Studies	 Dr. Uma Joseph Principal

SEMESTER II

ENVIRONMENTAL STUDIES

6. Course Description

Program: BA, BMS & BCOM
 Course Code: U24/EVS/AECC/201
 Course Type: AECC
 No. of credits: 2

Max. Hours: 30
 Hours per week: 2
 Max. Marks: 50

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Max. Marks: 30

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 G. Dhanalakshmi Head, Dept. of Environmental Studies	 G. Dhanalakshmi, Head, Dept. of Environmental Studies	 Dr. Uma Joseph Principal

**St. FRANCIS COLLEGE FOR WOMEN, BEGUMPET HYDERABAD-
500016 (An Autonomous College Affiliated to Osmania University)**

DEPARTMENT OF CHEMISTRY

**DISCIPLINE SPECIFIC CORE I
CHEMISTRY PAPER I
B.Sc. I - SEMESTER- II 60 Hrs**

Module 1: Inorganic Chemistry

p-block elements
Interhalogen Compounds
Chemistry of Zero group elements
Boranes and Carboranes
Metal carbonyls

Module 2: Physical Chemistry

Electrochemistry

Module 3: Organic Chemistry

Aromatic Hydrocarbons
Halogen compounds
Alcohols, Phenols, Ethers

Module 4: General Chemistry

Solutions
Symmetry of molecules
Stereochemistry of Carbon Compounds

CHEMISTRY – II

Course Description

Programme: B.Sc. Max. Hours: 60 Hrs

Course Code: U24/CHE/DSC/201 Hours per week: 4 Hrs

Course Type: DSC-2 Max. Marks: 100

No. of credits: 4

Course Objectives

- To study about the elements of p block and the properties of their compounds.
- To understand the behavior of electrolytes in solution and to know the applications of electrode


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Dept of Chemistry
Osmania University, Hyd-07.

process.

- To learn the methods of preparation and reactivity of hydrocarbons with mechanisms and to classify and identify organic molecules by their functional groups.

• To learn the structures of basic organic molecules, the types of reactions they undergo and their stereochemistry and to foster acquisition of knowledge on the concepts of solutions.

Course Outcomes

On completion of the course the student will be able to:

CO1: Acquire knowledge on p-block elements.

CO2: Understand the theory of electrical conductance, transformation of chemical energy into electrical energy in Galvanic cells.

CO3: Interpret the concept of aromaticity and familiarize with the various types of aliphatic and aromatic reactions. Recognize functional groups in organic molecules and predict their reactivity through mechanisms.

CO4: Application of the behaviour of solutions and acquire a fundamental understanding of the relationships between molecular structure and reaction mechanisms.

Course Content

MODULE I: Inorganic Chemistry

(15 Hrs)

p-block elements

(10 Hrs)

General Characteristics of p block elements.

Group – 13: Synthesis and structure of diborane and higher Boranes (B₂H₆ and B₃H₉). Preparation and structure of boron-nitrogen compounds (B₃NH₆ and BN), Lewis acid nature of the BX₃.

Group – 14: Classification (ionic, covalent, interstitial) and industrial applications of Carbides. Preparation, classification (straight chain, cyclic and cross-linked) and applications of silicones, Preparation and applications of graphitic compounds.

Group – 15: Preparation, structure and reactions of hydrazine, hydroxylamine, Phosphazenes

Group – 16: Classifications of oxides based on (i) Chemical behavior and (ii) Oxygen content. Normal: acid, basic, amphoteric and neutral, Mixed oxides, Sub oxides, Peroxides, Super oxides.

Oxyacids of N, P, S and Cl – structure, acidic nature and redox properties

Interhalogen Compounds

Classification- general preparation- structures of AB, AB₂, AB₃ and AB₄ type and reactivity. Poly halides- definition and structure of ICl₃, ICl₄ and I₃. Comparison of Pseudo halogens with halogens.

Chemistry of Zero group elements

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General preparation, structure, bonding and reactivity of Xenon compounds – Oxides, Halides. Clathrate compounds.

Boranes and Carboranes

(2 Hrs)

Definition of clusters. Structures of boranes and carboranes- Wade's rules, closo, nido, arachno Boranes and carboranes

Metal carbonyls

(3 Hrs)

Preparation and properties of Ni(CO)_n. Structural features of Ni(CO)_n, Fe(CO)_n, Fe₂(CO)_n, Fe₃(CO)_n and Cr(CO)_n.-18 valence electron rule.

