

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

DISCIPLINE SPECIFIC CORE I
CHEMISTRY I
B.Sc. I - SEMESTER- I 60 h

Module 1: Inorganic Chemistry

Chemistry of p-Block elements

Module 2: Organic Chemistry

Structural Theory in Organic Chemistry

Acyclic Hydrocarbons

Aromatic Hydrocarbons

Module 3: Physical Chemistry

Elementary Quantum Mechanics

Chemical Kinetics

Photochemistry

Module 4: General Chemistry

General Principles of Inorganic Quantitative Analysis

Isomerism

Colloids & Surface Chemistry

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**SEMESTER - I
CHEMISTRY - I****1. Course Description**

Programme: B.Sc.
Course Code: U26/CHE/DSC/101
Course type: DSC - 1
No. of credits: 4

Max. Hours: 60
Max. Marks: 100
Hours per week: 4

2. Course Objectives

- To develop an understanding of the periodic trends, electronic configuration, bonding, structure, and reactivity of p-block elements and their compounds.
- To enable students to comprehend structural theory, bonding, stereochemistry, and the preparation, properties, and reactions of acyclic and aromatic hydrocarbons.
- To introduce the fundamental principles of quantum mechanics, chemical kinetics, and photochemistry, and apply them to explain molecular behavior and reaction mechanisms.
- To equip students with foundational knowledge of inorganic quantitative analysis, structural and stereoisomerism, and the principles governing colloids and surface phenomena.

3. Course Outcomes

On completion of the course the student will be able to

- Analyze the electronic configuration, periodic trends, bonding, and reactivity of p-block elements to predict the properties of their compounds.
- Apply principles of structural theory and mechanistic reasoning to interpret and predict the reactions of acyclic and aromatic hydrocarbons.
- Explain and apply the fundamental concepts of quantum mechanics, chemical kinetics, and photochemistry to analyze molecular systems and reaction rates.
- Demonstrate analytical and conceptual understanding of inorganic quantitative analysis, isomerism, and colloidal and surface phenomena in chemical systems.

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Alkynes— Preparation by dehydrohalogenation of vicinal dihalides, dehalogenation of tetrahalides. Physical Properties: Chemical reactivity – electrophilic addition of X_2 , HX , H_2O (tautomerism), Oxidation (formation of enediol) and reduction (catalytic hydrogenation).

Aromatic Hydrocarbons

5h

Introduction to aromaticity: Huckel's rule – Benzene, Naphthalene and Anthracene. Reactions - General mechanism of electrophilic substitution, mechanism of nitration, sulphonation and halogenation, Friedel Crafts 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 - nitro, nitrile, carbonyl, carboxylic acid, sulphonic acid and halo groups.

IKS: Traditional distillation methods in the extraction of perfumes.

MODULE III: PHYSICAL CHEMISTRY

15 h (1 h/week)

Elementary quantum mechanics

3h

Limitations of classical mechanics and Origin of quantum mechanics-Black body radiation, Rayleigh Jeans law; Planck's radiation law, photoelectric effect, Compton effect, de Broglie's hypothesis. Heisenberg's uncertainty principle. Schrödinger wave equation (derivation not required) – significance of ψ and ψ^2 .

Chemical Kinetics

8h

Introduction to chemical kinetics, rate of reaction, rate laws and rate constant. Molecularity and Order of a reaction. Factors influencing the reaction rates. First order reaction, derivation of equation for rate constant. Characteristics of first order reaction. Units for rate constant. Half- life period, graph of first order reaction, Example - Decomposition of H_2O_2 . Problems. Pseudo first order reaction, Hydrolysis of methyl acetate, inversion of cane sugar, problems. Second order reaction, derivation of expression for second order rate constant, example-Saponification of ester. Characteristics of second order reaction, units for rate constants, half- life period and second order plots. Problems. Methods for determining the order of a reaction. Arrhenius equation – activation energy -problems.

Photochemistry

4h

Introduction to photochemistry – differences between dark and photo reactions. Laws of photochemistry; Quantum Yield – problems; Examples of photo chemical reactions with different quantum yields. Photo chemical combinations of H_2-Cl_2 and H_2-Br_2 reactions. Abnormal quantum yield – high and low-examples with reasons. Singlet and triplet states. Jablonski diagram – non radiative processes – Internal conversion and Intersystem crossing; radiative processes- Fluorescence and phosphorescence.

4. Course Content

MODULE I: INORGANIC CHEMISTRY

15 h (1 h/week)

Chemistry of p-Block Elements

15 h

Structure and bonding in diborane (B_2H_6), Boron nitrogen compounds ($B_3N_3H_6$ and BN), Lewis acid nature of BX_3 .

Carbides- Classification -ionic, covalent, interstitial-Structures and reactivity. Industrial applications. Silicones-Classification-straight chain, cyclic and cross-linked and applications.

Nitrides-Classification -ionic, covalent and interstitial- Reactivity – hydrolysis.

Oxides and Oxyacids- Definition and Types of oxides (a) Normal- acidic, basic amphoteric and neutral (b) Mixed oxide (c) sub oxide (d) peroxide (e) superoxide. Structure of oxides and oxyacids of B, C, N, P, S and Cl - reactivity, thermal stability, hydrolysis.

Interhalogens- Classification- general preparation- structures of AB , AB_3 , AB_5 and AB_7 type and reactivity.

Poly halide- Definition and structure of ICl_2^- , ICl_4^- and I_3^- .

Pseudohalogens- Comparison with halogens.

Structure, bonding and reactivity of Xenon Compounds-Oxides, Halides and Oxy-halides.

MODULE II: ORGANIC CHEMISTRY

15 h (1 h/week)

Structural Theory in Organic Chemistry

5h

Bond polarization: Factors influencing the polarization of covalent bonds, electro negativity – inductive effect. Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbonium ions. Resonance - Mesomeric effect, application to (a) acidity of phenol. (b) acidity of carboxylic acids and basicity of anilines. Stability of carbo cations, carbanions and free radicals. Hyper conjugation and its application to stability of carbonium ions, free radicals and alkenes.

Acyclic Hydrocarbons

5h

Alkanes– Methods of preparation: Preparation of Alkanes from Grignard reagent. Chemical reactivity- inert nature, free radical substitution, Halogenation example.

