

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

(An Autonomous College Affiliated to Osmania University)

FACULTY OF SCIENCE- DEPARTMENT OF CHEMISTRY

THEORY SYLLABUS CBCS-2024

SEMESTER -VI

ADVANCED INORGANIC CHEMISTRY

1. Course Description

Program: B.Sc.

Max. Hours: 60 Hrs

Course Code: U24/CHE/DSE/601

Max. Marks: 100

Course: DSE 3

Hours per week: 4 Hrs

No. of Credits: 3

2. Course Objectives

- To enable the students to understand the concepts of Coordination chemistry and its applications and Inorganic reaction mechanisms of metal complexes.
- The course aims at giving an overview on principles and types of pericyclic reactions, colloids and surface chemistry
- To understand the basic principles and to develop skills in interpretation of various spectra in elucidation of structure of simple molecules.

3. Course Outcomes

CO1: Understand the concepts of Coordination Chemistry in elucidating the structures of complexes and apply in isomerism.

CO2: Understand the reaction mechanisms in metal complexes with applications. Interpret the concepts and applications of HSAB.

CO3: Understand and apply the principles of spectroscopy in solving the problems related to structural analysis of simple organic molecules.

CO4: Elaborate on the concepts of synthetic organic chemistry. To help the students acquire knowledge on the basic principles of colloids and surface chemistry.

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4. Course Content

MODULE I: COORDINATION CHEMISTRY

15 Hrs

Werner's theory – postulates, experimental evidence. Sidgwick's theory – Calculation of EAN, limitations. Nomenclature of inorganic complex compounds.

Valence bond theory – postulates, geometries of coordination number 4 & 6- tetrahedral $[\text{Ni}(\text{NH}_3)_4]^{2+}$, $[\text{NiCl}_4]^{2-}$ and $[\text{Ni}(\text{CO})_4]$, square planar $[\text{Ni}(\text{CN})_4]^{2-}$, $[\text{Cu}(\text{NH}_3)_4]^{2+}$, $[\text{PtCl}_4]^{2-}$. Octahedral complexes $[\text{Fe}(\text{CN})_6]^{4-}$, $[\text{Fe}(\text{CN})_6]^{3-}$, $[\text{FeF}_6]^{4-}$, $[\text{Co}(\text{NH}_3)_6]^{3+}$, $[\text{CoF}_6]^{3-}$. Limitations of VBT. Crystal field theory – features, splitting of d-orbitals, in octahedral, tetrahedral and square planar complexes, Crystal field stabilization energy (calculation of CFSE for d^n configurations in octahedral complexes),

Magnetic properties of transition- metal complexes: Types of magnetic behaviour, spin only formula, calculation of magnetic moments using spin only formula.

Electronic spectra of metal complexes – d-d transitions, spectrochemical series, Electronic absorption spectrum of $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$. Determination of composition of complexes - Job's method and mole ratio method.

Thermodynamic and kinetic stability of transition metal complexes. Stability of metal complexes – step wise and overall stability constant and their relationship and chelate effect.

Isomerism in coordination compounds: structural: ionization, hydrate, linkage, co- ordination, coordination- position and polymerisation isomerism. Stereo isomerism – (a) geometrical isomerism in (i) square planar metal complexes of the type $[\text{MA}_2\text{B}_2]$, $[\text{MA}_2\text{BC}]$, $[\text{M}(\text{AB})_2]$, $[\text{MABCD}]$. (ii) Octahedral metal complexes of the type $[\text{MA}_4\text{B}_2]$, $[\text{M}(\text{AA})_2\text{B}_2]$, $[\text{MA}_3\text{B}_3]$ using suitable examples, (b) Optical isomerism in (i) Tetrahedral complexes $[\text{MABCD}]$, (ii) Octahedral complexes $[\text{M}(\text{AA})_2\text{B}_2]$, $[\text{M}(\text{AA})_3]$ using suitable examples.

Applications of coordination compound

Applications of coordination compounds a) in quantitative and qualitative analysis with suitable examples b) in medicine for removal of toxic metal ions and cancer therapy c) in industry as catalysts polymerization – Ziegler Natta catalyst d) water softening.

MODULE II: INORGANIC REACTION MECHANISM AND HSAB

15 Hrs

Inorganic Reaction Mechanism

Lability and inertness of complexes

Substitution Reactions – dissociation and association reactions, mechanism for SN^1 and SN^2 in octahedral and square planar complexes with one example each. Trans effect – theories and applications. Acid Hydrolysis (mechanism) and Base Hydrolysis (mechanism). Electron transfer reactions – outer sphere and inner sphere mechanism (brief account only) – two electron transfer reactions.

Hard and soft acids and bases

Classification, Pearson's concept of hardness and softness, application of HSAB principles, stability of complexes, predicting the feasibility of a reaction.

MODULE III: MOLECULAR SPECTROSCOPY -II

15 Hrs

NMR Spectroscopy

5 Hrs

Principles of nuclear magnetic resonance, number of signals, equivalent & non equivalent protons, position of signals-chemical shift. NMR splitting of signals, Spin-Spin coupling,

coupling constants. Application of NMR with suitable examples-Ethyl bromide, Ethanol, Acetaldehyde, 1,1,2-Tribromoethane, Ethylacetate, Toluene & Acetophenone.

Mass Spectrometry

5 Hrs

Basic principles – Nitrogen rule, Types of ions: Molecular ion / parent ion, fragment ions / daughter ions. Theory – formation of parent ions. Representation of mass spectrum. Identification of parent ion, $(M+1)$, $(M+2)$, base peaks (relative abundance 100%) Determination of molecular formula – Mass spectra of ethyl benzene, ethyl bromide, acetophenone, n-butylamine and 1- propanol.

Spectral interpretation

2 Hrs

Interpretation of IR, UV-Visible, H^1 -NMR and mass spectral data of the following compounds 1. Phenylacetylene 2. Acetophenone 3. Cinnamic Acid 4. para-nitro aniline.

Electron Spin Resonance

3 Hrs

Electron Spin Resonance (ESR) spectroscopy: Basic principle, hyperfine structure, ESR of simple radicals like H^\cdot , CH_3^\cdot and $\text{CH}_3\text{CH}_2^\cdot$.

MODULE IV: COLLOIDS, SURFACE CHEMISTRY & PERICYCLIC REACTIONS

15 Hrs

Colloids & Surface Chemistry

9 Hrs

Definition of colloids. Classification of colloids. Solids in liquids (sols): preparations and properties – Kinetic, Optical and Electrical stability of colloids. Protective action. Hardy-Schultz law, Gold number. Liquids in liquids (emulsions): Types of emulsions, preparation and emulsifier. Liquids in solids(gels): Classification, preparations and properties, General applications of colloids. Adsorption: Types of adsorption. Factors influencing adsorption. Freundlich adsorption isotherm. Langmuir theory of unilayer adsorption isotherm. Applications.

Photochemistry

6 Hrs

Interaction of radiation with matter, difference between thermal and photochemical process. Laws of photochemistry- Grothus Draper law, Stark Einstein law. Quantum yield, Problems based on quantum efficiency. photochemical combinations of Hydrogen- Chlorine & Hydrogen -Bromine. Jablonski diagram depicting various processes occurring in an excited state. Qualitative description of Fluorescence, phosphorescence, non-radiative process (internal conversion, intersystem crossing).

5. References

1. 30.Wahid.U.Malik, Tuli G.D and Madan R.D (1976) *Selected topics in Inorganic Chemistry*: S.Chand Publishers
2. Puri B.R, Sharma L.Rand Khalia K.C (2014) *Principles of Inorganic Chemistry*: Milestone publishers and Distributers.
3. Tuli G.D, Madan R.D, Basu S.K, Sathyaprakash. *Advanced Inorganic Chemistry Volume II* : S.Chand and company ltd (New Delhi ,India)
4. Sharma, Y.R. *Text Book of Complete Organic Chemistry*, 2nd Edn. Kalyani, 2007.
5. Jain, M.K. & Sharma, S.C. *Modern Organic Chemistry*, 4th Edn. Vishal, 2009.
6. Sharma Y.R (2005) *Elementary Organic Spectroscopy; Principles and Chemical applications* : S.Chand & Company Ltd
7. Puri, B.R., Sharma L.R., and Pathania, M.S. (2003). *Elements of Physical Chemistry*. Jalandhar, Delhi: Vishal Publishing Co.
8. Bahl, A., & Tuli. (2009). *Essentials of physical chemistry: A textbook for B. Sc. classes as per UGC model syllabus* (Rev. multicoloured.). New Delhi; S. Chand

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 -VI

EXPERIMENTS IN PHYSICAL CHEMISTRY II AND INSTRUMENTATION

Program: B.Sc.

Max. Hours: 30 Hrs

Course Code: U20/CHE/DSE/601/P

Max. Marks: 50

Course: DSE-3&4

Hours per week: 3 Hrs

No. of Credits : 1

Course Objectives

- To equip the students with skills to determine various physical parameters using instrumentation methods and to synthesize complexes.

Course Outcomes

CO1: Achieve the expertise in determining pH, conductivity, unknown concentration of solutions and rate constants of reactions.

CO2: Acquire the ability to synthesize metal complexes.

Chemical Kinetics:

1. Catalytic Decomposition of Hydrogen Peroxide.
2. Acid catalyzed hydrolysis of methyl acetate.
3. Kinetic study of oxidation of I⁻ by K₂S₂O₈.

Colorimetry:

4. Determination of Dichromate and Permanganate in a mixture using Beer Lambert's Law.
5. Job's Method for the determination of ferric thiocyanate complex.

pHmetry:

6. Titration of strong acid Vs strong base.
7. Determination of ionization constant of acetic acid by pH metric method.

Preparation of Complexes:

8. To prepare a complex of tetraammine copper II sulphate complex.
9. To prepare a complex of chloropentaamminecobalt III chloride.
10. To prepare a complex of hexammine nickel II chloride.

References

1. Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry*, R. Chand & Co.: New Delhi (2011).
2. Svehla, G, *Vogel's Qualitative Inorganic Analysis*: Pearson Education, 2012.
3. Mendham, J, *Vogel's Quantitative Chemical Analysis*: Pearson, 2009.

6. Syllabus Focus

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

Local /Regional/National /Global Development Needs	Relevance
Local	Knowledge of chemistry of complexes helps in everyday life
Regional	Learning the concepts of surface chemistry and pericyclic reactions changes their perspective towards various processes
National	Through Knowledge of spectral interpretation opens new horizons in skill development and employability
Global	A complete idea of complexes and spectral interpretation increases students inclination towards research

b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Module 1 synthesis of complexes	Some complexes are synthesized in the Lab. Many metal complexes are widely used in the pharmaceutical companies. This enhances their skill development and employability.
SD	Module 3 Spectral interpretation	Students are taught the instrumentation of all the spectroscopic methods, they are taken to various research labs to show live instrumentation techniques. They are thoroughly trained in spectral interpretation by giving assignments.