MODULE II: Physical Chemistry

(15 Hrs)

Electrochemistry

Electrical transport – conduction in metals & in electrolyte solutions, specific conductance & equivalent conductance and measurement of equivalent conductance, variation of specific and equivalent conductance with dilution. Migration of ions and Kohlrausch's law. Arrhenius theory of electrolytic dissociation and its limitation, weak and strong electrolytes, Ostwald's dilution law, its uses and limitations. Debye- Huckel- Onsager's equation for strong electrolytes (elementary treatment only). Transport number, definition and determination by Hittorf method for attackable and non-attackable electrodes. Applications of conductivity measurements. Determination of degree of dissociation, determination of K_a of acids, determination of solubility product of sparingly soluble salt, conductometric titrations. Electrolytic and Galvanic cell – reversible and irreversible cells, conventional representation of electrochemical cell. EMF of a cell and its measurement. Computation of EMF. Types of reversible electrodes gas electrode, metal - metal ion, metal - insoluble salt and redox electrode. Electrode reactions, Nernst equation, cell EMF and single electrode potential, standard Hydrogen electrode – reference electrodes (calomel electrode) – standard electrode potential, sign conventions, electrochemical series and its significance. Calculation of thermodynamic quantities of cell reaction – ΔG , ΔH and K. Determination of pH using Hydrogen electrode, Glass electrode, quinhydrone electrode, solubility product of AgCl. Potentiometric titrations.

MODULE III: Organic Chemistry

(15 Hrs)

Aromatic Hydrocarbons

(6 Hrs)

Concept of aromaticity – definition, Huckel's rule – application to Benzenoids and Non – Benzenoids (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation). Preparations: From acetylene, phenols, benzene carboxylic acids and sulphonic acids Reactions - General mechanism of electrophilic substitution, mechanism of nitration, sulphonation, and halogenation, Friedel Craft's alkylation and acylation. Orientation of aromatic substitution - Definition of ortho, para, and meta directing groups. Ring activating and deactivating groups with examples. Orientation – (i) activating groups: Amino, methoxy and alkyl groups. (ii) Deactivating groups - carboxyl, nitro, nitrile, carbonyl and sulphonic acid & halo groups.


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Halogen compounds

(4 Hrs)

Nomenclature and classification: alkyl (primary, secondary, tertiary), aryl, aralkyl, allyl, vinyl, benzyl. Chemical reactivity - reduction, formation of RMgX, Nucleophilic substitution reactions - classification into S₁ and S₂. Mechanism and energy profile diagrams of S₁ and S₂ reactions. Stereochemistry of S₂ (Walden Inversion) 2-Bromobutane, S₁ (Racemisation) 1-Bromo-1-phenylpropane explanation of both by taking the example of optically active alkyl halide. Structure and reactivity - Ease of hydrolysis - comparison of alkyl, vinyl, allyl, aryl, and benzyl halides.

Alcohols, Phenols, Ethers

(5 Hrs)

Alcohols: Preparation of 1, 2 and 3 alcohols using Grignard reagent, Ester hydrolysis, Reduction of aldehydes, ketones, carboxylic acid and esters. Reactions: With sodium, HX (Lucas test), esterification (mechanism), oxidation (with PCC, alk. KMnO₄, acidic dichromate, conc. HNO₃). Oppenauer oxidation

Diols: oxidation of diols, Pinacol - Pinacolone rearrangement.

Phenols: Preparation: Cumene hydroperoxide method, from diazonium salts. Reactions: Electrophilic substitution: Nitration, Halogenation and sulphonation. Reimer-Tiemann Reaction (with mechanism), Gattermann Aldehyde Reaction, Houben-Hoesch Condensation, Schotten-Baumann Reaction, Azo coupling reactions

Ethers (aliphatic and aromatic): Preparation: Williamson synthesis, Reaction: Cleavage of ethers with HI.

MODULE IV: General Chemistry

(15 Hrs)

Solutions

(6 Hrs)

Liquid-liquid mixtures - ideal liquid mixtures, Raoult's and Henry's law. Non-ideal systems. Azeotropes: HCl-H₂O, ethanol - water systems. Fractional distillation. Partially miscible liquids - phenol - water, trimethyl amine - water system, Nicotine - water

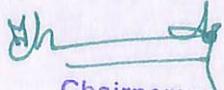
Lower and upper consolute temperature. Effect of impurity on consolute temperature. Immiscible liquids and steam distillation.