Alkenes - Preparation of alkenes (with mechanism) (a) by dehydration of alcohols (b) dehydrohalogenation of alkyl halides (c) by dehalogenation of 1,2 dihalides, Zaitsev's rule. Properties: Anti-addition of halogen and its mechanism. Addition of HX, Markovnikov's rule, addition of H_2O , HOX with mechanism and addition of HBr in the presence of peroxide (anti Markovnikov's addition). Oxidation (cis-additions) hydroxylation by $KMnO_4$, OsO_4 , anti-addition- peracids (via epoxidation), ozonolysis – location of double bond.

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MODULE IV: GENERAL CHEMISTRY

15 h (1 h/week)

General Principles of Inorganic Quantitative Analysis 5h

Volumetric Analysis: Introduction, standard solutions, indicators, end point, titration curves, Types of titrations: i) neutralization titration- principle, theory of acid base indicators, titration curves and selection of indicators- strong acid - strong base, strong acid -weak base, weak acid- strong base and weak acid -weak base. Theory of redox titrations – internal (KMnO_4) and external indicators – use of diphenylamine and ferroin indicators. Theory of complexometric titrations – use of EBT, Murexide and Fast sulphone black indicators. Role of pH in complexometric titrations. Precipitation titrations – theory of adsorption indicators.

Isomerism 5h

Isomerism: Definition of isomers. Classification of isomers: Constitutional and Stereoisomers - definition and examples. Constitutional isomers: chain, functional and positional isomers. Stereoisomers: enantiomers and diastereomers – definitions and examples. Representation of stereoisomers – Wedge, Fischer, Sawhorse, Newmann projection formulae.

Conformational analysis: Classification of stereoisomers based on energy. Definition and examples Conformational and configurational isomers. Conformational analysis of ethane, n- butane, 1,2- dichloroethane, 2-chloroethanol. Cis-trans isomerism: E-Z Nomenclature.

Colloids & Surface Chemistry 5h

Colloids: Definition of colloids-classification of colloids-examples. Solid in liquid (sol)-Preparation, kinetic and electrical properties, stability and protection of colloids - Hardy-Schulze rule and Gold number. Liquid in liquid (emulsion)-types of emulsions and emulsifiers. Liquid in solid (gel)-types and properties. Applications of colloids. **Adsorption:** Types of adsorptions; Factors influencing adsorption; Freundlich adsorption isotherm and Langmuir adsorption isotherm. Applications.

5. Reference Books

General reference: B.Sc I Year Chemistry : Semester I, Telugu Academy publication, Hyd.

Module- I

1. Puri, B. R., Sharma, L. R., & Kalia, M. S. (1996). Principles of inorganic chemistry. Vishal Publications.
2. Lee, J. D. (1981). Concise inorganic chemistry (3rd ed.). Oxford University Press.
3. Cotton, F. A., Wilkinson, G., & Gaus, P. L. (2001). Basic inorganic chemistry (3rd ed.). Wiley.

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- Huheey, J. E., Keiter, E. A., & Keiter, R. L. (1993). Inorganic chemistry: Principles of structure and reactivity (4th ed.). Harper Collins College Publishers.
- Greenwood, N. N., & Earnshaw, A. (1989). Chemistry of the elements. Pergamon Press.
- Shriver, D. F., & Atkins, P. W. (1999). Inorganic chemistry (3rd ed.). Oxford University Press.
- Gopalan, R. (2009). Textbook of inorganic chemistry. University Press.

Module- II

- Morrison, R. T., & Boyd, R. N. (2011). Organic chemistry. Pearson Education (Prentice Hall).
- Solomons, T. W. G., & Fryhle, C. B. (2016). Organic chemistry. Wiley (John Wiley & Sons).
- Bruice, P. Y. (2017). Organic chemistry. Pearson Education.
- Wade, L. G., Jr. (2013). Organic chemistry. Pearson Education.
- Jones, M., Jr. (2010). Organic chemistry. W. W. Norton & Company.
- McMurry, J. (2015). Organic chemistry. Cengage Learning (Brooks/Cole).
- Soni, P. L., & Soni, H. M. (2012). Organic chemistry. Sultan Chand & Sons.
- Ghosh, S. K. (2009). General organic chemistry. Bharati Bhawan Publishers.
- Pillai, C. N. (2008). Organic chemistry. Universities Press (India) Pvt. Ltd.

Module- III

- Puri, B. R., Sharma, L. R., & Pathania, M. S. (2013). Principles of physical chemistry (46th ed.). Vishal Publishing Company.
- Raj, G. (2009). Advanced physical chemistry (35th ed.). Goel Publishing House.
- Lewis, G., & Glasstone, S. (1966). Elements of physical chemistry. Macmillan.
- Atkins, P. W. (2001). Physical chemistry (7th ed.). Oxford University Press.
- Kapoor, K. L. (1994). A textbook of physical chemistry (Vols. 4 & 5). Macmillan India Ltd.
- Laidler, K. J. (1987). Chemical kinetics (3rd ed.). McGraw Hill.
- Rajaraman, J., & Kuriacose, J. (1993). Kinetics and mechanism of chemical transformations. Macmillan India.
- Turro, N. J. (1978). Molecular photochemistry. W. A. Benjamin, Inc.
- Rohatgi-Mukherjee, K. K. (1978). Fundamentals of photochemistry. Wiley Eastern.
- Dogra, S. K., & Dogra, S. (1996). Physical chemistry through problems (4th ed.). New Age International.
- Kalidas, C., & Sangaranarayanan, M. V. (2019). Physical chemistry: Problems and solutions. University's Press.

Module- IV

- Jeffery, G. H., Bassett, J., Mendham, J., & Denney, R. C. (1999). Vogel's textbook of quantitative chemical analysis (5th ed.). Addison Wesley Longman Inc.
- Day, R. A., & Underwood, A. L. (2004). Quantitative analysis (6th ed.). Prentice Hall of India.