7. Pedagogy

S. No.	Chairperson Student Centric Methods Adopted Dept of Chemistry Hyd-07.	Type / Description of Activity
1.	Field trips	Students are taken to various institutes like IICT, HCU, IIT, ARCI etc
2.	Role play	Students are made to enact various concepts of chemistry
3.	Seminars/ workshops/ research projects	Students are allowed to participate in seminars and workshops organized in and

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		outside the college. They are encouraged to take up research projects.
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8. Course Assessment Plan

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

CO	Continuous Internal Assessments CIA - 50%	End Semester Examination-50%
CO1	CIA 1 written exam (10 M)	Written Exam
CO2	Skill Test 1 (10 M)	
CO3	CIA 1 written exam (10 M)	
CO4	Skill Test 2 (10 M)	


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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. II YEAR SEMESTER -VI

ADVANCED CHEMISTRY

TIME: 2hrs

Course Code: U24/CHE/DSE/601

Max. Marks: 50

SECTION –A (Essay Questions)

I. Answer the following

4X10 =40 Marks

1. a) Describe the structure of $[\text{Cu}(\text{NH}_3)_4]$ using Valence bond theory. (CO1) L1 5M

b) Define optical isomerism? Draw and explain the optical isomerism in octahedral complexes. (CO1) L1 5M

OR

2. a) Summarise Werner's theory with examples. (CO1) L2 5M

b) Explain the Crystal field splitting in octahedral complexes. (CO1) L5 5M

3. Outline the mechanism of SN^1 in the octahedral and SN^2 in square planar complexes with one example each. (CO2) L2 10 M

OR

4. a) Define trans effect? Discuss the theories and applications of trans effect. (CO2) L2 5M

b) Distinguish labile and inert complexes? Explain with examples. (CO2) L4 5M

5. a) What is the chemical shift? Explain the change in position of signals with examples. (CO3) L1 5M

b) Elaborate about $(M+1)$, $(M+2)$ and base peaks with two examples in Mass spectrometry. (CO3) L6 5M

OR

6. a) Indicate the number of signals possible for $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-OH}$ and explain spin- spin splitting. (CO3) L6 5M

b) Explain the basic principles of ESR spectroscopy. (CO3) L5 5M

7. a) Classify the various types of colloids? (CO4) L5 5M

b) Deduce the expression for Langmuir adsorption isotherms. (CO4) L5 5M

OR

8. What are Fluorescence and Phosphorescence? Explain the phenomenon of fluorescence and phosphorescence using Jablonski diagram. 10M

SECTION – B (Short answer questions)

II. Answer any four questions.

4 X 5 = 20 Marks

9. Explain the Job's method of determination of composition of a complex. (L2)

10. What is EAN? Calculate the EAN for $[\text{Co}(\text{NH}_3)_6]$ and $[\text{FeF}_6]^{3-}$ (L1)

11. Describe the acid hydrolysis of octahedral complexes. (L2)

12. Define Hardy Schulze rule and Gold number. (L1)

13. Show how the molecular formula of a compound is determined based on its Mass spectrum? (L1)

14. Discuss the quantum yield for the photochemical combination of H_2 & Cl_2 to form HCl (L5)

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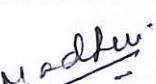
11. Describe the acid hydrolysis of octahedral complexes. (L2)
12. Define Hardy Schulze rule and Gold number. (L1)
13. Show how the molecular formula of a compound is determined based on its Mass spectrum? (L1)
14. List out the various types of NMR signals expected for 1,1,2-tribromoethane? What is the intensity ratio of the peaks? (L1)

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	1	2	10	2	20
2	15	2	2	10	1	15
3	15	3	2	10	2	20
4	15	4	2	10	1	15

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions (Hrs)
1	2,5	Understanding	15
2	1,7	Applying & Analysing	15
3	2,7	Remembering	15
4	4	Creating & Evaluating	15

Prepared by	Checked & Verified by	Approved by
 Name and Signature of the teaching faculty Y. Lakshmi madhuri	 Name and Signature of the HoD Dr. D.Sumalatha	 Name and Signature of Principal Dr. Uma Joseph


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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

B.SC. III YEAR SEMESTER -VI

ADVANCED CHEMISTRY

TIME: 2hrs

Max. Marks: 50

Course Code: U24/CHE/DSE/601

Credits: 4

SECTION A - INTERNAL CHOICE			4 X 10 M = 40M	
Question Number	Question		CO	BTL
1	Module 1	(a) Describe the structure of $[\text{Cu}(\text{NH}_3)_4]$ using Valence bond theory. 5M (b) Define optical isomerism? Draw and explain the optical isomerism in octahedral complexes. OR	CO1	Level 1
2	Module 1	(a) Summarise Werner's theory with examples. (b) Explain the Crystal field splitting in octahedral complexes.	CO1	Level I
3	Module 2	Outline the mechanism of SN^1 in the octahedral and SN^2 in square planar complexes with one example each. 10 M OR	CO2	Level 2
4	Module 2	(a) Define the trans effect? Discuss the theories and applications of trans effect. (L1) 5M (b) Distinguish labile and inert complexes? Explain with examples. (L4) 5M	CO2	Level 2
5	Module 3	(a) What is the chemical shift? Explain the change in position of signals with examples. 5M (b) Elaborate about $(M+1)$, $(M+2)$ and base peaks with two examples in Mass spectrometry 5M OR	CO3	Level 1
6	Module 3	(a) Develop the number of signals possible for $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-OH}$ and explain spin- spin splitting. 5M (b) Explain the basic principles of ESR spectroscopy.	CO3	Level 5 & 6
7	Module 4	(a) Classify the various types of colloids? 5M (b) Deduce the expression for Langmuir adsorption isotherms. 5M OR	CO4	Level 5
8	Module 4	What are Fluorescence and Phosphorescence ? Explain the phenomenon of fluorescence and phosphorescence using Jablonski diagram.	CO4	Level 2

SECTION B – (Short answer questions)**ANSWER ANY 4 OUT OF 6****4 X 5M = 20 M**

9	Module 1	9. Explain the Job's method of determination of composition of a complex.	CO1	Level 2
10	Module 2	10. What is EAN ? Calculate the EAN for $[\text{Co}(\text{NH}_3)_6]$ and $[\text{Fe}_6]^{3-}$	CO1	Level 1
11	Module 3	11. Describe the acid hydrolysis of octahedral complexes.	CO2	Level 2
12	Module 4	12. Define Hardy Schulze rule and Gold number	CO4	Level 1
13	Module 2	13. Show how the molecular formula of a compound is determined based on its Mass spectrum? (L1)	CO3	Level 1
14	Module 3	14. Discuss the quantum yield for the photochemical combination of H_2 & Cl_2 to form HCl	CO4	Level 5

SEMESTER-VI

ECOLOGY, EVOLUTION & ZOOGEOGRAPHY

1. Course Description

Programme: B.Sc.

Max. Hours: 60

Course Code: U24/ZOO/DSE/601

Hours per week: 4

Type of course: DSE - II

Max. Marks: 100

No. of credits: 4

2. Course Objectives

- To understand the origin of life, diversity of animal life on earth and mechanism of evolution
- To comprehend and summarize ecological concepts.
- To study the distribution of animals.

3. Course Outcomes

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

CO1: To comprehend the working principles of ecology, its association between biotic and abiotic factors.

CO2: To apply ecological concepts on population ecology, its adaptations, environmental pollution and wildlife conservation.

CO3: To remember zoogeography and its application in conservation of species and biodiversity.

CO4: To understand the evolutionary mechanism - both selective and random - which can explain the genetic composition of populations, form, and distribution of organisms

4. Course Content**MODULE I: Module I: Ecology – I** 15 HRS

1.1 Ecosystem: structure and functions. Types of Ecosystems - Aquatic and Terrestrial
 1.2 Biogeochemical cycles - Nitrogen, Carbon, Phosphorus and Water.
 1.3 Energy flows in the ecosystem.
 1.4 Food chain, food web and ecological pyramids.
 1.5 Animal Associations - Mutualism, commensalism, parasitism, competition, predation

Module II: Ecology – II 15 HRS

2.1 Concept of Species, Population dynamics and Growth Curve
 2.2 Community Structure and dynamics and Ecological Succession.
 2.3 Ecological Adaptations
 2.4 Environmental Pollution -Sources, Effect and Control measures of Air, Water, Soil & Noise
 Pollution
 2.5 Wildlife conservation - National parks and Sanctuaries of India, Endangered species.

MODULE II: Zoogeography 15 HRS

3.1 Zoogeographical regions - Palaearctic, Nearctic, Neotropical, Oriental, Australian and
 Ethiopian regions - their Climatic and faunal peculiarities
 3.2 Wallace line, Discontinuous distribution
 3.3 Continental Drift
 3.4 Biodiversity and hotspots of
 Biodiversity in India

MODULE IV: Evolution 15 HRS

4.1 Theories of evolution - Lamarckism and Neo-Lamarckism, Darwinism and Neo- Darwinism,
 Modern synthetic theory.
 4.2 Evidence of Evolution. Causes and Role of Extinction in Evolution.
 4.3 Forces of Evolution - mutation, gene flow, genetic drift, and natural selection. Hardy
 Weinberg Law
 4.4 Isolation - Premating and post mating isolating mechanisms
 4.5 Speciation: Methods of speciation - Allopatric and sympatric

5. References

- a) Ridley, M (2004) Evolution III Edition Blackwell publishing .
- b) Hall, B.K. and Hallgrimson, B (2008). Evolution IV Edition. Jones and Barlett Publishers.
- c) Campbell, N.A. and Reece J.B (2011). Biology. IX Edition. Pearson, Benjamin, Cummings.
- d) Douglas, J. Futuyma (1997). Evolutionary Biology. Sinauer Associates.
- e) Snustad. S Principles of Genetics. Pevsner, J (2009).
- f) Bioinformatics and Functional Genomics. II Edition Wiley-Blackwell.
- g) Colinvaux, P. A. (1993). Ecology. II Edition. Wiley, John and Sons, Inc.
- h) Krebs, C. J. (2001). Ecology. VI Edition. Benjamin Cummings.
- i) Odum, E.P., (2008). Fundamentals of Ecology. Indian Edition. Brooks/Cole
- j) Robert Leo Smith Ecology and field biology Harper and Row publisher
- k) Ricklefs, R.E., (2000). Ecology. V Edition. Chiron Pres

 
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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 Development Needs	The course aims at developing an understanding of structural components of the environment & ecological aspects, which helps the individual to analyse the factors involved in disturbing the natural environmental conditions in their immediate surroundings..
Regional Development Needs	The Course also creates a deep understanding of possible solutions to control environmental issues related to the given region.
National Development Needs	To educate in the conservation of the nation's natural resources. To understand the evolutionary mechanisms.
Global Development Needs	To aid the preservation and conservation of biodiversity. To comprehend the ecological impact on evolution and Zoogeography.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development	Module I & II	Field visits to local water bodies to analyse different parameters
Entrepreneurship Development	Module I & II	Projects will be given on finding ways or solutions for sustainable living
Employability	Module I - IV	Field work on analysing animal diversity and behavioural studies in animals. Internships in institutes such as Zoological parks, ZSI, LaCONES etc.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Presentation	Participative Learning
2.	Field Trips	Experiential Learning
3.	Case Study	Problem Solving Learning

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

ECOLOGY, EVOLUTION & ZOOGEOGRAPHY
MODEL QUESTION PAPER

Course Code: U24/ZOO/DSE/601

Max Marks: 60

Credits: 4

Time: 2Hrs

ILLUSTRATE WITH DIAGRAMS WHEREVER NECESSARY

SECTION-A

I. Answer the following: - $4 \times 10 = 40 \text{ M}$

1. Define Ecosystem and explain types of Ecosystems.
OR
2. Describe biogeochemical cycles and explain Nitrogen and Phosphorus cycles.
3. What is Ecological succession and explain in detail.
OR
4. What are different types of pollution & analyse the various threats of air pollution to the environment. List out the solutions to control it.
5. Examine the Biodiversity hotspots of India.
OR
6. Distinguish between the faunal peculiarities of Oriental and Palaearctic realm
7. Write a note on Lamarckism and classify the evidence of evolution.
OR
8. Derive the Hardy Weinberg Law and illustrate it.