Symmetry of molecules (3 Hrs)

Symmetry operations and symmetry elements in molecules. Definition of Axis of symmetry types of C_n, Plane of symmetry (σ_h , σ_v , σ_d) Center of symmetry and improper rotational axis of symmetry (S_n). Explanation with examples.

Stereochemistry of Carbon Compounds (6 Hrs)

Conformations with respect to ethane, butane and cyclohexane. Molecular representation: Wedge Formula, Newmann, Sawhorse and Fischer representations. Optical isomerism: optical activity, optical rotation and specific rotation, Concept of chirality. Examples: Glyceraldehyde, Lactic acid, Alanine. Molecules with similar chiral carbons (Tartaric acid), Enantiomers and Meso compounds. Molecules with dissimilar chiral carbons (2,3 - Dibromopentane). Diastereomerism. Configuration: Relative (D and L) and Absolute configuration, CIP Rules: R/S Racemic mixture racemization and resolution techniques (chemical method only) Geometrical isomerism with reference to alkenes and cycloalkanes: cis - trans and E/Z configuration.


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SEMESTER-1I

ENZYMES & ANALYTICAL TECHNIQUES

1. Course Description

Programme	: B.Sc.	Max. Hours:	60
Course Code	: U24/BIC/DSC/201	Hours per week:	4
Type of course	: DSC 2	Max. Marks:	100
No. of credits	: 4		

2. Course Objectives

- To acquire knowledge about concepts of enzymes, thermodynamics and energy transformations observed in living systems.
- To learn various important techniques of separation like chromatography, electrophoresis, centrifugation, and spectroscopy.

3. Course Outcomes

After the successful completion of the course, the student will be able to:

CO1: Describe enzymes, nomenclature, mechanism of enzyme action and kinetics. (L2)

CO2: Demonstrate the influence of thermodynamics of biochemical reactions. (L3)

CO3: Illustrate the separation techniques like chromatography, electrophoresis and centrifugation. (L3)

CO4: Analyze the principle and applications of spectrophotometry and radioactivity(L4).


Professor Karuna Rupuri
Department of Biochemistry
University College of Science
Osmania University
Hyderabad-500 007 (TS)

4. Course Content –**Module I: ENZYMES****(15 hrs)**

Introduction to bio catalysis, Difference between chemical and biological catalysis. Nomenclature and classification of enzymes. Characteristic features of enzymes. Introduction to the principles of activation energy, transition state, Active site. Outline of mechanism of enzyme action – lock and key model, induced fit model.

Factors affecting catalysis – substrate concentration, pH, temperature, activators and inhibitors (competitive and non-competitive types). Michaelis constant (K_m) and its significance. Line Weaver – Burk plots, Isoenzymes, zymogen activation – activation of trypsinogen and chymotrypsinogen, allosteric enzymes (elementary treatment). Ribozyme, abzyme (definitions only).

Module II: BIOENERGETICS**(15 hrs)**

Energy transformations in the living system, First and second laws of Thermodynamics; Concept of enthalpy, entropy, free energy, exergonic and endergonic reactions. Helmholtz & Gibbs free energy. Relationship between standard free energy change and equilibrium constant.

High energy compounds and their role. Ultrastructure of mitochondria – $F_0 F_1$ ATPase; Oxidative phosphorylation- mitochondrial electron transport chain and carriers involved, sites of ATP production.

Outline of mechanism and Theories of oxidative phosphorylation:

- Chemical coupling hypothesis
- Conformational coupling hypothesis
- Chemiosmotic coupling hypothesis.

Oxidation of extramitochondrial NADH – Shuttle systems,

- Malate Aspartate shuttle
- Glycerol 3 phosphate shuttle

ATP yield and P/O ratio. Inhibitors and uncouplers of oxidative phosphorylation.

Module III: SEPARATION TECHNIQUES**(15 hrs)**

Chromatography - Principles and applications of separation methods like paper, thin layer, Ion exchange, gel-filtration, Affinity Chromatography.

Electrophoresis –Principles and applications of paper, agarose, and polyacrylamide - native and SDS gel electrophoresis. Centrifugation – Principles and applications of centrifugation techniques – Differential, density gradient. Dialysis.