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3. Svehla, G. (1996). Vogel's qualitative inorganic analysis (7th ed.). Prentice Hall.
4. Morrison, R. T., & Boyd, R. N. (2011). Organic chemistry. Pearson Education.
5. Solomons, T. W. G., & Fryhle, C. B. (2016). Organic chemistry. Wiley.
6. Bruice, P. Y. (2017). Organic chemistry. Pearson Education.
7. Soni, P. L. (2012). Textbook of organic chemistry. Sultan Chand & Sons.
8. Levine, I. N. (2009). Physical chemistry (6th ed.). McGraw Hill.
9. Kapoor, K. L. (1994). A textbook of physical chemistry (Vols. 4 & 5). Macmillan India Ltd.
10. Atkins, P., & de Paula, J. (2010). Atkins' physical chemistry (9th ed.). Oxford University Press.
11. McQuarrie, D. A., & Simon, J. D. (1997). Physical chemistry: A molecular approach. Viva Books Pvt. Ltd.
12. Satake, M., Hayashi, Y., Mido, Y., Iqbal, S. A., & Sethi, M. S. (2014). Colloidal and surface chemistry. Discovery Publishing Pvt. Ltd.

6. Syllabus Focus

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

Local/Regional/ National/Global Development Needs	Relevance
Local	Helps individuals understand and safely use everyday chemical products such as fuels, medicines, fertilizers, and cleaning agents.
Regional	Supports regional industries like agriculture, petrochemicals, pharmaceuticals, and environmental monitoring.
National	Contributes to national economic growth through industrial development, technological innovation, and scientific research.
Global	Plays a vital role in addressing global challenges such as climate change, sustainable energy, food security, and healthcare advancements.

b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED /EMP	Syllabus Content	Description of Activity

SD	Module I	Encourage them to compare and discuss trends in reactivity and chemical behaviour.
EMP	Module II	Students will create a brief dossier on a hydrocarbon compound, highlighting its structure–property link, synthesis, safety, and industrial uses to build employability skills.
ED	Module III	Students will develop a startup proposal for a light-driven or catalytic process applying concepts of quantum mechanics, chemical kinetics, and photochemistry to assess feasibility and market potential.
EMP NSQF level 3 & 4	Module IV	Hands on practical training and field visits.

c. IKS component:

IKS	Syllabus Content	Module
	Introduced Traditional distillation methods in the extraction of perfumes.	II

7. Pedagogy

S. No.	Student Centric Methods Adopted	Type / Description of Activity
1	Experiential Learning	Micro-scale experiments in Volumetric analysis and field visits.
2	Participative Learning	Collage/ Quiz/ JAM/Game based

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: Collage/Quiz/JAM/	
CO3	CIA-1: Written Exam	
CO4	CIA-2: Assignment/ Game based/ Poster making	

b. Model Question Paper - End Semester Exam Theory

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 (An Autonomous College Affiliated to Osmania University)
 Faculty of Science – Department of Chemistry
MODEL PAPER
B.Sc. I YEAR SEMESTER -I
CHEMISTRY - I

Time: 2 hrs

Course Code: U26/DSC/CHE/101

Max. Marks: 60

SECTION –A (Essay Questions)

I. Answer the following

4x 10=40 Marks

- Classify the oxides based on the oxygen content. 4M
 - What are interhalogen compounds? Explain the structure of AX₃ type of molecules. 6M

OR
- Discuss the structure of Diborane. 5M
 - What are silicones? Give their classification. 5M
- What is the Mesomeric effect? How does it explain the acidity of phenols? 5M
 - Explain the acidic strength of carboxylic acids by applying the concept of Inductive effect. 5M

OR
- Write the mechanism for Friedel Crafts alkylation of benzene. 5M
 - What are ortho, meta and para directing groups? Explain with one example each. 5M
- Write the Schrodinger wave equation and explain the significance of ψ and ψ^2 and draw shapes of p and d atomic orbitals. 10M

OR
- Derive an expression for the rate constant of first order reaction. 5M

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- b. A first order reaction is 50% complete in 100 minutes. How long will it take for 90% completion? 5M
7. Explain the principle involved in Redox titrations? Add a note on the detection of end points. 10M
- OR
8. a. Classify various types of colloids. 5M
- b. Deduce the expression for Langmuir adsorption isotherms. 5M

SECTION –B (Short Answer Questions)

II. Answer any four.

4x5=20 Marks

9. Discuss the structure of XeO₃.
10. State and explain Markovnikov's rule with mechanism.
11. What is Huckel's rule? State whether naphthalene, cyclopentadienyl anion and tropylium cation are aromatic or not based on Huckel's rule.
12. Determine the order of reaction using Van't Hoff differential method.
13. State and explain Grothus and Draper's law.
14. Discuss the conformations of n-Hexane. Which is more stable and why?

Question Paper Format - Blooms Taxonomy Level

SECTION A - INTERNAL CHOICE				4 X 10 = 40 M	
Question Number	Module	Question	CO	BTL	
1	I	a. Classify the oxides based on the oxygen content. 4M b. What are interhalogen compounds? Explain the structure of AX ₃ type of molecules. 6M OR	CO1	Level 1 & 2	
2	I	a. Discuss the structure of Diborane. (CO1) 5M b. What are silicones? Give their classification. 5M	CO1	Level 1 & 2	

3	II	a. What is the Mesomeric effect? How does it explain the acidity of phenols? 5M b. Explain the acidic strength of carboxylic acids by applying the concept of Inductive effect. 5M OR	CO2	Level 3
4	II	a. Write the mechanism for Friedel Crafts alkylation of benzene. 5M b. What are ortho, meta and para directing groups? Explain with one example each. 5M	CO2	Level 2 & 3
5	III	a. Write the Schrodinger wave equation and explain the significance of ψ and ψ^2 and draw shapes of p and d atomic orbitals. 10M OR	CO3	Level 2
6	III	a. Derive an expression for the rate constant of first order reaction. 5M b. A first order reaction is 50% complete in 100 minutes. How long will it take for 90% completion? 5M	CO3	Level 4 & 5
7	IV	Explain the principle involved in Redox titrations? Add a note on the detection of end points. 10M OR	CO4	Level 2
8	IV	a. Classify various types of colloids. 5M b. Deduce the expression for Langmuir adsorption isotherms. 5M	CO4	Level 2 & 4
SECTION B - Short answer questions				
ANSWER ANY 4 OUT OF 6				4 x 5 = 20M
9	I	Discuss the structure of XeO_3 .	CO1	Level 2
10	II	State and explain Markovnikov's rule with mechanism.	CO2	Level 1 & 4
11	II	What is Huckel's rule? State whether naphthalene, cyclopentadienyl anion	CO2	Level 3