SECTION- B

II. Answer any FOUR $4 \times 5 = 20 \text{ M}$

9. How does studying food chains help us to understand energy flow in ecosystems?
10. How can we preserve endangered animals?
11. Identify the Biodiversity hotspots in India
12. Differentiate between Allopatric and sympatric speciation
13. Explain population dynamics
14. Elaborate different animal associations

ECOLOGY, EVOLUTION & ZOOGEOGRAPHY
MODEL QUESTION PAPER

SECTION A - INTERNAL CHOICE **4 Q X 10 M = 40 M**

Question Number	Question	Question	CO	BTL(Bloom's Taxonomy Level)
1	Module 1	Define Ecosystem and explain types of Ecosystems.	CO 1	Level I
2	Module 1	Describe Biogeochemical cycles and explain Nitrogen and Phosphorus cycles	CO 1	Level I & Level II
3	Module 2	What is Ecological succession and explain in detail.	CO 2	Level V
4	Module 2	What are different types of pollution & analyze the various threats of air pollution to the environment. List out the solutions to control it.	CO 2	Level V & VI
5	Module 3	Examine the Biodiversity hotspots of India.	CO 3	Level IV
6	Module 3	Distinguish between the faunal peculiarities of Oriental and Palaearctic realm	CO 3	Level IV
7	Module 4	Write a note on Lamarckism and classify the evidence of evolution.	CO 4	Level I & Level II
8	Module 4	Derive the Hardy Weinberg Law and illustrate it.	CO 4	Level II

SECTION B - ANSWER ANY 4 OUT OF 6

4 Q X 5M = 20 M

9	Module 1	How does studying food chains help us to understand energy flow in ecosystems?	CO 1	Level IV
10	Module 2	How can we preserve endangered animals?	CO 2	Level VI
11	Module 3	Identify the Biodiversity hotspots in India	CO 3	Level III
12	Module 4	Differentiate between Allopatric and sympatric speciation	CO 4	Level IV
13	Module 2	Explain population dynamics	CO 2	Level II
14	Module 1	Elaborate different animal associations	CO 1	Level VI

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ECOLOGY, EVOLUTION & ZOOGEOGRAPHY
PRACTICAL

Course Code: U24/ZOO/DSE/601/P

Hours per week: 2

Max. Hours: 30

Max. Marks: 50

No. of credits: 1

Course Objectives:

- To understand the origin of life, diversity of animal life on earth and mechanism of evolution
- To comprehend and summarize ecological concepts.

Course Outcomes:

CO1: To analyze the evolutionary mechanism through the study of fossils.

CO2: To evaluate the water quality through different physicochemical parameters.

CO3: To remember zoogeography and its understand the distribution of fauna.

Syllabus:

1. Determination of pH of Soil and Water
2. Estimation of salinity (chlorides) of water in given samples.
3. Estimation of Carbonates and bicarbonates in the given water samples.
4. Estimation of dissolved oxygen of pond water, sewage water and effluents.
5. Identification of Zooplankton from a nearby water body.
6. Study of Pond Ecosystem / local polluted site - Report submission
7. Study of at least 3 endangered or threatened wild animals of India through photographs / specimens / models
8. Field visit to Zoo Park to study the management, behavior and enumeration of wild animals.
9. Identification of Zoogeographical realms from the Map and identify specific fauna of respective regions.
10. Museum Study of Fossil animals: Peripatus, Coelocanth Fish, Dipnoi fishes, Sphenodon, Archeopteryx.
11. Study of homology and analogy from suitable specimens and pictures
12. Problems on Hardy-Weinberg Law
13. Macroevolution using Darwin finches (pictures)

ECOLOGY, EVOLUTION & ZOOGEOGRAPHY
MODEL QUESTION PAPER - PRACTICAL

Course Code: U24/ZOO/DSE/601/P

Credits: 1

Max Time: 2 hrs

Max. Marks: 50

I. EXPERIMENT : WRITE THE PRINCIPLE, PROCEDURES, INFERENCE AND RESULTS

14 M

1. Estimation of salinity (chlorides) of water in given samples. Determination of pH of Soil and Water

2. Estimation of Carbonates and bicarbonates in the given water samples. Determination of pH of Soil and Water

3. Estimation of dissolved oxygen of pond water, sewage water and effluents. Determination of pH of Soil and Water

4. Identification of Zooplankton from a nearby water body. Determination of pH of Soil and Water

5. Identification of Zoogeographical realms from the Map and identify specific fauna of respective regions.

II. PROBLEMS ON HARDY-WEINBERG LAW

5 M

III. IDENTIFY THE FOLLOWING SPOTS

3 X 2 = 6 M

1. Museum Study of Fossil animals: Peripatus, Coelacanth Fish, Dipnoi fishes, Sphenodon, Archeopteryx.

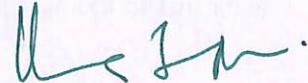
2. Study of homology and analogy from suitable specimens and pictures

3. Macroevolution using Darwin finches(pictures)

III. REPORT**10 M**

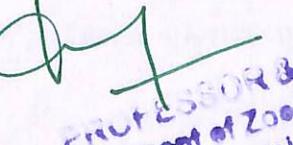
1. Study of Pond Ecosystem / local polluted site – Report submission
2. Study of at least 3 endangered or threatened wild animals of India through photographs / specimens /models
3. Field visit to Zoo Park to study the management, behavior and enumeration of wild animals.

IV. VIVA**5 M****V. RECORD****5 M**

Prepared by	Checked & verified by	Approved by
<p>S. SRAVANTHI</p> <p>S. SRAVANTHI</p> <p>Name and Signature of the teaching faculty</p>	 <p>DR. JYOTHI RANI</p> <p>Name and Signature of HoD</p>	 <p>Principal</p>



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 Department of Zoology, UCS,
 Osmania University, Hyd-07.

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 -VI****EXPERIMENTS IN PHYSICAL CHEMISTRY II AND INSTRUMENTATION**

Program: B.Sc.

Course Code: U20/CHE/DSE/601/P

Course: DSE-3&4

No. of Credits : 1

Max. Hours: 30 Hrs

Max. Marks: 50

Hours per week: 3 Hrs

Course Objectives

- To equip the students with skills to determine various physical parameters using instrumentation methods and to synthesize complexes.

Course Outcomes

CO1: Achieve the expertise in determining pH, conductivity, unknown concentration of solutions and rate constants of reactions.

CO2: Acquire the ability to synthesize metal complexes.

Chemical Kinetics:

1. Catalytic Decomposition of Hydrogen Peroxide.
2. Acid catalyzed hydrolysis of methyl acetate.
3. Kinetic study of oxidation of I⁻ by K₂S₂O₈.

Colorimetry:

4. Determination of Dichromate and Permanganate in a mixture using Beer Lambert's Law.
5. Job's Method for the determination of ferric thiocyanate complex.

pH metry:

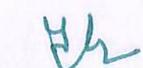
6. Titration of strong acid Vs strong base.
7. Determination of ionization constant of acetic acid by pH metric method.

Preparation of Complexes:

8. To prepare a complex of tetraammine copper II sulphate complex.
9. To prepare a complex of chloropentaamminecobalt III chloride.
10. To prepare a complex of hexammine nickel II chloride.

References

1. Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry*, R. Chand & Co.: New Delhi (2011).
2. Svehla, G, *Vogel's Qualitative Inorganic Analysis*: Pearson Education, 2012.
3. Mendham, J, *Vogel's Quantitative Chemical Analysis*: Pearson, 2009.



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Dept. of CHEMISTRY, St. FRANCIS

COLLEGE FOR WOMEN

Osmania University, Hyderabad



Head

Department of Chemistry

Osmania University

UCS, DILRABAD

Hyderabad-500 007.

6. Syllabus Focus

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

Local /Regional/National /Global Development Needs	Relevance
Local	Knowledge of chemistry of complexes helps in everyday life
Regional	Learning the concepts of surface chemistry and pericyclic reactions changes their perspective towards various processes
National	Through Knowledge of spectral interpretation opens new horizons in skill development and employability
Global	A complete idea of complexes and spectral interpretation increases students inclination towards research

b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Module 1 synthesis of complexes	Some complexes are synthesized in the Lab. Many metal complexes are widely used in the pharmaceutical companies. This enhances their skill development and employability.
SD	Module 3 Spectral interpretation	Students are taught the instrumentation of all the spectroscopic methods, they are taken to various research labs to show live instrumentation techniques. They are thoroughly trained in spectral interpretation by giving assignments.