Module IV: SPECTROSCOPIC&RADIO ISOTOPIC TECHNIQUES**(15 hrs)**

Colorimetry and Spectrophotometry – Laws of light absorption- Beer Lambert's law, UV and Visible absorption spectra, molar extinction coefficient. Biochemical applications of spectrophotometer. Principles of fluorimetry& Flame photometry.

Nature of radioactivity; Radio isotopes; types of radioactive decay; β and γ emitters; Units of Radioactivity, Half-life. Uses of radioisotopes in biology.

5. Reference Books

1. Lehninger: Principles of Biochemistry (2013) 6thed.,Nelson, D.L. and Cox, M.M.W.H. Freeman and Company (New York).
2. Trevor Palmer: Enzymes (Biochemistry, Biotechnology, Clinical Chemistry), (2001) Horwood Publishing, ISBN 1-898563-78-0.
3. Wilson & Walker : Principles & Biochemical Techniques of Practical Biochemistry,(2000) Cambridge University Press. (Fifth Edition)
4. Upadhyaya &Upadhyaya. Biophysical Chemistry (2009) Himalayan Publishers.
5. Mathews: Biochemistry –3rd edition. Pearson Education Limited. (2003). ISBN: 81-297-0215-0.

6. Syllabus Focus

a) Relevance to Local , Regional , National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Global Development needs	Analytical techniques play a crucial role in various fields and industries, providing valuable insights and information
Global Development needs	Studying thermodynamic principles aid in easy understanding of cellular processes and energy flow

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD/EMP	Chromatography	Practicals
SD/EMP	Centrifugation	Practicals
SD/EMP	Electrophoresis	Practicals

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Science experiments	Experiential Learning
2.	Field trip	Experiential Learning
3.	Presentations/Assignments	Participative Learning

8. Course Assessment Plan

a) Weightage of Marks in Continuous Internal Assessments and End Semester Examination

COs	Continuous Internal Assessments – CIA (40%)	End Semester Examination (60%)
CO1	CIA-1	End Semester examination
CO2	CIA-1	
CO3	CIA-2 - Objective	
CO4	CIA-2 - Assignment/ model making/ PPT	

b) Model Question Paper

ENZYMES & ANALYTICAL TECHNIQUES

Code : U24/BIC/DSC/201
Credits : 4

Max Marks : 60
Time : 2 Hrs

I. Answer the following questions

(4x10=40M)

1. (a) Explain the factors affecting the enzyme catalysis.
OR
(b) Give the classification of enzymes with suitable examples.
2. (a) Illustrate the mitochondrial electron transport chain.
OR
(b) Explain the laws of thermodynamics
3. (a) Demonstrate the principle & applications of Ion exchange chromatography.
OR
(b) Demonstrate the principle & application of Affinity chromatography.
4. (a) Distinguish Colorimetry & Spectrophotometry
OR
(b) Analyze the types of Isotopes? Enumerate the uses of Radioisotopes.

II. Write Short notes on any 4 questions

(4x5=20M)

5. Lock and key hypothesis
6. Malate aspartate shuttle
7. Principle of paper chromatography
8. Dialysis
9. Molar extinction coefficient
10. Half life

**GUIDELINES FOR MODEL PAPER SETTING
AS PER BLOOMS TAXONOMY LEVEL (BTL)**

Semester II : Enzymes & Analytical Techniques

SECTION A - INTERNAL CHOICE (4 X 10 M = 40 M)				
Question Number	Question	Question	CO	BTL (Blooms Taxonomy Level)
1	Module 1	Explain the factors affecting the enzyme catalysis.	CO 1	2
2	Module 1	Give the classification of enzymes with suitable examples	CO 1	1
3	Module 2	Illustrate the mitochondrial electron transport chain.	CO 2	3
4	Module 2	Explain the laws of thermodynamics	CO 2	2
5	Module 3	Demonstrate the principle & applications of Ion exchange chromatography	CO 3	3
6	Module 3	Demonstrate the principle & application of Affinity chromatography	CO 3	3
7	Module 4	Distinguish Colorimetry & Spectrophotometry	CO 4	4
8	Module 4	Analyze the types of Isotopes? Enumerate the uses of Radioisotopes.	CO 4	4
SECTION B - ANSWER ANY 4 OUT OF 6 (4Q X 5M = 20M) (To compulsorily have ONE question from each module)				
9	Module 1	Lock and key hypothesis	CO 1	2
10	Module 2	Malate aspartate shuttle	CO 2	3
11	Module 3	Principle of paper chromatography	CO 3	3
12	Module 4	Dialysis	CO 3	3
13	Any Module	Molar extinction coefficient	CO 4	4
14	Any Module	Half life	CO 4	4

ENZYMES & ANALYTICAL TECHNIQUES PRACTICAL

1. Course Description:

Max. Hours: 30

Course Code: U24/BIC/DSC/201/P

Type of course: DSC

Hours per week: 2

No. of credits: 1

Max. Marks: 50

2. Course objective:

- Acquire skills of important separation techniques.