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		and tropylium cation are aromatic or not based on Huckel's rule.		
12	III	Determine the order of reaction using Van't Hoff differential method.	CO3	Level 3
13	III	State and explain Grothus and Draper's law.	CO3	Level 2
14	IV	Discuss the conformations of n-Hexane. Which is more stable and why?	CO4	Level 2 & 4

c) 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
1	15	CO1	2	10	6 (By taking at least one question from each module)	4x5=20
2	15	CO2	2	10		
3	15	CO3	2	10		
4	15	CO4	2	10		

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions (h)
1	1,3	Understand	15
2	1,2	Analyse	15
3	1,2	Apply	15
4	1,7	Remember	15

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FACULTY OF SCIENCE- DEPARTMENT OF CHEMISTRY
SEMESTER -I
LABORATORY COURSE-I - QUANTITATIVE ANALYSIS

1. Course description

Program: B.Sc.

Max. Hours: 20

Course Code: U26/CHE/DSC/101/ P

Max. Marks: 50

Course type: DSC-1

Hours per week: 2

No. of Credits: 1

2. Course Objective

- To enable students to understand the principles of volumetric analysis and apply titrimetric methods for precise quantitative estimation of chemical substances.

3. Course outcomes

CO 1: Students will be able to accurately prepare and standardize solutions, select suitable indicators, and perform various titrimetric methods with proper laboratory technique.

CO 2: Students will be able to apply volumetric analysis techniques to determine the composition or strength of constituents in market samples and interpret the results with appropriate calculations.

4. Course content**QUANTITATIVE ANALYSIS****Acid-Base Titrations**

1. Estimation of Carbonate in Washing Soda.
2. Estimation of Bicarbonate in Baking Soda.
3. Estimation of Carbonate and Bicarbonate in the Mixture.
4. Estimation of Alkali content in Antacid using HCl.

Redox Titrations

1. Determination of Fe(II) using $K_2Cr_2O_7$
2. Determination of Fe(II) using $KMnO_4$ with sodium oxalate as primary standard.
3. Determination of Cu(II) using $Na_2S_2O_3$ with $K_2Cr_2O_7$ as primary standard

Complexometric Titrations

1. Estimation of Mg^{2+} by EDTA
2. Estimation of Cu^{2+} by EDTA

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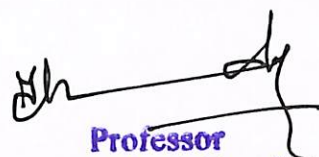
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5. Reference Books

1. Jeffery, G. H., Bassett, J., Mendham, J., & Denney, R. C. (1999). Vogel's textbook of quantitative chemical analysis (5th ed.). Addison Wesley Longman Inc.
2. Vogel, A. I. Vogel's Textbook of Quantitative Chemical Analysis, 6th Edition, Pearson Education, 2000. ISBN: 9780582226289
3. Giri, A. N. (2010). A textbook of practical chemistry. Himalaya Publishing House.
4. O.P. Pandey, D.N. Bajpai, & S. Giri. (2020). Practical chemistry. 10th Revised Edition, S. Chand Publishing. ISBN: 9789352535859
5. Gopalan, R., Subramanian, P. S., & Raghavan, K. (2004). Elements of analytical chemistry. Sultan Chand & Sons.
6. Gopalan, R., Venkappayya, D., and Nagarajan, S. (2012). Textbook of Inorganic Chemistry (Lab Manual), 3rd Edition, Universities Press, Hyderabad, ISBN: 9788173718204
7. Ahluwalia, V. K., and Sunita Dhingra, (2005). A Laboratory Manual of Organic and Inorganic Chemistry, 1st Edition, University Press, Hyderabad, ISBN: 9788173715623


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6. Model Question Paper - End Semester Exam Practical

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(An Autonomous College Affiliated to Osmania University)

Faculty of Science – Department of Chemistry

MODEL PAPER

B.Sc. I YEAR SEMESTER -I

LABORATORY COURSE-I - QUANTITATIVE ANALYSIS

Program: B.Sc.

Course Code: U26/DSC/CHE/101/P

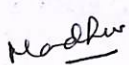
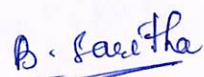

Type of course: DSC-1

Time: 2 hrs

No. of credits: 1

Max. Marks: 50


1. Estimate the amount of Oxalic acid present in 100 mL of the given unknown solution. You are provided with a pure sample of sodium oxalate and KMnO_4 solution of 0.02 M approximately. 30M
2. Viva 10 M
3. Record & attendance 10 M

Prepared by	Checked & Verified by	Approved by
 Dr Lakshmi Madhuri Ms B Prashanthi	 Dr Saritha Aduri HoD	 Prof. Uma Joseph Principal Principal

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SEMESTER - I

FUNDAMENTALS OF NUTRITION

1. Course Description**Programme: B. Sc****Course Code: U26/ NUT/ DSC/101****Type of Course: DSC-1****No. of Credits: 4****Max. Hours: 60****Hours per week: 4****Max. Marks: 60****2. Course Objectives**

1. To study various nutrients and their relationship to health.
2. To understand the biological processes and systems as applicable to Human Nutrition

3. Course Outcomes**After the successful completion of the course, the student will be able to:****CO1:** Understand the functions of carbohydrates and estimation of energy values of food.**CO 2:** Remember the role of essential and non-essential proteins and fats and its metabolism.**CO 3:** Analyze the deficiencies of vitamins, and regulation of water and electrolyte balance.**CO 4:** Remember the importance of minerals and fiber in a balanced diet

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4. Course content**MODULE I: CARBOHYDRATES AND ENERGY****(15 Hours)**

1.1. Introduction to Nutrition: Definition, Nutrients, Food, classification of foods, nutritional needs of the body. Role of nutrients.

1.2. Carbohydrates: Classification, Sources, Functions, and requirements of carbohydrates, digestions and absorption of carbohydrates, Transport, utilization and storage of carbohydrates. Metabolism- glycolysis, TCA Cycle, glycogenesis, glycogenolysis, gluconeogenesis.