7. Pedagogy

S. No.	Chairperson Student Centric Methods Adopted Hyd-07.	Type / Description of Activity
1.	Field trips	Students are taken to various institutes like IICT, HCU, IIT, ARCI etc
2.	Role play	Students are made to enact various concepts of chemistry
3.	Seminars/ workshops/ research projects	Students are allowed to participate in seminars and workshops organized in and

	outside the college. They are encouraged to take up research projects.
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8. Course Assessment Plan

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

CO	Continuous Internal Assessments CIA - 50%	End Semester Examination-50%
CO1	CIA 1 written exam (10 M)	Written Exam
CO2	Skill Test 1 (10 M)	
CO3	CIA 1 written exam (10 M)	
CO4	Skill Test 2 (10 M)	

Chairperson
Board of Studies in Chemistry
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Department of Chemistry
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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

MODEL PAPER
B.SC. II YEAR SEMESTER -VI
ADVANCED CHEMISTRY

TIME: 2hrs

Course Code: U24/CHE/DSE/601

Max. Marks: 50

SECTION –A (Essay Questions)

I. Answer the following

4X10 =40 Marks

1. a) Describe the structure of $[\text{Cu}(\text{NH}_3)_4]$ using Valence bond theory. (CO1) L1 5M
b) Define optical isomerism? Draw and explain the optical isomerism in octahedral complexes. (CO1) L1 5M

OR

2. a) Summarise Werner's theory with examples. (CO1) L2 5M
b) Explain the Crystal field splitting in octahedral complexes. (CO1) L5 5M
3. Outline the mechanism of SN^1 in the octahedral and SN^2 in square planar complexes with one example each. (CO2) L2 10 M

OR

4. a) Define trans effect? Discuss the theories and applications of trans effect. (CO2) L2 5M
b) Distinguish labile and inert complexes? Explain with examples. (CO2) L4 5M
5. a) What is the chemical shift? Explain the change in position of signals with examples. (CO3) L1 5M
b) Elaborate about (M+1), (M+2) and base peaks with two examples in Mass spectrometry. (CO3) L6 5M

OR

6. a) Indicate the number of signals possible for $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-OH}$ and explain spin- spin splitting. (CO3) L6 5M
b) Explain the basic principles of ESR spectroscopy. (CO3) L5 5M
7. a) Classify the various types of colloids? (CO4) L5 5M
b) Deduce the expression for Langmuir adsorption isotherms. (CO4) L5 5M

OR

8. What are Fluorescence and Phosphorescence? Explain the phenomenon of fluorescence and phosphorescence using Jablonski diagram. 10M

SECTION – B (Short answer questions)

II. Answer any four questions.

4 X 5 = 20 Marks

9. Explain the Job's method of determination of composition of a complex. (L2)
10. What is EAN? Calculate the EAN for $[\text{Co}(\text{NH}_3)_6]$ and $[\text{FeF}_6]^{3-}$ (L1)
11. Describe the acid hydrolysis of octahedral complexes. (L2)
12. Define Hardy Schulze rule and Gold number. (L1)
13. Show how the molecular formula of a compound is determined based on its Mass spectrum? (L1)
14. Discuss the quantum yield for the photochemical combination of H_2 & Cl_2 to form HCl (L5)


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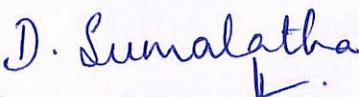
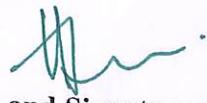
11. Describe the acid hydrolysis of octahedral complexes. (L2)
12. Define Hardy Schulze rule and Gold number. (L1)
13. Show how the molecular formula of a compound is determined based on its Mass spectrum? (L1)
14. List out the various types of NMR signals expected for 1,1,2-tribromoethane? What is the intensity ratio of the peaks? (L1)

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	1	2	10	2	20
2	15	2	2	10	1	15
3	15	3	2	10	2	20
4	15	4	2	10	1	15

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions (Hrs)
1	2,5	Understanding	15
2	1,7	Applying & Analysing	15
3	2,7	Remembering	15
4	4	Creating & Evaluating	15

Prepared by	Checked & Verified by	Approved by
 Name and Signature of the teaching faculty Y. Lakshmi madhuri	 Name and Signature of the HoD Dr. D. Sumalatha	 Name and Signature of Principal Dr. Uma Joseph


 Chairperson
 Board of Studies in Chemistry
 Dept of Chemistry
 Osmania University, Hyderabad


 Head of Department of Chemistry
 UCS, Osmania University
 Hyderabad-500 007.

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. III YEAR SEMESTER -VI

ADVANCED CHEMISTRY

TIME: 2hrs

Max. Marks: 50

Course Code: U24/CHE/DSE/601

Credits: 4

SECTION A - INTERNAL CHOICE			4 X 10 M = 40M	
Question Number	Question		CO	BTL
1	Module 1	(a) Describe the structure of $[\text{Cu}(\text{NH}_3)_4]$ using Valence bond theory. 5M (b) Define optical isomerism? Draw and explain the optical isomerism in octahedral complexes. OR	CO1	Level 1
2	Module 1	(a) Summarise Werner's theory with examples. (b) Explain the Crystal field splitting in octahedral complexes.	CO1	Level I
3	Module 2	Outline the mechanism of SN^1 in the octahedral and SN^2 in square planar complexes with one example each. 10 M OR	CO2	Level 2
4	Module 2	(a) Define the trans effect? Discuss the theories and applications of trans effect. (L1) 5M (b) Distinguish labile and inert complexes? Explain with examples. (L4) 5M	CO2	Level 2
5	Module 3	(a) What is the chemical shift? Explain the change in position of signals with examples. 5M (b) Elaborate about $(M+1)$, $(M+2)$ and base peaks with two examples in Mass spectrometry 5M OR	CO3	Level 1
6	Module 3	(a) Develop the number of signals possible for $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-OH}$ and explain spin- spin splitting. 5M (b) Explain the basic principles of ESR spectroscopy.	CO3	Level 5 & 6
7	Module 4	(a) Classify the various types of colloids? 5M (b) Deduce the expression for Langmuir adsorption isotherms. 5M OR	CO4	Level 5
8	Module 4	What are Fluorescence and Phosphorescence ? Explain the phenomenon of fluorescence and phosphorescence using Jablonski diagram.	CO4	Level 2

SECTION B – (Short answer questions)**ANSWER ANY 4 OUT OF 6****4 X 5M = 20 M**

9	Module 1	9. Explain the Job's method of determination of composition of a complex.	CO1	Level 2
10	Module 2	10. What is EAN ? Calculate the EAN for $[\text{Co}(\text{NH}_3)_6]$ and $[\text{Fe}_6]^{3-}$	CO1	Level 1
11	Module 3	11. Describe the acid hydrolysis of octahedral complexes.	CO2	Level 2
12	Module 4	12. Define Hardy Schulze rule and Gold number	CO4	Level 1
13	Module 2	13. Show how the molecular formula of a compound is determined based on its Mass spectrum? (L1)	CO3	Level 1
14	Module 3	14. Discuss the quantum yield for the photochemical combination of H_2 & Cl_2 to form HCl	CO4	Level 5

SEMESTER -VI

FISHERIES AND LIMNOLOGY

1. Course Description

Programme: B.Sc.

Max. Hours: 60

Course Code: U24/ZOO/DSE/602

Hours per week: 4

Course Type: DSE - II

Credits: 4

2. Course Objectives

- To comprehend the basic concepts of fisheries and aquaculture techniques and management.
- To understand limnology and its reliance and application.

3. Course Outcomes

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

CO1: To discuss the scope of fisheries ,aquaculture systems and its management practices.

CO2: To analyze the different feeding , breeding and hatchery management of finfish and shellfish.

CO3: To describe the concepts ,limnology factors influencing the physical & chemical conditions of living organisms and the major group of organisms involved with it.

CO4: To summarize the productivity of lakes and the factors affecting its productivity.

4. Course Content

MODULE I: Introduction to Fisheries, aquaculture systems, management practices**15 HRS**

1.1 Introduction, definition, history, scope and significance of 'Fisheries'. Present status and prospects of Fisheries at global, national and local (state) level. Blue revolution.

1.2 Classification of Fisheries.

i) Fin fisheries & Shell fisheries;

ii) Capture fisheries & Culture fisheries;

iii) Freshwater (inland), Brackish water & Marine fisheries.

1.3 Aquaculture systems: Pond culture, pen culture, cage culture. Monoculture, composite culture, integrated culture systems.

1.4 Culture phases and management practices: Nursery, rearing and grow-out pond preparation. Liming, fertilization/manuring, and water quality management. Control of aquatic weeds, algal blooms, and weed fishes.

1.5 Traits of important cultivable finfish and shellfish: Indian major carps and Minor carps, Exotic carps, air breathing fishes, cold water fishes, freshwater prawns, mussels.

MODULE II: Feeding, Breeding and hatchery management of finfish and shellfish**15 HRS**

2.1 Bundh breeding: Concept; wet and dry bundhs; Collection and hatching of eggs.

2.2 Induced breeding: Environmental factors affecting spawning; Hypophysation of fishes; Fish pituitary gland: Structure, collection, preservation, and preparation of extract for injection, dosages and methods of injection, dosages and methods of injection.

2.3 Brood-stock management and transportation of brood fish. Synthetic hormones are used for induced breeding of carps.

2.4 Types of fish hatcheries: Traditional, Chinese, Glass jar, Modern controlled hatcheries. Breeding and hatchery management of *Penaeus monodon* and *Macrobrachium rosenbergii*.

2.5 Fish nutrition: Natural and supplementary feeding of cultivable finfish and shellfishes. Forms of feeds: Wet feeds, dry feeds, mashes, pelleted feeds, floating and sinking pellets.

MODULE III: Limnology**15 HRS**

3.1 Introduction to limnology, Inland water bodies: Characteristics and field distribution of Ponds, Lakes, Reservoirs, Streams and Rivers.

3.2 Dynamics of lentic and lotic environments.

3.3 Major rivers and fresh water lakes of India. Origin, Classification and morphometry of lakes.

3.4 Influence of physical and chemical conditions on living organisms in inland waters- Temperature, Light, pH, Turbidity, Thermal stratification, Dissolved Oxygen (DO), Alkalinity, Acidity, Hardness, BOD, COD etc.

3.5 Major groups of organisms in freshwater bodies: Planktons, Periphytons, Neustons, Nektons, Benthos, large aquatic plants etc. Ecological adaptations of freshwater fauna.

MODULE IV: : Productivity of lakes**15 HRS**

4.1 Ecology of ponds and takes (Lentic ecosystems) - Structure and dynamics - Energy flow.

4.2 Productivity of water bodies: Concept of productivity, primary, secondary and tertiary productivity. Factors affecting productivity. Classification of takes based on productivity.

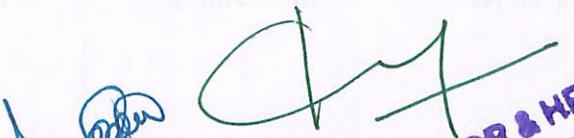
4.3 Laws of minimum and quantitative relationships in a standing crop.

4.4 Biotic potential and environmental resistance. Succession phenomenon and indices of productivity of lakes.

4.5 Eutrophication - causes, consequences and control mechanisms.

5. References

1. Goldman CR. And Home AJ. 1983. Limnology. Mc Graw — Hill International Book Company.
2. Ruttner F. 1953. Fundamentals of Limnology. University of Toronto press, Toronto.
3. Welch PS, 1952. Limnology . 2nd Ed. Me Graw-Hill Book Co., New York.
4. Golterman, HL. 1975. Physiological Limnology. Elsevier Publishing Co., Amsterdam
5. Cole GA. 1983. Text book of Limnology. C.V Mosby Company, St. Louis, Missouri, USA.
6. Wetzel RG. 1975. Limnology. W.B. Sanders Company, Philadelphia.