3. Course Outcome:

CO1: Demonstrate their skills in qualitative identification of amino acids.

CO2: Apply the knowledge of separation techniques of biomolecules.

PRACTICAL SESSIONS

1. Qualitative Analysis of Amino acids (4 sessions)
2. Separation of Sugars by Paper Chromatography
3. Separation of Amino Acids by Paper Chromatography
4. Separation of Lipids by TLC
5. Separation of Plant Pigments on Alumina Column
6. Gel Filtration Chromatography
7. Paper Electrophoresis
8. Dialysis
9. Formal Titration of Amino Acid – Glycine


Professor Karuna Rupula
Department of Biochemistry
Osmania University
Hyderabad-500 007 (TS)

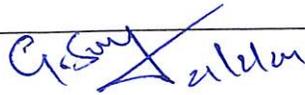
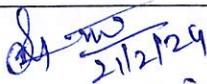
**MODEL QUESTION PAPER
PRACTICAL**

Course Code: U24/BIC/DSC/201/P
Credits: 1

Max Time: 2 Hrs
Max. Marks: 50

Answer the following: -

1. Write the schematic representation (flowchart) for the qualitative analysis of
 - c. Amino acids
 - d. Principle involved in Gel filtration chromatography (10 M)
2. Identify the given amino acid present in the given solutions **A** and **B** (10 + 10 M)
3. Perform Paper chromatography of amino acids & calculate the R_f value of the mixture. (10 M)
4. Viva (5M)
5. Record (5M)

Prepared by Course Teacher [Name & Signature]	Checked & Verified by HOD [Name & Signature]	Approved by the Principal
 Dr. G. Sony	 21/2/24 (S. Malathi Varma)	

HOD Biochemistry
St. Francis College for Women
Begumpet, Hyderabad-16.


Professor Karuna Rupula
 Department of Biochemistry
 University College of Science
 Osmania University
 Hyderabad-500 007 (TS)

St. FRANCIS COLLEGE FOR WOMEN, BEGUMPET, HYDERABAD-500016
(An Autonomous College Affiliated To Osmania University)
FACULTY OF SCIENCE- DEPARTMENT OF CHEMISTRY
PRACTICAL SYLLABUS CBCS-2024
SEMESTER -II
QUANTITATIVE ANALYSIS II
(Volumetric Analysis)

Program: B.Sc.
Course Code: U24/CHE/DSC/201/P
Course: DSC-2
No. of Credits: 1

Max. Hours: 20 Hrs
Max. Marks: 50
Hours per week: 2 Hrs

Course Objectives

- To develop analytical skills using the principles of quantitative analysis.

Course Outcomes

CO 1: Interpret and apply the principles of redox and complexometric titrations.

CO 2: Quantitative estimation of salts using gravimetric principles.

Volumetric Analysis

1. Estimation of Fe (II) ions by titrating it with $K_2Cr_2O_7$ using an internal indicator.
2. Estimation of Cu (II) ions using $Na_2S_2O_3$ with $K_2Cr_2O_7$ as primary standard.
3. Estimation of Iodine content in Iodized salt.
4. Estimation Nickel by back titration using $MgSO_4$.
5. Estimation of Zinc using EDTA.
6. Estimation of calcium or magnesium ions in milk.
7. Estimation of hardness of water.

References:

1. Vogel's Qualitative Inorganic Analysis, *Svehla, G.* Pearson Education, 2012.
2. J. Vogel's Quantitative Chemical Analysis, *Mendham*, Pearson, 2009.