1.3. Energy: Energy value of foods, Estimation of energy value of foods by a Bomb calorimeter and by Benedict's oxy calorimeter. Factors affecting energy requirements. Determination of Basal Metabolic rate. Factors affecting BMR, SDA. Determination of BMR. Respiratory quotient, Physiological fuel value.

MODULE II: PROTEINS AND LIPIDS**(15 Hours)**

2.1. Proteins: Classification, Sources, Functions, and requirements of Proteins, Digestion and absorption of proteins, transport and storage of proteins. Supplementary value of proteins and deficiency.

2.2. Lipids: Classification, sources and functions, Digestion and absorption of lipids, transport and storage of lipids. Role of essential fatty acid and deficiency. Role of Lipoproteins.

2.3. Metabolism: Protein Metabolism - deamination, decarboxylation, transamination, urea cycle. Fat Metabolism - β oxidation of fatty acids.

MODULE III: VITAMINS AND WATER AND ELECTROLYTE BALANCE (15 Hours)

3.1 Fat soluble Vitamins: Sources, functions, Requirements, transport, utilization, storage, deficiencies of vitamins- A, D, E, K.

3.2. Water soluble Vitamins: Sources, functions, Requirements, transport, utilization, storage, deficiencies of vitamins-thiamine (B1), Riboflavin (B2), Niacin (B3), Pantothenic acid (B5), Pyridoxine (B6), Folic acid, Biotin, Cyanocobalamin (B12) and vitamin C.

3.3. Water and Electrolyte balance: Water as a nutrient, Functions, Sources, Requirements, Regulation of water balance, abnormalities of water balance, Water compartments in the body.

MODULE IV: MINERALS AND DIETARY FIBRE**(15 Hours)**

4.1. MacroMinerals: Calcium- sources, functions, requirements, absorption, utilization and deficiency. Phosphorus- sources, functions, absorption, utilization and deficiency.

4.2. Micro minerals: Sources, functions, absorption, utilization and deficiency of Iron, Iodine, Fluorine, Selenium, copper, manganese, zinc (brief).

4.3. Dietary fiber: Importance of fibre in diet, Classification, Functions, Role of fibre in diseases.

5. Reference Books

1. Food carbohydrate, Ronald E.U. (Willy Blackwell)
2. Biochemistry - Dushyant Kumar Sharma- Narosa, 2010.
3. Nutrition Science, B. Srilakshmi 4th edition, New age, reprint.
4. Biochemistry ,A. V. S.S. Rama Rao (5th edition)
5. Biochemistry, U. Satyanarayana, 3rd edition.2009 reprint.
6. Fundamentals of foods, Nutrition and Diet therapy, Sumathi R. Mudambi-2007
7. Nutritional Biochemistry, Patricia Trueman,
8. Advanced Text Book On Food & Nutrition - Volume I By Dr. M Swaminathan
9. Nutrition and Dietetics, Shubangini Joshi, 5th Edition.
10. Clinical Nutrition and Dietetics Manual for Nurses, Supriya V.
11. Textbook of Nutrition and Dietetics, Kumud Khanna - 2nd Edition- Reprinted, 2020


6. Syllabus Focus

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


S. No	Student Centric Methods Adopted	Type/Description of Activity
1.	National	Understanding nutrients helps reduce malnutrition and improve public health in India.
2.	Global	Knowledge of balanced nutrition contributes to global health and prevention of nutrient deficiency diseases.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development (NSQF level 3 &4)	Module III & IV	Hands- on Practicals


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c) IKS components

IKS	Syllabus Content	Module
IKS	Use of traditional foods such as millets, pulses, and fermented foods.	I,II

Aligned with (SDG 3 (Good Health and well- being) and SDG 4 (Quality Education


7. Pedagogy


S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative Learning	Presentations and Group discussions
2.	Experiential Learning	Field Trips to research organizations

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 – Subjective	Written Exam
CO2	CIA 1 – Subjective	
CO3	CIA 2 – Test 1: Nutrition Album	
CO4	CIA 2 – Test 2: MCQ's or Presentation	


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b) Model Question Paper – End Semester Exam Theory

FUNDAMENTALS OF NUTRITION

Course Code: U26/ NUT/ DSC/101

MAX MARKS: 60

Credits: 4

TIME: 2 hours

SECTION – A (Long Essay Type)

Answer ALL questions:

Marks: 4 x 10 =40


1. Write in detail the steps of Glycolysis.
OR
2. How is the calorific value of food analyzed in a Bomb Calorimeter?
3. How are proteins classified? Discuss the effects of protein deficiency.
OR
4. Write in detail the classification of Lipids.
5. Discuss the role of Vitamin A in human nutrition.
OR
6. How is water balance regulated?
7. What are the functions of Calcium? Write a note on Calcium deficiency.
OR
8. "Fiber is an important part of our healthy diet" Explain.


SECTION – B

II. Answer any FOUR of the following

Marks 4 x 5 = 20 M

9. Classification of Foods
10. BMR
11. Supplementary value of proteins
12. Monounsaturated Fats
13. Electrolyte Balance
14. Dietary Fiber


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Question Paper format – Blooms Taxonomy Level

SECTION A - INTERNAL CHOICE				4Q X 10 M = 40 M
Question Number	Module Covered	Question	CO	BTL (Blooms Taxonomy Level)
1	Module 1	Write in detail the steps of Glycolysis.	CO 1	Level I & II
2	Module 1	How is the calorific value of food analyzed in a Bomb Calorimeter?	CO 1	Level IV
3	Module 2	How are proteins classified? Discuss the effects of protein deficiency.	CO 2	Level II & IV
4	Module 2	Write in detail the classification of Lipids.	CO 2	Level II
5	Module 3	Discuss the role of Vitamin A in human nutrition.	CO 3	Level IV
6	Module 3	How is water balance regulated	CO 3	Level II
7	Module 4	What are the functions of Calcium? Write a note on Calcium deficiency.	CO 4	Level IV
8	Module 4	Fiber is an important part of our healthy diet" Explain.	CO 4	Level II
SECTION B - ANSWER ANY 4 OUT OF 6 (To compulsorily have ONE question from each module)				4Q X 5 M = 20 M
9	Module 1	Classification of Foods	CO 1	Level I
10	Module 1	BMR	CO 1	Level II
11	Module 2	Supplementary value of proteins	CO 2	Level II
12	Module 2	Monounsaturated Fats	CO 2	Level I
13	Module 3	Electrolyte Balance	CO 3	Level II
14	Module 4	Dietary Fiber	CO 4	Level I