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PROFESSOR & HEAD
Department of Zoology, UCS.
Osmania University, Hyd-07.

6. Syllabus Focus

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

Local /Regional/National /Global Development Needs	Relevance
Local development needs	To study and maximize sustainable biomass yield and increase employability.
Regional development needs	To comprehend and identify regional sources of fresh water bodies.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development	Module I- IV	Field visit to local or nearby fisheries units or fresh water bodies.
Employability	Module I- II	Visit to Research institute -NFDB- National fisheries development board.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiential Learning	Field Trips
2.	Participative Learning	Seminar and workshops
3.	Problem solving	Case studies Research Projects

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 - I Written Test	Written Exam
CO2	CIA - I Written Test	
CO3	CIA - II Assignment	
CO4	CIA - II Objective test	

b) Model Question Paper- End Semester Exam

FISHERIES AND LIMNOLOGY
MODEL QUESTION PAPER

Course Code: U24/ZOO/DSE/602

Max Marks: 60

Credits: 4

Time: 2Hrs

ILLUSTRATE WITH DIAGRAMS WHEREVER NECESSARY

SECTION-A**I. Answer the following: -** **$4 \times 10 = 40 \text{ M}$**

1. Write an elaborate note on Indian Major carps and Minor carps.
OR
2. Define fisheries. Classify the different types of fisheries.
3. What is induced breeding. Write in detail the environmental factors affecting spawning.
OR
4. Describe the types of fish hatcheries .Write a note on fish hatcheries.
5. How would you classify and measure morphology of lakes..
OR
6. What is Limnology ?Write a note on the influence of physical and chemical conditions on living organisms in inland waters.
7. Explain lentic ecosystem.
OR
8. Write the relation between primary, secondary and tertiary productivity of water bodies.

SECTION- B**II. Answer any FOUR** **$4 \times 5 = 20 \text{ M}$**

9. Scope of fisheries
10. Exotic carps
11. Forms of feed
12. Major rivers of India
13. Planktons
14. Laws of minimum

FISHERIES AND LIMNOLOGY - MODEL QUESTION PAPER

SECTION A - INTERNAL CHOICE

4 Q X 10 M = 40 M

Question Number	Question	Question	CO	BTL(Bloom's Taxonomy Level)
1	Module 1	Write an elaborate note on Indian Major carps and Minor carps.	CO 1	VI
2	Module 1	Define fisheries. Classify the different types of fisheries.	CO 1	I
3	Module 2	What is induced breeding. Write in detail the environmental factors affecting spawning.	CO 2	I
4	Module 2	Describe the types of fish hatcheries .Write a note on fish hatcheries.	CO 2	V
5	Module 3	How would you classify and measure morphology of lakes?	CO3	II
6	Module 3	What is Limnology ? Write a note on the influence of physical and chemical conditions on living organisms in inland waters.	CO 3	III
7	Module 4	Explain lentic ecosystem.	CO 4	IV
8	Module 4	Write the relation between primary ,secondary and tertiary productivity of water bodies.	CO 4	V

SECTION B - ANSWER ANY 4 OUT OF 6			4 Q X 5 M = 20 M	
11	Module 1	Scope of fisheries	CO 1	IV
12	Module 2	Exotic carps	CO 2	I
13	Module 3	Forms of feed	CO 2	V
14	Module 4	Major rivers of India	CO 3	I
15	Module 3	Plantons	CO 3	II
16	Module 4	Laws of Minimum	CO 4	III

FISHERIES AND LIMNOLOGY

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	1	5
2	15	CO2	2	10	1	5
3	15	CO3	2	10	1	5
4	15	CO4	2	10	1	5

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Osmotic University, Hyd-97.

Board of Studies
Osmotic University, Hyd-97.

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Osmotic University, Hyd-97.

FISHERIES AND AQUACULTURE - PRACTICALS

Subject Code: U24/ZOO/DSE/602/P

Max Marks: 50

No. of Credits: 1

No. of Hrs allotted: 2 Hr

Course objective:

1. To enhance the knowledge on basics of various water analysis.
2. To study the complex & diverse approaches of aquaculture practices.

Course outcome:

- To apply the principles involved in qualitative and quantitative analysis of physicochemical parameters in the given sample.
- To comprehend the identification of cultivable fishes and morphometric analysis of freshwater bodies.

Syllabus:

1. Aquaculture production statistics — World, India, and Telangana state.
2. Aquaculture resources of the World, India, and Telangana state.
3. Histological studies of testis and ovary of fish.
4. Identification of important cultivable freshwater fishes-Indian major carps, exotic carps, mahaseers, trouts, tilapias, catfishes and murrel fish.
5. Removal of fish pituitary gland and preparation of pituitary gland extract.
6. Morphometry of lakes, ponds and streams.
7. Determination of physical and chemical characteristics of lotic and lentic water bodies: Temperature, transparency, turbidity, pH, electrical conductivity, total dissolved solids, dissolved oxygen, free carbon dioxide, total alkalinity, total hardness, calcium, magnesium, inorganic nitrogen (ammonium and nitrate) and phosphorous.
8. Collection and identification of freshwater Phytoplankton.
9. Collection and identification of freshwater Zooplankton.
10. Estimation of primary productivity in freshwater bodies.
11. Field trip to local or nearby fisheries unit/freshwater body is to be conducted and certified field note book should be submitted at the time of practical examination.

HEAD
DEPARTMENT OF ZOOLOGY, ST. FRANCIS COLLEGE FOR WOMEN, HYDERABAD
BOARD OF STUDIES IN ZOOLOGY, PGCAT, ST. FRANCIS COLLEGE FOR WOMEN, HYD-07.
UNIVERSITY OF HYDERABAD, HYD-07.

MODEL QUESTION PAPER

PRACTICAL

Course Code: U24/ZOO/DSE/602/P

Max Time: 2 hrs

Credits: 1

Max. Marks: 50

I. Dissect and display fish pituitary gland

15 M

II. Perform the Physicochemical analysis on the given water sample.

12 M

(Experiment 7M; Principle 1M; Procedure 2 M; Results 2M)

- a. pH
- b. Total Alkalinity
- c. Total Hardness

III. Identify the given spots

4 X 2 = 8 M

1. Labeo
2. Euglena
3. Daphnia
4. Cyanobacteria

IV. REPORT

5 M

V. RECORD

5 M

VI. VIVA

5 M

Prepared by	Checked & Verified by	Approved by
<p><i>X. Sheila Merlin</i></p> <p>Name and Signature of the teaching faculty</p>	<p><i>Jyothi Rani M</i></p> <p>DR. JYOTHI RANI Name and Signature of HoD</p>	<p><i>U. S. J. S.</i></p> <p>Name and Signature of Principal</p>

ST.FRANCIS DEGREE COLLEGE FOR WOMEN BEGUMPET
HYDERABAD-500016
(AN AUTONOMOUS COLLEGE OF OSMANIA UNIVERSITY)
DEPARTMENT OF NUTRITION

DSE-3	FOOD SAFETY AND QUALITY CONTROL SEMESTER- VI	60 HRS
Module 1 - Food handling and public health Module 2 - Food packaging and labeling Module 3 - Food adulteration Module 4 - Food spoilage and preservation		

- The syllabus contains four Modules. Paper should give equal weightage to all Modules. Four long questions- One question per module with internal choice

SEMESTER - VI
FOOD SAFETY AND QUALITY CONTROL

1. Course Description

Programme: B.Sc.

Course Code: U24/NUT/DSE/601

Course Type: DSE -3

No. of credits: 4

Max. Hours: 60

Hours per week: 3

Max. Marks: 100

2. Course Objectives

- To emphasize on the importance of food safety, food quality and food laws and regulations
- Enables the students in application of basic aspects of food safety and quality assurance in quality surveillance system

3. Course Outcomes

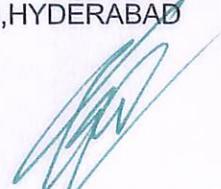
On completion of the course the student will be able to:

CO1: Acquaint the students with protocols for safe handling of foods, water and was management.

CO 2: Recognise the role of food packaging and Nutrition labelling.

CO 3: Analyze consequences of food poisoning and infection on the health of individuals

CO 4: Interpret the knowledge of basic principles and methods in food preservation.



4. Course Content

MODULE I: FOOD HANDLING AND PUBLIC HEALTH

(15 Hrs)

1.1. Food Hygiene and Handling: Introduction, Definition, Basic aspects of Personal Hygiene, Importance of personal hygiene of the food handler, Disease transmission, Preventing food borne illnesses.

1.2. Food Institutions: Sanitation of food Institutions & pest control

1.3. Water & Waste Management: Composition of waste water, process of water purification, disposal of waste water, Types of wastes, Solid wastes, liquid wastes, gaseous wastes and disposal.

MODULE II: FOOD PACKAGING AND LABELING

(15 Hrs)

2.1 Food Packaging: Definition, Functions, Classification of packaging materials, Laws related to packaging.

2.2 Food and Nutrition Labeling: Standards, purpose, description types of labels, Components of labeling, mandatory labeling provision. Role of FSSAI in labeling.

2.3. Standards for health claims: Marketing and Regulatory issues, Regulatory bodies in India.

MODULE III: FOOD ADULTERATION

(15 Hrs)

3.1. Food Adulteration and Laws: Definition, Purpose, Types and methods of adulteration. Detection of food adulterants, Role of FSSAI

3.2. Food Standardization and Regulation Agencies in India- Framework of National food control system, Role of State and Central level Agencies. Institutes and Labs for testing food samples.

3.3 HACCP - Objectives, Principles and Process. Role and duties of food inspector .

MODULE IV: FOOD SPOILAGE AND PRESERVATION

(15 Hrs)

4.1Food Spoilage: Physical, chemical and microbiological spoilage of foods.

4.2. Food Borne Intoxication & Infections: Food poisoning – *Staphylococcus*, *Botulism*, *Salmonellosis*, *Cholera* and *Typhoid*

4.3 Food Preservation: Methods of preservation, General principles and applications of Food preservation. Preservation by using temperature, Preservation using drying method, . Preservation using Class I and Class II preservatives, Preservation using radiation.

5. References

1. Kiron Prabhakar. A Practical guide to food laws and regulations. 1st Ed. Bloomsbury.
2. Sunetra Roday (2017). Food hygiene and sanitation. 2nd Ed. McGraw Hill Publications
3. Pulkit Mathur (2018). Food Safety and Quality Control (2018).
4. William C. Frazier, Dennis C. Westhoff, N.M. Vanitha Food Microbiology, 5th Edition McGraw Hill Education.