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6. Syllabus Focus

a. Relevance to Local, Regional, National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Local	In manufacturing processes, local energy production and storage techniques, production of solvents and other materials, drug formulation and dosage calculations.
Regional	Preparation of fertilizers impacting agriculture, metal refining process, food and pharmaceutical applications, useful for analytical techniques.
National	Optimizing the use of P - block elements, focus on electrochemical principles, preparation of polymers, phase transformations of various systems.
Global	Electronic industry, advancements in electrochemical technologies, sustainable industrial processes impacting the environment, formulation of solutions.

b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Module No. 1	Encourage them to compare and discuss trends in reactivity and chemical behaviour
EMP	Module No. 2	Engage students in electrochemical cell design and analysis
ED	Module No. 3	Invite professionals or researchers who can share their insights from organic chemistry.
EMP	Module No. 4	Divide students into groups and share some real time applications.



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Dept of Chemistry

7. Pedagogy

S. No.	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiential Learning	Field trips
2.	Participative Learning	Presentations
3.	Problem solving	Case studies

8. Course Assessment Plan

a. Weightage of Marks in Continuous Internal Assessments and End Semester Examination

CO	Continuous Internal Assessments CIA - 40%	End Semester Examination-60%
CO1	CIA 1 written exam	Written Exam
CO2	CIA 2 (Quiz/Assignment/3D model making)	
CO3	CIA 1 written exam	
CO4	CIA 2 (Crossword/Problem solving/Assignment)	


 Chairperson
 Board of Studies in Chemistry
 Dept of Chemistry
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b. Model Question Paper - End Semester Exam

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(An Autonomous College Affiliated to Osmania University)

Faculty of Science – Department of Chemistry

MODEL PAPER

B. Sc. I YEAR SEMESTER -II

TIME: 2 hrs

Course Code: U24/CHE/DSC/201

Max. Marks: 60 M

SECTION –A (Essay Questions)

I. Answer the following

4X10M=40 Marks

1. a). Classify the oxides based on the oxygen content. (CO 1) L1 4M
b). What are interhalogen compounds? Explain the structure of the AX₅ type of molecule. (CO 1) L1 6M
- OR
2. a). Discuss the structure of Diborane. (CO 1) L2 5M
b). What are silicones? Classify them. (CO 1) L1 5M
 3. a). Describe the Hittorf method for the determination of transport number (CO 2) L2 5M
b) Explain Debye –Huckle’s theory and the role of inter-ionic effect. (CO 2) L2 5M
- OR
4. a) Explain the working and construction of S.H.E. (CO 2) L2 5M
b) State Kohlrausch law of independent migration of ions and list out its applications. (CO 2) L2 5M
 5. a) Give the mechanism of Nitration on Benzene. (CO3) L1 5M
b) Write a note on directive influence of methyl group. (CO3) L1 5M
- OR
6. Explain S_N1 and S_N2 reactions with their mechanism, stereochemistry, and energy profile diagram. (CO 3) L2 10M
 7. a) What are azeotropes? Explain ethanol-water system. (CO 4) L2 5M
b) State and explain Raoult’s law with its limitations. (CO 4) L2 5M
- OR
8. a) Justify that the chair form of cyclohexane is the most stable conformation. (CO4) L4 6M
b) Define proper axis of symmetry. Illustrate with 2 examples. (CO4) L1 4M

SECTION – B (Short Answer Questions)

II. Answer any four

4x5=20 Marks

9. Discuss the structure of XeO₃. (CO1) L1
10. Calculate the EMF of Cd, Cd²⁺//Cu²⁺, Cu E⁰ (Cu²⁺, Cu) = 0.34V.
E⁰(Cd²⁺, Cd) = -0.488 V. (CO 2) L5
11. How can you interpret aromatic character in a molecule? (CO3) L5
12. State and explain Henry’s Law and its limitations. (CO 4) L2
13. Write a note on Williamson synthesis. (CO3) L1
14. What are carbides and give their classification. (CO1) L1



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b. Model Question Paper - End Semester Exam

St. FRANCIS COLLEGE FOR WOMEN, BEGUMPET, HYDERABAD-500016

(An Autonomous College Affiliated to Osmania University)