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c) Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	CO Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
1	15	CO-1	2	4x10=40	6 (By taking at least one question from each Module)	4x5=20
2	15	CO-2	2			
3	15	CO-3	2			
4	15	CO-4	2			

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions (hrs)
1	1, 2	Analyze	15
2	2, 7	Understand	15
3	1, 2	Remember	15
4	1, 2	Understand	15


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FUNDAMENTALS OF NUTRITION
Practical Syllabus

1. Course Description

Programme: B. Sc
Course Code: U26/ NUT/ DSC/101/P
Type of Course: DSC-1
No. of Credits: 1

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

2. Course Objectives

1. To know the qualitative analysis of carbohydrates, proteins and lipids.
2. Gain knowledge on functions, sources and effects of deficiency of nutrients.


3. Course Outcome:

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

- CO1:** Analyze the difference between different types of carbohydrates.
CO2: Understand the functions of different vitamins and minerals.

4. Practical Sessions

1. Qualitative analysis of Glucose
2. Qualitative analysis of Fructose
3. Qualitative analysis of Sucrose
4. Qualitative analysis of Lactose
5. Qualitative analysis of Starch
6. Qualitative analysis of proteins by Biuret method .
7. Qualitative analysis of lipids.
8. Estimation of vitamin C using DPPH method.
9. Observation and identification of various deficiency disorders
10. Protein Energy Malnutrition
11. Vitamins- Fat soluble and water soluble
12. Minerals - macro and micro


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5. Model Question Paper – End Semester Exam Practical

FUNDAMENTALS OF NUTRITION

Programme : B.Sc.
 Course Code : U26/NUT/DSC/101/P
 Type of Course : DSC-1

Max Marks :50
 No. of credits :1

Answer the following


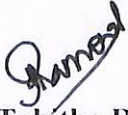

1. Identify the unknown carbohydrate solution (25 M)


- a) Flow chart 5 M
 b) Procedure 10 M
 c) Observation and inference 08 M
 d) Result 02 M


2. Identify the given spots (5 x 4 = 20M)

- a) Night blindness
 b) Anemia
 c) Phrynoderma
 d) Marasmus
 e) Dental fluorosis

3. Record 5 M

Prepared by	Checked & Verified by	Approved by
 Dr. Tabitha Ramona Teaching faculty	 Dr. Tabitha Ramona HOD	 Prof. Uma Joseph Principal


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SEMESTER - I

ANIMAL DIVERSITY – INVERTEBRATES & VERTEBRATES

1. COURSE DESCRIPTION

Programme:	B. Sc	Max. Hours:	60
Course Code:	U26/ ZOO/ DSC/101	Hours per week:	4
Type of Course:	DSC-1	Max. Marks:	60
No. of Credits:	4		

2. COURSE OBJECTIVES

1. To provide students with a comprehensive understanding of the diversity, classification, and evolutionary significance of invertebrates and vertebrates, from protozoa to mammals.
2. To develop analytical skills in recognizing structural, functional, and adaptive features of animal groups, emphasizing ecological roles, evolutionary trends, and conservation strategies.

3. COURSE OUTCOMES

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

- CO1: Explain** the fundamental concepts of multicellularity, body organization, symmetries, and body cavities, and **differentiate** major animal phyla based on their structural and functional characteristics. (L II)
- CO2: Analyze** adaptations in various animal groups such as locomotion in protozoa, canal systems in sponges, polymorphism in cnidarians, and parasitic strategies in helminths. (L IV)
- CO3: Understand** evolutionary trends in invertebrates and vertebrates, including the transition from water to land, flight adaptations in birds, and mammalian diversification. (L I)
- CO4: Apply** knowledge of animal diversity to ecological and conservation contexts, demonstrating awareness of threats to vertebrate diversity and strategies for protecting endangered species. (L III)



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4. COURSE CONTENT


MODULE I: INVERTEBRATES - PROTOZOA TO PLATYHELMINTHES 15 HRS


- 1.1 Concepts of: Multicellularity; Diploblastic and triploblastic organization; Symmetries; Body cavities.
- 1.2 Protozoa: General characteristics and classification up to classes; Locomotory organelles and locomotion in Protozoa.
- 1.3 Porifera: General characteristics and classification up to classes; Canal system in sponges and spicules; Evolutionary significance of sponges as early metazoans.
- 1.4 Cnidaria: General characteristics and classification up to classes; Polymorphism in Hydrozoa and Siphonophora; Coral reef formation and ecological significance.
- 1.5 Helminthes: General characteristics and classification up to classes of Platyhelminthes and Nematelminths; Parasitic adaptations in helminths; Regeneration in Turbellarians.

MODULE II: INVERTEBRATES – ANNELIDA TO HEMICHORDATA 15 HRS

- 2.1 Annelida: General characteristics and classification up to classes; Metamerism and its evolutionary significance; Coelom and coelomocytes.
- 2.2 Arthropoda: General characteristics and classification up to classes; Vision in Arthropods, Metamorphosis in insects; Economic importance of insects.
- 2.3 Mollusca: General characteristics and classification up to classes; Torsion & detorsion in gastropods; Pearl formation and economic importance of molluscs.
- 2.4 Echinodermata: General characteristics and classification up to classes; Water vascular system in starfish; Larval forms of echinoderms.
- 2.5 Hemichordata: General characteristics and affinities of Hemichordata.


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MODULE III: VERTEBRATES - PROTOCHORDATES TO AMPHIBIANS 15 HRS

- 3.1 General characteristics of Urochordata and Cephalochordata; Retrogressive metamorphosis in Urochordata.
- 3.2 Cyclostomata: General characteristics and classification; Evolutionary status and affinities of cyclostomes.
- 3.3 Pisces: General characteristics and classification up to classes and major orders; Migration and osmoregulation in migratory fishes; Parental care in fishes.
- 3.4 Amphibia: General characteristics and classification up to orders; Parental care, neoteny, and paedogenesis in amphibians.
- 3.5 Evolutionary Trends in Early Vertebrates: Transition from water to land; Adaptive features in early tetrapod.