6. Syllabus Focus

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

Local /Regional/National / Global Development Needs	Relevance
Global Development Needs	Practicing food hygiene and sanitation plays an important role in public health.
Global Development Needs	Recognising the role of different preservative techniques and enhancing the shelf life of food stock addresses food security globally.

b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
EMP	Module -3	Analysis of food adulterants and implementation of HACCP plays an important role in the food industry.
SD	Module -2	Development of food labels

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Seminar Presentation	Participative Learning
2.	Quiz	Experiential Learning
3.	Group Discussion	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	Written examination
CO2	CIA-1	
C03	CIA-2 Canteen survey	
C04	CIA-2 Skill test (written/quiz)	

a) Model Question paper pattern

SECTION A - INTERNAL CHOICE			5 Q X 10 M = 50 M	
Question Number	Question	Question	CO	BTL(Blooms Taxonomy Level)
1	Module 1	Give an account of the basic aspects of personal hygiene and its importance.	CO 1	I
2	Module 1	Write note on the various methods used in disposal of solid waste.	CO 1	I
3	Module 2	Illustrate about the recent advances in packaging materials in food packing.	CO 2	II
4	Module 2	Explain in brief about the standards and various types of food labels.	CO 2	II
5	Module 3	List out the points put forth by PFA according to which an article is considered adulterated.	CO 3	I
6	Module 3	Explain food borne illness with suitable examples.	CO 3	II
7	Module 4	Explain the preservation of food by high temperature.	CO 4	II
8	Module 4	What are the various methods of drying involved in preservation of food	CO 4	I

SECTION B - ANSWER ANY 5 OUT OF 7			5 Q X 2 M = 10 M	
(To compulsorily have ONE question from each module)				
11	Module 1	Illustrate Waste disposal	CO 1	II
12	Module 2	Define Nutritional labeling	CO 2	I
13	Module 3	Describe PFA	CO 3	II
14	Module 4	Explain Botulism	CO 4	II
16	Module 4	List the role of Personal hygiene	CO 4	I
17	Module 4	Explain Packaging laws	CO 4	II

**FOOD SAFETY AND QUALITY CONTROL
PRACTICAL****Programme: B.Sc.****Max.Hours: 30****Course Code: U24/NUT/DSE/601 /P****Hours per week: 2****Course Type: DSE 3****Max.Marks: 50****No. of credits: 1****COURSE OBJECTIVES:**

- To identify common food adulterants
- Preparations of home made preserved foods, using different home scale preservation methods.

Course Outcomes:

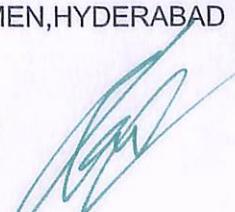
- Understand the role of food packaging and Nutrition labeling.
- Learn the preparation methods of homemade preserved foods.

PRACTICAL SESSIONS**1. Food Preservation**

- Preparation of Jams
- Preparation of Jellies.
- Preparation of Sauces.
- Preparation of Squashes
- Preparation of Pickles

2. Food Adulteration Tests

- Cereal and cereal products
- Pulses
- Milk and milk products
- Fats and oils
- Spices and condiments
- Sugar
- Beverages

3. Food labeling- Guidance on understanding of various aspects of Nutrition labeling.**4. Food Microbiology- study of different disease causing organisms.**

MODEL QUESTION PAPER
FOOD SAFETY QUALITY CONTROL
PRACTICAL

Course Code: U20/NUT/DSE /603/P
Course Credit:1

Marks: 50 Marks
Time: 2 Hrs

Answer the following

1. Identify the given spot and write the points of identification: **5 x 5 = 25 M**
A - E

2. Identify the adulterants in the given food samples **4 x 5 = 20 M**

3. Record **5 M**

Prepared by	Checked & Verified by	Approved by
 Ms Indu Bhargavi Signature of the teaching faculty	 Ms. Tabitha Ramona Name and Signature of HoD	 Dr. Uma Joseph Name and Signature of Principal

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DEPARTMENT OF NUTRITION

SEC-4	FOOD SERVICE MANAGEMENT SEMESTER- VI	30 HRS
Module 1 - Quantity Food Production Module 2 - Planning different courses of meal		

- The syllabus contains two Modules. Paper should give equal weightage to all Modules. Five short questions with internal choice

SEMESTER - VI**FOOD SERVICE MANAGEMENT****1. Course Description****Programme:** B.Sc**Max. Hours:** 30**Course Code:** U24/NUT/SEC/601**Hours per week:** 2**Course Type:** SEC -4**Max. Marks:** 50**No. of credits:** 2**2. Course Objectives**

- To gain knowledge on different types of food service layouts.
- To plan and prepare different types of menus for food production.

3. Course Outcomes

This SEC paper will help students to enhance their overall skills and in Course Content

- Acquire knowledge of the different types of food service styles and to apply the skills in menu planning for the food service Modules.
- Acquire skill in cost concepts in the food industries.

4. Course Content

MODULE I: QUANTITY FOOD PRODUCTION

(15 Hrs)

1.1. Food Production Process: Food purchase, receiving and storage standards for selection of fresh food, substitutes - convenience or ready prepared food.

1.2. Menu planning: Importance of menu, Factors affecting menu planning, Types of menu-Table d'hote menu, A' la carte menu

1.3. Planning of a Small Food Service Unit and types of Services: Planning the set up- Identifying resources, Developing Project plan, Determining investments, 5 types of service – Table service, assisted service, self service, single point service, specialized service.

MODULE II: PLANNING DIFFERENT COURSES OF MEAL

(15 Hrs)

1. Table Setting, Napkin folding.
2. Appetizer- Tomato Soup, Sweet Corn Soup
3. Starter- Vegetable Cutlet
4. Main Course- Chinese Fried Rice
5. Snacks -Sandwich
6. Dessert - Custard, Carrot Halwa

5. References

1. Food & Beverage - Service and Management by Bobby George (Author), Sandeep Chatterjee, Institutional Food Management by Mohini Sethi .
2. Catering management by Mohini Sethi.
3. Andrews S, Food and Beverage Service: Training Manual, 2nd edition, New Delhi, Tata McGraw Hill,2017.
4. Bessie Brooks West and Levelle Wood MS, Food Service in Institutions ,6th edition, John MacMillan Publishing Co,1988.
5. Fuller J and Thomas S, Modern Restaurant Service, 4th edition, Copp Clark Pitman ,1983
6. Harris N, Meal management ,6th edition, New York,Mac Millan,1984.
7. Kotas R, Accounting in hotel and catering industry, 4th edition Cengage Learning EMEA,1981.
8. Kotler P and Keller K, Marketing Management ,16th edition, Pearson Education,2022.
9. Roday S, Food Hygiene and Sanitation –Tata McGraw Hill Publishing Co. Ltd., 3rd reprint

6. Syllabus Focus

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

Local /Regional/National /Global Development Needs	Relevance
Local	Planning standardized recipes for the food service unit.

b) Components on Skill Development/Entrepreneurship Development/ Employability

SD/ED/EMP	Syllabus Content	Description of Activity
ED	2	Preparation of Standardized recipes in the food service unit.

7. Course Assessment Plan

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

Formative Assessment - FA (40)	Summative Assessment - SA (60)
CIA-20 marks Fill in the blanks/ MCQ/ Crossword	End Semester exam-30 Marks

b) Model Question Paper- End Semester Exam

**FOOD SERVICE MANAGEMENT
MODEL QUESTION PAPER
THEORY**

Course Code: U24/NUT/SEC/601

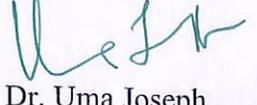
Credits: 3

Max Marks: 30

Time: 1 Hrs

I. Answer any five of the following**5x6 = 30M**

1. Describe the different types of Menus in a catering industry.
2. Factors affecting menu planning.
3. Developing a project plan
4. A' la carte menu
5. Importance of Menu
6. Assisted service
7. Standards for the selection of fresh foods
8. Table d'hote menu

Prepared by	Checked & Verified by	Approved by
 Ms Indu Bhargavi Signature of the teaching faculty	 Ms. Tabitha Ramona Name and Signature of HoD	 Dr. Uma Joseph Name and Signature of Principal

SEMESTER -VI
SEC-IV MATERIAL SCIENCE AND CATALYSIS

1. Course Description

Programme: B.Sc. Max. Hours: 30
Course Code: U24/CHE/SEC/601 Hours per week:
2 Type of course: SEC Max. Marks: 50
No. of credits: 2

2. Course Objectives:

- To provide students with a comprehensive understanding of catalysis at nanoscale with a focus on the unique properties.
- To equip students with application of catalysts including both homogeneous and heterogeneous types and their role in chemical processes and industries.

3. Course Outcome:

CO 1: Gain foundation in the principles of catalysis and apply at nanoscale.

CO 2: Identify and explain the mechanisms of catalytic reactions including the role of active sites and reaction pathways.

This SEC paper will help students to enhance their overall skills.


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Osmania University, Hyderabad

4. Course Content:**Module I: NANOMATERIALS AS CATALYSTS****15 Hrs**

Introduction: Nanocatalyst-A New Fangled material in the Catalytic World, Challenges to Nanocatalysts, Types of Nanocatalysis.Types of Nanocatalysts, Metal Nanoparticles as Catalysts, Metal Oxide Nanoparticles as Catalysts.

Carbon Family Nanomaterials as Nanocatalyst, other Nanomaterials as Nanocatalysts, Size and Shape, Effect of Nanoparticles on Catalytic Activity, Mechanism of Nanocatalysis

Green Nanocatalysis, Nanocatalysis and the Prospects of Green Chemistry, Some Examples of Nano Catalytic Green Reactions, Recoverability and Recycling of Nanocatalysts.

Applications of Nanocatalysts, nanocatalysts and multicomponent reactions.The concept of nanoreactor photocatalysis.

Module II: CATALYSIS**15 Hrs**

Introduction: Definition of a catalyst and catalysis. Homogeneous and heterogeneous catalysis- Comparison of homogeneous and heterogeneous catalysis with specific examples. General characteristics of catalytic reactions.

Acid-base catalysis- Examples of acid and base catalysed reactions- Hydrolysis of esters and Aldol condensation. Kinetics of acid catalysed reactions. Specific acid and general acid catalysis, Specific base and general base catalysis. Effect of pH on reaction rate of acid and base catalysed reactions.

Phase transfer catalysis: Principle of phase transfer catalysis, classification of phase transfer catalysts. Factors influencing the rate of PTC reactions.

Enzyme catalysis, Characteristics of enzyme catalysis, Examples: (i) Invertase in inversion of cane sugar (ii) Maltase in conversion of maltose to glucose (iii) Urease in decomposition of urea and (iv) Zymase in conversion of glucose to ethanol. Factors affecting enzyme catalysis. Effect of temperature, pH, concentration and inhibitor on enzyme catalysed reactions. Michaelis Menten equation.