Faculty of Science – Department of Chemistry

B. Sc. I YEAR SEMESTER -II

Time: 2 Hrs

Max. Marks: 60M

Course Code: U24/CHE/DSC/201

Credits: 4

SECTION A - INTERNAL CHOICE			4 Q X 10 M = 40M	
Question Number	Question		CO	BTL
1	Module 1	a) Classify the oxides based on the oxygen content. 4M b) What are interhalogen compounds? Explain the structure of AX ₃ type of molecule. 6M OR	CO 1	(Level II)
2	Module 1	a) Discuss the structure of Diborane. 5M b) What are silicones? Classify them 5M	CO 1	(Level II)
3	Module 2	a) Describe the Hittorf method for the determination of transport number 5M b) Explain Debye –Huckle's theory and explain the role of inter-ionic effect. 5M OR	CO 2	(Level II)
4	Module 2	a) Explain the working and construction of S.H.E. 5M b) State Kohlrausch law of independent migration of ions and list out application 5M	CO 2	(Level II)
5	Module 3	a) Give the mechanism of Nitration on Benzene. 5M b) Write a note on directive influence of methyl group. 5M OR	CO 3	(Level I)
6	Module 3	Explain the hydrolysis of primary and tertiary alkyl halides with mechanism, stereochemistry and energy profile Diagram. 10M	CO 3	(Level II)

7	Module 4	a) What are azeotropes? Explain ethanol-water system. 5M b) State and explain Raoult's law with its limitations. 5M OR	CO 4	(Level II)
8	Module 4	a) Justify that the chair form of cyclohexane is the most stable conformation. 6M b) Define proper axis of symmetry. Illustrate with 2 examples. 4M	CO 4	(Level IV)
SECTION B – (Short answer questions)				
ANSWER ANY 4 OUT OF 6			4 X 5M = 20 M	
9	Module 1	Discuss the structure of XeO ₃	CO 1	(Level I)
10	Module 2	Calculate the EMF of Cd, Cd ²⁺ //Cu ²⁺ , Cu E ⁰ (Cu ²⁺ , Cu) = 0.34V. E ⁰ (Cd ²⁺ , Cd) = -0.488V.	CO 2	(Level V)
11	Module 3	How can you interpret aromatic character in a molecule?	CO 3	(Level V)
12	Module 4	State and explain Henry's Law and its limitations.	CO 4	(Level II)
13	Module 3	Write a note on Williamson synthesis.	CO 3	(Level I)
14	Module 1	What are carbides and give their classification.	CO 1	(Level I)


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SEMESTER - II
WEB PROGRAMMING

1. Course Description**Programme: B.Sc.****Course Code: U24/CAP/DSC/201****Course Type: DISCIPLINE SPECIFIC CORE****No. of credits: 4****Max. Hours: 60****Hours per week: 4****Max. Marks: 100****2. Course Objectives**

- To know the basics of Internet
- To introduce the design of Web pages, with an emphasis on the JavaScript's standards and the use of JavaScript.

3. Course Outcomes

On completion of the course the student will be able to:

CO1: *Discuss* and *explain* basic Internet concepts such as WWW, HTML and XHTML
(Cognitive level – 2)

CO2: *Apply* various font tags and CSS concepts. (Cognitive level – 3)

CO3: *Apply* the primitive operations and expressions and work with control statements
(Cognitive level - 5)

CO4: *Design* website using basic commands and functions. (Cognitive level – 6)



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4. Course Content

MODULE I: FUNDAMENTALS OF HTML (15 Hrs)

Introduction to the Internet – WWW, Web Browsers, Web Servers, URL, MIME; HTML & XHTML – Basic Syntax, XHTML Document Structure, Basic Text Markup, Images, Hypertext Links, Lists, Tables.

MODULE 2: FORMS AND CSS (15 Hrs)

Forms – Form Tags, Input, Select, Text Area, Action Buttons; Frames; CSS – Levels of Style Sheets, Style Specification Formats, Selector Forms, Property Value Forms, Font Properties, List Properties, Color, Alignment of Text, Box Model, Background Images, Span & Div Tags, Conflict Resolution.

MODULE 3: JAVASCRIPT (15 Hrs)

JavaScript – Object Orientation to JavaScript, General Syntactic Characteristics, Primitive Operations and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions.

MODULE 4: DOCUMENT OBJECT MODEL (15 Hrs)

DOM – Element Access in JavaScript, Events and Event Handling, Handling Events - From Body Elements, From Button Element, From Textbox and Password Elements; Dynamic Documents with JavaScript – Positioning Elements, Moving Elements, Element Visibility, Changing Color and Font, Stacking Elements.

5. References

1. Programming the World Wide Web by Robert Sebesta 4th Edition Pearson 2011.
2. Bootstrap by Jake Spurlock 1st Edition, O'Reilly Publications 2013.