UNIT IV: VERTEBRATES - REPTILIA TO MAMMALIA 15 HRS

- 4.1 Reptilia: General characteristics and classification up to orders; Biting mechanism in snakes and temporal fossae in reptiles; Adaptive radiations in Mesozoic reptiles.
- 4.2 Aves: General characteristics and classification up to orders; Flight adaptations and migration in birds; Evolutionary significance of birds as theropod ancestors.
- 4.3 Mammalia: General characteristics and classification up to orders; Origin of mammals: Monotremes, marsupials, and placentals
- 4.4 Dentition and aquatic adaptations in mammals.
- 4.5 Conservation of Vertebrate Diversity: Threats to vertebrate diversity; Conservation strategies for endangered species. Citizen Science and Science Communication



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5. SUGGESTED READINGS:

1. Ruppert, E.E., Fox, R.S., Barnes, R.D. (2004). Invertebrate Zoology: A Functional Evolutionary Approach. VII Edition, Cengage Learning, India
2. Barrington, E.J.W. (2012). Invertebrate Structure and Functions, II Edition, ELBS and Nelson.
3. Pechenik, J. A. (2015). Biology of the Invertebrates. VII Edition, McGraw-Hill Education
4. Hickman, C., Keen, S., Larson, A., Eisenhour, D. (2018). Animal Diversity, 9th Edition, McGraw-Hill.
5. Young, J.Z. (2004). The Life of Vertebrates, III Edition, Oxford University Press.
6. Kardong, K.V. (2009). Vertebrates: Comparative Anatomy, Function, Evolution, 4th Edition, McGraw-Hill.
7. Pough F.H., Janis, C.M., Heiser, J.B., Heiser, C.B. (2009). Vertebrate Life, VIII Edition, Benjamin Cummings.
8. L.H. Hyman 'The Invertebrates' Vol I, II and V. – M.C. Graw Hill Company Ltd.
9. Kotpal, R.L. Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
10. E.L. Jordan and P.S. Verma 'Invertebrate Zoology' S. Chand and Company.
11. R.D. Barnes 'Invertebrate Zoology' by: W.B. Saunders CO., 1986.
12. P.S. Dhami and J.K. Dhami. Invertebrate Zoology. S. Chand and Co. New Delhi.
13. Parker, T.J. and Haswell 'A text book of Zoology' by, W.A., Mac Millan Co. London.
14. Mohan P.Arora. 'Chordata – I, Himalaya Publishing House Pvt.Ltd.
15. Marshal, Parker and Haswell 'Text book of Vertebrates'. ELBS and McMillan, England.
16. J.W. Young, The Life of Vertebrates, 3rd ed, Oxford University press.
17. Harvey Pough F, Christine M. Janis, B. Heiser, Vertebrate Life, Pearson, 6th ed, Pearson Education Inc.2002.


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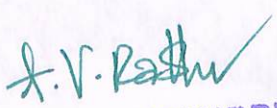
6. SYLLABUS FOCUS


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

Local /Regional/National /Global Development Needs	Relevance
Global Development Needs	<p>It is important to develop an understanding of invertebrate and vertebrate biology and appreciate their biodiversity.</p> <p>They form a key element in the food chains and are the most successful and prolific animals on the planet.</p> <p>Identifying priority areas for biodiversity is essential for directing conservation resources. Fundamentally, we must know where individual species live, which ones are vulnerable, where human actions threaten them and their levels of protection.</p>

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	II,	Guest lecture and Seminar
EMP	IV	Field trip


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7. PEDAGOGY

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiential Learning	Field Trips, Science Experiments
2.	Participative Learning	Presentation, Seminar & Workshops


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 Test	Written Exam
CO2	CIA-1 Written Test	
CO3	CIA-2 Assignment	
CO4	CIA-2 Objective Test	


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b) Model Question Paper – End Semester Exam Theory

ANIMAL DIVERSITY – INVERTEBRATES & VERTEBRATES

Course Code: U26/ ZOO/ DSC/101
Credits: 4

MAX MARKS: 60
TIME: 2 hours

Note: This question paper consists of Section A and B.

The answer to Section A & B must be written in the answer book given.

SECTION – A (Long Essay Type)

Answer ALL questions:

Marks: 4 x 10 = 40

1 Explain Canal system in sponges.

OR

2. Explain Polymorphism in Hydrozoa and Siphonophora

3. What is Metamerism and explain its evolutionary significance

OR

4. Describe Water vascular system in starfish

5. Describe the Adaptive features in early tetrapod, its transition from water to land

OR

6. Explain neoteny and paedogenesis in amphibians.

7. Explain Adaptive radiations in Mesozoic reptiles.

OR

8. Discuss aquatic adaptations in mammals.

SECTION –B (Short Essay Type)

II. Write short notes on any **FOUR** of the following:

Marks: 4 x 5 = 20

9. Locomotion in Protozoa.

10. Coral reef formation

11. Pearl formation.

12. General characteristics of Hemichordata.

13. Migration in fishes.

14. Flight adaptations in birds

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Question Paper format – Blooms Taxonomy Level

SECTION A - INTERNAL CHOICE				4Q X 10 M = 40 M
Question Number	Module Covered	Question	CO	BTL (Blooms Taxonomy Level)
1	Module 1	Explain Canal system in sponges.	CO 1	Level II & IV
2	Module 1	Explain Polymorphism in Hydrozoa and Siphonophora	CO 1	Level IV
3	Module 2	What is Metamerism and explain its evolutionary significance.	CO 2	Level II & IV
4	Module 2	Describe Water vascular system in starfish	CO 2	Level II
5	Module 3	Describe the Adaptive features in early tetrapod, its transition from water to land	CO 3	Level IV
6	Module 3	Explain neoteny and paedogenesis in amphibians.	CO 3	Level II
7	Module 4	Explain Adaptive radiations in Mesozoic reptiles	CO 4	Level IV
8	Module 4	Discuss aquatic adaptations in mammals.	CO 4	Level II
SECTION B - ANSWER ANY 4 OUT OF 6 (To compulsorily have ONE question from each module)				4Q X 5 M = 20 M
9	Module 1	Locomotion in Protozoa	CO 1	Level I
10	Module 1	Coral reef formation	CO 1	Level II
11	Module 2	Pearl formation.	CO 2	Level II
12	Module 2	General characteristics of Hemichordata	CO 2	Level I
13	Module 3	Migration in fishes	CO 3	Level II
14	Module 4	Flight adaptations in birds	CO 4	Level I