5. References:

- T. Pradeep *Nano: The Essentials*, McGraw-Hill Education.
- CNR Rao et.al. *Chemistry of nanomaterials: Synthesis, Properties and applications*, Wiley-VCH Verlag GmbH & Co. KGaA.
- William D. Callister, Jr. John Wiley & Sons Materials Science and Engineering An Introduction.
- Nanotechnology: Principles and Practices by Sulabha K. Kulkarni
- Principles of Physical Chemistry by Puri, Sharma and Pathania, 2017.
- Text Book of Physical Chemistry P.L Soni, O.P Dharmaha, U.N Dash.
- Physical Chemistry by Atkins and De Paula, 8 th Edn.

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	CIA1- Assignment	Written Exam
CO2	CIA2- Skill test	

9.**a) Weightage of Marks in Formative and Summative Assessments**

Formative Assessment - FA (40%)	Summative Assessment - SA (60%)
CIA-20 marks	End Semester exam-30 Marks


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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 and regional	Products made from nanomaterials and their roles in human life.
National and global	Catalysts commonly used in industry/research for the synthesis of numerous compounds.

7. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	All	Current progress on the application of nanomaterials synthesized using Nano catalysts.
ED	All	Gives us an insight of fundamentals of catalysts and its development in the production process.
EMP	All	Research and knowledge helps in designing nanomaterials, which are all important skills for working in biotechnology, pharmaceuticals, and advanced materials.



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b) Question Paper Pattern

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 UNIVERSITY) CHEMISTRY

Model Paper

B.Sc. III - Semester VI

SKILL ENHANCEMENT COURSE

MATERIAL SCIENCES AND CATALYSIS

Course Code: U24/CHE/SEC/601

Time: 1 Hr

Max. Marks: 30

SECTION A - Answer any six questions $6 \times 5 = 30$ Marks

Question Number	MODULE	Question	CO	BTL
1	Module 1	What are the different Types of Nanocatalysis?	CO 1	(Level IV)
2	Module 1	Explain the Mechanism of Nanocatalysis.	CO 1	(Level II)
3	Module 1	Write a note on Prospects of Nanocatalysis in Green Chemistry with examples.	CO 1	(Level I)
4	Module 1	Explain any 4 applications of Nanocatalysis.	CO 1	(Level I)
5	Module 2	Define catalysis. Give the characteristics of catalysis.	CO 2	(Level I)
6	Module 2	Derive Michaelis - Menten Equation.	CO 2	(Level IV)
7	Module 2	Discuss the principle of Phase transfer Catalysis.	CO 2	(Level II)
8	Module 2	Explain the kinetics of Acid-catalyzed reactions.	CO 2	(Level IV)



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DEPARTMENT OF NUTRITION

DSE-IV	NUTRITION THERAPY IN CRITICAL CONDITIONS SEMESTER- VI	60 HRS
Module 1 - Advance Nutritional Care Module 2 - Diet in Degenerative diseases Module 3 - Diet in Renal disease Module 4 - Diet in diseases of liver, gallbladder, pancreas - Malabsorption Syndrome		

- The syllabus contains four Modules. Paper should give equal weightage to all Modules. Four long questions- One question per module with internal choice

SEMESTER - VI
NUTRITION THERAPY IN CRITICAL CONDITIONS

1. Course Description

Programme : B.Sc.

Course Code : U24/NUT/DSE/602

Course Type : DSE- 4

No. of credits : 4

Max. Hours : 60

Hours per week : 3

Max. Marks : 100

2. Course Objectives

- To obtain knowledge on the role of diet in various disease conditions.
- Students are able to understand Principles of Diet therapy, modifications of normal diet for therapeutic purposes, and Role of a Dietitian.

3. Course Outcomes

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

CO 1: Understand the various kinds of diets in a hospital and dietary management in gastrointestinal disorders

CO 2: To determine the etiology, risk factors, clinical features and dietary management in degenerative disorders.

CO 3: Emphasis on nutrition modification in critical conditions such as renal failure and dialysis.

CO 4: Acquire knowledge with respect to the physiology and the dietary intervention in cardiac and liver disorders.

4. Course Content

MODULE 1 - ADVANCE NUTRITIONAL CARE

(15 hrs)

1.1 Surgical procedures: CABG, Pre & post-operative care, Nutritional assessment of critically ill patients.

1.2 Diet in gastritis: symptoms of gastritis, dietary management

1.3 Burns: Degree of burns, fluid & electrolyte replacement & dietary management

MODULE 2 - DIET IN DEGENERATIVE DISEASES

(15 hrs)

2.1 Cancer- Definition, types, cancer therapy, & dietary management of cancer patients.

2.2 Hyperlipidemia & congestive heart failure: Etiology, symptoms & dietary management.

2.3 Respiratory Disorders: Pneumonia, COPD

MODULE 3: DIET IN RENAL DISEASE

(15 hrs)

3.1 Diet in renal disorders: Causes, symptoms & dietary treatment in ARF, CRF. Types of dialysis, renal calculi- types & dietary management.

3.2 Gout causes, symptoms & diet

MODULE 4 : DIET IN DISEASES OF LIVER, GALLBLADDER, PANCREAS - MALABSORPTION SYNDROME

(15 hrs)

4.1 Liver disorders - Hepatic coma, Chololithiasis, cholecystitis & pancreatitis.

4.2 Diet in disturbance of small intestine & colon: sprue, coeliac disease, & disaccharide Intolerance- symptoms & dietary management

5. References

1. Sri Lakshmi.B - Dietetics, New Age International Publishers.
2. Antia FP. Clinical dietetics and Nutrition, 2nd Edition, Oxford University Press, Delhi.
Swaminathan- Advance textbook in Food & Nutrition Volume II, the Bangalore printing and publishing company.
3. Krause M, Kathleen. L Mahan and Sylvia Escott Stump, Food, Nutrition, & Diet Therapy. 11 edition WB Saunders Company, Philadelphia, 2004
4. Joshi AS. Nutrition & Dietetics 2010, Tata Mc. Graw Hill.
5. Robinson C. H. Lawler M. R., Chenoweth W. L. & Garwick A. E., Normal and Therapeutic Nutrition, Mc Millan Publishing Company.
6. Modern Nutrition In Health And Disease by Maurice E. Shils, Moshe Shike, A.
7. Catharine Ross, Lippincott William and Wilkins publications
8. Sue Rodwell Williams, Nutrition and Diet therapy, Times Mirror/ Mosby, College Publishing st. Louis.
9. Kumud Khanna, textbook of nutrition and dietetics, phoenix publishing house, Prt Ltd. New Delhi
10. Guyton & Hall- textbook of medical physiology, 9t edition, W.B saunders & co. Burtis G., Davis J. and Martin S. Applied Nutrition and Diet Therapy, W.B.Saunders Co.

6. Syllabus Focus

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

Local /Regional/National /Global Development Needs	Relevance
Global	To identify different causative agents in disease conditions and their modification through diet.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
EMP	1, 2,3,&4	Planning diets for various non communicable and communicable diseases for hospitalized patients.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Seminar Presentation	Participative Learning
2.	Quiz	Experiential Learning
3.	Group Discussion	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	
CO2	CIA-1	
C03	CIA-2 Flashcards	
C04	CIA-2 Skill test (written/quiz)	Written examination

a) Model Question paper pattern

SECTION A - INTERNAL CHOICE			5 Q X 10 M = 50 M	
Question Number	Question	Question	CO	BTL(Blooms Taxonomy Level)
1	Module 1	Give an account on the symptoms, causes and role of nutrition in management of gastritis	CO 1	I
2	Module 1	Explain in detail the assessment of nutritional status of critically ill patients.	CO 1	II
3	Module 2	Illustrate in detail the dietary management in cancer patients with special reference to functional foods.	CO 2	II
4	Module 2	Explain the process of hyperlipidemia and role of fats in the development of the same.	CO 2	II
5	Module 3	Explain the etiology, symptoms & dietary management in ARF.	CO 3	II
6	Module 3	Explain the symptoms, causes and role of nutrition in management of Gout	CO 3	II
7	Module 4	Explain the correlation between the coeliac disease and dietary fiber	CO 4	II
8	Module 4	What are the symptoms, causes and role of nutrition in management of in liver cirrhosis	CO 4	I

SECTION B - ANSWER ANY 5 OUT OF 7 (To compulsorily have ONE question from each module)			5 Q X 2 M = 10 M	
11	Module 1	Explain Post operative care	CO 1	II
12	Module 2	Define Fluid and electrolyte replacement in burns Nutritional labeling	CO 2	I
13	Module 3	Describe COPD	CO 3	II
14	Module 4	Explain Heart failure	CO 4	II
16	Module 4	Explain Renal Calculi	CO 4	II
17	Module 4	Explain Pancreatitis	CO 4	II

NUTRITION THERAPY IN CRITICAL CONDITIONS PRACTICAL

Programme: B.Sc.

Max.Hours: 30

Course Code: U24/NUT/DSE /602/P

Hours per week: 2

Course Type: DSE 4

Max.Marks: 50

No. of credits: 1

Course Objectives:

- To plan days diet for different health conditions
- Preparations of modified diets

Course Outcomes:

- Apply concepts of therapeutic condition to plan and calculate nutritive value
- Create and prepare a menu based on various dietary disorders.

PRACTICAL SESSIONS

1. Planning and preparation of diets for Hyperlipidemia.
2. Planning and preparation of diets for Congestive Heart Failure.
3. Planning and preparation of diets for Acute Renal failure and Chronic Renal failure.
4. Planning and preparation of diets for patients with chronic renal failure undergoing
5. Dialysis.
6. Planning and preparation of diet for Renal calculi.
7. Planning and preparation of diets for Surgery

MODEL QUESTION PAPER
PRACTICAL

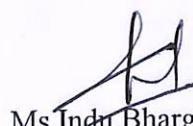
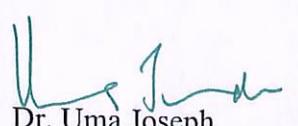
Course Code: U24/NUT/DSE /602/P

Course Credit:1

Marks: 50 Marks
Time: 2 Hrs

Answer the following

1. Write the modified RDA for the given condition	05M
2. Plan A Day's Diet for The Given Condition	10M
a) Hyperlipidemia	
b) Congestive Heart Failure	
c) Acute Renal Failure	
d) Chronic Renal Failure	
c) Chronic Renal failure with dialysis	
1) Renal Calculi	
g) Surgery	
3. Calculate The Any Two Nutrients of Importance & conclusion table	15M
4. Preparation of Selected Meal and Display	10M
5. Record	05 M

Prepared by	Checked & Verified by	Approved by
 Ms Indu Bhargavi Signature of the teaching faculty	 Ms. Tabitha Ramona Name and Signature of HoD	 Dr. Uma Joseph Name and Signature of Principal

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

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FACULTY OF SCIENCE- DEPARTMENT OF CHEMISTRY

THEORY SYLLABUS CBCS-2024

SEMESTER -VI

POLYMER CHEMISTRY

1. Course Description

Program: B.Sc. Max.