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6. Syllabus Focus**a) Relevance to Local, Regional, National and Global Development Needs**

Local /Regional/National /Global Development Needs	Relevance
Global Development	Websites of various domains can be designed and developed using concepts such as HTML, CSS and JavaScript

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Modules 1 and 2	Designing forms with various form controls and using CSS.
EMP	Modules 3 and 4	JavaScript can be used both in the front-end and back-end of web development

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative	Seminars
2.	Experimental	Quiz
3.	Problem solving	Troubleshoot (debug) code



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8. Course Assessment Plan**a) Weightage of Marks in Continuous Internal Assessments and Written Exam**

CO	Continuous Internal Assessments CIA - 40%	Written Exam-60%
CO1	CIA 1 – Written Test	Written Exam
CO2	CIA 2 – Written Test	
CO3	CIA 2 – Written Assignment	
CO4	CIA 3 – Lab Test	



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b) Model Question Paper- End Semester Exam**WEB PROGRAMMING**

Course code: U24/CAP/DSC/201
Credits: 4

Max. Marks:60
Time: 2 Hrs

SECTION – A**I. Answer the following****4 x 10 = 40 M**

1. What are Web servers and Web Browsers?

OR

2. Explain Tables and write HTML Code to demonstrate tables with all attributes.

3. Create a signup form using HTML Form Controls.

OR

4. What is CSS? Explain different types of CSS with examples of each.

5. Explain Control Statements in Javascript with an example.

OR

6. Explain Java script Functions with an example.

7. What is an Event? Explain different Event Handling functions in JavaScript. .

OR

8. Explain Document Object Model in detail.

SECTION – B**II. Answer any FOUR****4 x 5 = 20 M**

9. Explain about expressions in Java Script.

10. Explain the Structure of HTML with an example.

11. Explain how to access elements in Java Script.

12. Explain different types of Lists in HTML

13. How to declare, initialize java script arrays?

14. Explain types of Font Properties with examples



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**WEB PROGRAMMING
PRACTICAL**

1. Course Description

Programme: B.Sc

Max. Hours: 30

Course Code: U24/CAP/DSC/201/P

Hours per week: 2

Course Type: DISCIPLINE SPECIFIC CORE

Max. Marks: 50

No. of credits: 1

2. Course Objectives

CO1: To implement HTML concepts to create forms.

CO2: To develop proficiency in creating dynamic web pages.

PRACTICAL SESSIONS

1. HTML Exercises based on creating different types of Lists.
2. Create an HTML File and insert a hyperlink of a website.
3. Insert and Image in a HTML File and write a paragraph about it using different font tags.
4. Create a Registration Form.
5. Create a sign-in and sign-up form.
6. Create a student Admission form for your college.
7. Write a JavaScript function to perform arithmetic operations on two numbers.
8. Write a JavaScript program to find the maximum number in an array.
9. Write a JavaScript program to find the minimum number in an array.
10. Write a JavaScript program to reverse a given string.
11. Write a JavaScript function that takes an array of numbers and returns a new array with only the even numbers.
12. Write a JavaScript function to get the values of First and Last from an HTML form.
13. Write a JavaScript function to add rows to a table.
14. Write a JavaScript function that accepts a row, column (to identify a particular cell) and a string to update the cell's contents.
15. Write a JavaScript program to remove items from a drop-down list.



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PRACTICAL MODEL PAPER**Course Code: U24/CAP/DSC/201/P****Credits: 1****I. Answer any two:****Max Marks:50M****Time: 2 Hrs**

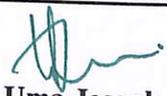
1. Create a form with a text input field and a submit button. When the form is submitted, display an alert with the text entered in the input field.
2. Create an array of numbers. Write functions to find the sum, average, maximum, and minimum values in the array.
3. Write a function that takes a string as input and counts the number of vowels (a, e, i, o, u) in it.

b) Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
I	15	1	2	10	1	5
II	15	2	2	10	1	5
III	15	3	2	10	2	5
IV	15	4	2	10	2	5

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions (hrs.)
1	1	2	15
2	2	3	15
3	1	5	15
4	2	6	15

Prepared by	Checked & verified by	Approved by
 Ms. Ummya Mohammedi Teaching Faculty	 Ms. D. Sowjanya HOD	 Dr. Uma Joseph Principal


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