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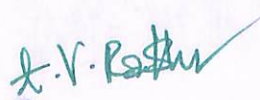
b) Question Paper Blueprint


Modules	Hours Allotted in the Syllabus	CO Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
1	15	CO-1	2	4x10=40	6 (By taking at least one question from each Module)	4x5=20
2	15	CO-2	2			
3	15	CO-3	2			
4	15	CO-4	2			

9. CO-PO MAPPING

CO	PO	Cognitive Level	Classroom sessions (hrs)
1	1, 2	Explain	15
2	2, 7	Analyse	15
3	1, 2	Understand	15
4	1, 2	Apply	15


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**ANIMAL DIVERSITY – INVERTEBRATES & VERTEBRATES
PRACTICAL SYLLABUS**

1. COURSE DESCRIPTION

Programme:	B. Sc	Max. Hours:	30
Course Code:	U26/ ZOO/ DSC/101/P	Hours per week:	2
Type of Course:	DSC-1	Max. Marks:	50
No. of Credits:	1		

2. COURSE OBJECTIVES

1. To develop practical skills in identifying, classifying, and analyzing animal diversity through museum specimens, dissections, virtual tools, and field visits, thereby reinforcing theoretical knowledge with experiential learning.

3. COURSE OUTCOMES

1. **Identify and classify** representative invertebrate and vertebrate specimens using museum collections, slides, and models, and **demonstrate** understanding of their anatomical and adaptive features.
2. **Apply practical knowledge** in comparative anatomy and zoological techniques, including dissections, virtual simulations, and field observations, while also recognizing ecological and conservation aspects such as snake identification and first aid for snake bites.

4. COURSE CONTENT

1. Study of Museum Specimens/Slides/Models (with Classification of animals)

1. Protozoa: Amoeba, Paramecium, Plasmodium vivax
2. Porifera: Sycon, Spongilla
3. Cnidaria: Obelia, Aurelia
4. Platyhelminthes: Fasciola, Taeniasolium
5. Nematelminths: Ascaris, Wuchereria
6. Annelida: Nereis, Hirudinaria
7. Arthropoda: Prawn, Periplaneta
8. Mollusca: Pila, Sepia

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9. Echinodermata: Asterias, Echinus
10. Protochordates: Balanoglossus, Amphioxus
11. Cyclostomata: Petromyzon, Myxine
12. Pisces: Scoliodon, Labeo
13. Amphibia: Hoplobatrachus, Bufo
14. Reptilia: Calotes, Naja
15. Aves: Columba, Passer
16. Mammalia: Pteropus, Oryctolagus, Funambulus

2. Dissections

Prawn: Appendages, digestive system, nervous system, mounting of statocyst.

Insect: Mouthparts of Anopheles, Culex, housefly, and butterfly.

Virtual dissection of Labeo/Tilapia: Digestive system, brain, and cranial nerves (demonstration only).

3. Key for identification of venomous and non-venomous snakes

4. First aid for snake bite mitigation

5. Animal Album: Mandatory submission of Animal album containing photographs, cut-outs, and write-ups about the studied taxa.

6. Visit to Zoological Park or Natural History Museum

7. Computer-Aided Techniques: Use of virtual dissections and animations for better understanding of anatomical structures.

5. SUGGESTED MANUALS:

1. Lal, S.S. Practical Zoology – Invertebrates, Rastogi Publications.
2. Verma, P.S. Practical Zoology – Invertebrates, S. Chand Publications.
3. Verma, P.S. A Manual of Practical Zoology – Chordata, S. Chand Publications.
4. S.S.Lal, Practical Zoology – Vertebrata
5. Freeman & Bracegirdle, An atlas of embryology



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6. MODEL QUESTION PAPER – END SEMESTER EXAM PRACTICAL

ANIMAL DIVERSITY – INVERTEBRATES & VERTEBRATES

Programme: B.Sc.

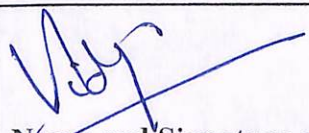


Course Code: U26/ZOO/DSC/101/P

Type of Course: DSC-1

Max. Marks: 50

No. of credits: 1

- I. **DRAW, DISSECT AND DISPLAY (Major Dissection)** 12 M
Prawn: Digestive system / Nervous system
- II. **DRAW, DISSECT AND DISPLAY (Minor Dissection)** 8M
Prawn: Appendages / mounting of statocyst.
- III. **IDENTIFY, CLASSIFY, DRAW, LABEL & WRITE POINTS OF IDENTIFICATION FOR THE FOLLOWING SPOTS (A-J).** 10 x 2 = 20 M
1. Protozoa: Amoeba, Paramecium, Plasmodium vivax
 2. Porifera: Sycon, Spongilla
 3. Cnidaria: Obelia, Aurelia
 4. Platyhelminthes: Fasciola, Taeniasolium
 5. Nematelminths: Ascaris, Wuchereria
 6. Annelida: Nereis, Hirudinaria
 7. Arthropoda: Prawn, Periplaneta
 8. Mollusca: Pila, Sepia
 9. Echinodermata: Asterias, Echinus
 10. Protochordates: Balanoglossus, Amphioxus
 11. Cyclostomata: Petromyzon, Myxine
 12. Pisces: Scoliodon, Labeo
 13. Amphibia: Hoplobatrachus, Bufo
 14. Reptilia: Calotes, Naja
 15. Aves: Columba, Passer
 16. Mammalia: Pteropus, Oryctolagus, Funambulus
- IV. **ANIMAL ALBUM** 5 M
- V. **RECORD** 5 M

Prepared by	Checked & Verified by	Approved by
 Name and Signature of the teaching faculty Dr. Vidya Jayaram	 Name and Signature of HoD Dr. JYOTHI RANI	 Name and Signature of Principal St. Francis College for Women Begumpet, Hyderabad-18,

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