Hours: 60 Hrs

Course Code: U24/CHE/DSE/602

Max. Marks: 100

Course: DSE- 4

Hours per week: 4 Hrs

No. of Credits: 4

2. Course Objectives

- To familiarize the students with the mechanism of polymerization and determination of their molecular mass.
- To introduce different levels of polymer structures and significance of Tg and Tm.
- To learn about different types of polymers.
- To understand the factors that influence the degradation of polymers.

3. Course Outcomes

CO 1: Understand the different mechanisms of polymerization and methods of their molecular weight determination.

CO 2: Apply the knowledge of polymer structure to Tg and Tm.

CO3: Understand synthesis, properties and applications of rubbers and plastics.

CO 4: Develop fundamental knowledge of fibers, biodegradable polymers and polymer degradation.

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POLYMER CHEMISTRY**4. Course Syllabus****Module 1: Polymerisation****15****Hrs**

Introduction to Polymers, Classification of polymers based on structure, chemistry of polymerisation, addition polymerisation, copolymerisation, condensation polymerisation, coordination polymerisation, Ziegler-Natta catalyst, Kinetics of polymerization - Free radical chain polymerization, Cationic polymerization, Anionic polymerization.

Degree of polymerisation, physical properties, weight average number average molecular weight. Experimental methods of molecular weight determination- End group analysis, Viscometry and Light scattering.

Module 2: Crystallinity and Glass transition temperature**15 Hrs**

Determination of crystalline melting point and degree of crystallinity. Factors affecting crystalline melting point. Effect of crystallinity on properties of polymers. Helix structures, Spherulites, Polymer single crystals. Glass Transition temperature (T_g). Factors affecting glass transition temperature. Importance of Glass Transition temperature, T_g and molecular weight, T_g and plasticisers, T_g and copolymers, T_g and melting point. Heat distortion temperature.

Module 3: Rubbers and Plastics**15 Hrs**

Natural rubbers, drawbacks of natural rubber, vulcanization, rubber compounding, foamed rubbers, gutta-percha rubber, properties and applications of synthetic rubbers- poly isoprene, poly buta- diene, poly styrene butadiene, neoprene rubbers, nitrile rubbers, polysulfide rubbers.

Thermosetting and thermoplastics. Thermoplastics: poly olefins, poly styrene, PVC, teflon, their preparation, structure and applications. Thermosetting plastics: phenolic resins, amino resins, polyester resins, epoxy resins - preparation, structure and applications. Laminates and fabrication of plastics. Types and properties of Silicones and Adhesives.

Module 4: Fibers, biodegradable polymers and Polymer degradation**15 Hrs**

Natural and synthetic fibers, study of synthetic fibers- polyamides, poly esters, poly acrylates.

Biodegradable Polymers: Introduction, biodegradation mechanism and properties of starch based polymers, polyesters, water soluble polymers. Environmental impacts. Applications of biodegradable polymers in agriculture, medicine and food packaging industry.

Polymer degradation: Types of degradation- thermal degradation, mechanical degradation, Photo degradation. Oxidative degradation and Hydrolytic degradation.

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5. References

1. Vasant R. Gowariker, N. V. Viswanathan, Jayadev Sreedhar, *Polymer science*, New Age International, 1986.
2. Verma.O.P. Narula.A.K. (2004), *Industrial Chemistry*, New Delhi, Galgotia Publications Pvt Ltd.
3. Gopalan.R, Venkappayya & Nagarajan.S, (2005), *Textbook of Engineering Chemistry* (3rd edition) New Delhi, Vikas Publishing House Pvt. Ltd.
4. Jain and Jain , *Engineering chemistry* Dhanpat Raj Publishing company
5. Principles of Physical Chemistry by Puri, Sharma and Pathania, 2017.
6. Text Book of Physical Chemistry P.L Soni, O.P Dharmaha, U.N Dash.
7. Physical Chemistry by Atkins and De Paula, 8 th Edn.
8. Chatwal. R.G., (2006) Chemistry and Industry, New Delhi, Himalaya Publishing House.

6. Syllabus Focus

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

Local /Regional/National/ Global Development Needs	Relevance
Local	Products made from polymers and its unforgettable roles in human life.
Regional	Polymers are commonly being used in catalytic applications as supports for compounds.
National	Polymers are crucial due to their versatility, cost-effectiveness and wide applications in various industries.


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b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP (Mention any ONE of the above at a time)	Syllabus Content (Mention Module No. or part content applicable)	Description of Activity (Activity that will be conducted in class to support the focus of SD/ED/EMP in the syllabus content)
SD	All	Advancement of polymers processing techniques of exciting possibilities for creating novel polymer based elements and devices.
ED	All	Give us an insight of fundamentals of polymer business and its development in the production process.
EMP	All	Research and knowledge helps in designing machinery procurement.

7. Pedagogy

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

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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	CIA1-Written Exam	Written Exam
CO2	CIA1-Written Exam	
CO3	CIA2- Role Play	Written Exam
CO4	CIA2- Group Survey	

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. III YEAR SEMESTER -VI

POLYMER CHEMISTRY

TIME: 2hrs

Course Code: U24/CHE/DSE/602

Max. Marks: 60

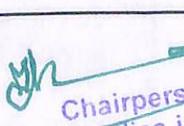
SECTION A - INTERNAL CHOICE 4 X 10 M = 40M				
Question Number	Question		CO	BTL
1	Module 1	Outline the mechanism of free-radical addition polymerization and Coordination polymerization. OR	CO 1	(Level I)
2	Module 1	What is the average molecular weight? How is it determined by viscometry? 10M	CO 1	(Level I)
3	Module 2	a) Define crystalline melting point and discuss the factors affecting crystalline melting point. 5 M b) How does the crystalline melting point affect the properties of polymers? 5 M	CO 2	(Level III)

		OR		
4	Module 2	a) What is Glass Transition temperature (T_g). Explain the factors affecting glass transition temperature. 5M b) Describe the relationship between T_g and molecular weight. 5M	CO 2	(Level I)
5	Module 3	a) Why does natural rubber require vulcanisation and how is it done? 5 M b) Write the preparation, properties and applications of poly isoprene and poly styrene butadiene rubbers. 5 M OR	CO 3	(Level II)

6	Module 3	a) Differentiate between thermoplastics and thermosetting plastics. 5 M b) Discuss the synthesis, properties and applications of PVC and phenolic resins. 5 M	CO 3	(Level I)
7	Module 4	Explain the synthesis, properties and applications of polyamides and polyesters. 10 M OR	CO 4	(Level II)
8	Module 4	What are biodegradable polymers? Explain the biodegradation mechanism of starch based and water soluble polymers. 10 M	CO 4	(Level I)

SECTION B - ANSWER ANY 4 OUT OF 6**4 X 5 M = 20 M**

9	Module 2	Write short notes on helix structures and polymer single crystals.	CO 1	(Level I)
10	Module 1	How are the polymers classified based on their structure? Give suitable examples.	CO 1	(Level I)
11	Module 3	Discuss briefly about fabrication of plastics.	CO 2	(Level II)
12	Module 1	What is copolymerisation? Give the classification of copolymers.	CO 2	(Level II)
13	Module 3	Explain the applications of biodegradable plastics.	CO 3	(Level II)
14	Module 4	Write about thermal and photodegradation of polymers.	CO 4	(Level II)


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SEMESTER – VI
PROJECT

1. Course Description

Programme : B.Sc

Course Code : U24/NUT/PRJ/601/P

Course Type : Project

No. of credits : 4

Hours per week : 4

Max. Marks : 100

2. Course Objectives:

- To mentor the students to design and conduct an original and ethical research.

Course Outcomes

- Students will be able to plan, design and write a scientific report

1. Basic Concepts of Project Planning

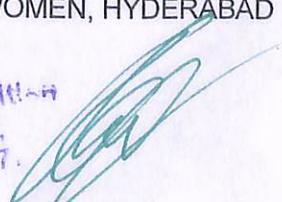
- a) Defining objectives - Need, problem, project, feasibility, planning. Formulation, Identifying resources.
- b) Methods/approaches, Project Appraisal - Project Format

2. Guideline for Project Writing

- a) Title of the project
- b) Name of the person
- c) Duration of the project, type of project
- d) Aims and objectives - summary of the proposed project
- e) Project information, location, people and personnel involved
- f) Working/methodology
- g) Evaluation
- h) Writing and reporting

Reference: Latest APA manual for dissertation

Evaluation: Viva jointly by one internal and one external examiner



PROJECT WORK- REPORT WRITING AND PRESENTATION OF PROJECT SEMINAR**Internal Examination:**

In internal examination, 40 marks based on day-to-day work of the concerned student in terms of experimental designing. Practical performance based on the laboratory work, interpretation of the results obtained and regularity and any other criteria relevant to the study.

Presentation of the work in front of the faculty of the department at least, twice during this project work as follows.

(1) Deciding of the project and state of the art presentation	10M
(2) Discussion of the materials and methods and protocols	10M
(3) Presentation of the obtained results	10M
(4) Review of Literature	10M

External Examination

(1) 60 marks examination of the dissertation examiners which includes viva-voce conducted by examiners.

Prepared by	Checked & Verified by	Approved by
 Ms. Indu Bhargavi Signature of the teaching faculty	 Ms. Tabitha Ramona Signature of HoD	 Dr. Uma Joseph Signature of Principal

SEMESTER - VI

PROJECT

Program: B.Sc

Subject Code: U24/ZOO/PRJ /601

Course: PRJ

No. of Hrs allotted per week: 4

Semester: VI

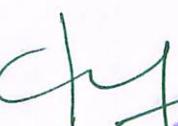
No. of Credits: 4

1. Course objective:

- To acquire knowledge and skills to conduct biological research and to understand the place of science in a broader context.
- To develop and carry out investigations that extend their science knowledge, including developing their understanding of the relationship between investigations and scientific theories and models.

2. Course outcome:

- To be able to design, conduct, record, analyze, and explain the results of biological experiments.
- Develop skills in scientific methods and critical analysis of research findings.
- Emphasis is on types of research, problem selection and hypothesis writing, research planning and design, data collection and measuring techniques, analysis and interpretation of data, and critical analysis of research reports.


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 Board of Studies in Zoology, Hyd-07, PROFESSOR & HEAD
 Osmania University, Hyderabad, U.C.S.


3. Course Assessment Plan

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

Continuous Internal Assessments CIA -40%	End Semester Examination-60%
Internal Project Assessment - 40 M	External Project Viva - 60M

Prepared by	Checked & Verified by	Approved by
 DR. JYOTHI RANI Name and Signature of the teaching faculty	 DR. JYOTHI RANI Name and Signature of HoD	 Name and Signature of Principal


CHAIR MEN
 Board of Studies in Zoology,
 Osmania University, Hyd-67.

PROFESSOR & HEAD
 Department of Zoology, U.G.
 Osmania University, Hyderabad.