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 -IV
SYNTHESIS OF ORGANIC COMPOUNDS AND FUNCTIONAL GROUP ANALYSIS

Program: B.Sc.
Course Code: U24/CHE/DSC/401/P
Course: DSC-4
No. of Credits: 1

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

Course Objective

- To prepare simple organic compounds and systematically analyse functional groups based on their nature and chemical reactivity.

Course Outcomes

CO1: Utilise the knowledge of organic reaction mechanisms in their preparations.
CO2: Categorise functional groups present in organic compounds using systematic quantitative analysis.

Systematic Qualitative Organic Analysis of Organic Compounds possessing mono functional groups (-COOH, phenolic, aldehydic, ketonic, carbohydrate, amide, nitro, amines) and preparation of one derivative.

Synthesis of organic compounds:

a. Acetylation – Preparation of Acetanilide.
b. Halogenation – Preparation of p-Bromo acetanilide.
c. Oxidation – Preparation of Benzoic acid.
d. Esterification - Preparation of n-butyl acetate.
e. Methylation – Preparation β-Naphthyl methyl ether.
f. Nitration – Preparation of Nitrobenzene
g. Reduction – Preparation of m-Nitroaniline

Reference Books:

- Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., *Textbook of Practical Organic Chemistry*, Prentice-Hall, 5th edition, 1996.
- Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry* Orient-Longman, 1960.
- Ahluwalia, V.K. & Aggarwal, R. *Comprehensive Practical Organic Chemistry,* Universities Press.

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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	Knowledge of the basic principles of Chemistry to help in day-to-day life.
Regional	Learn about the concepts and significance of carbohydrates and bioinorganic chemistry.
National	Understand the basics of organometallic compounds, non-aqueous solvents and dipole moments.
Global	Application of basic principles of rotational, IR, UV-Vis Spectroscopy techniques, concepts of chemical kinetics, heterocyclic compounds and pericyclic reactions.

b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Practical syllabus which includes Organic preparations and Qualitative analysis in Organic Chemistry Problem solving in Physical Chemistry	Students perform the experiments based on the procedure and also analyse the unknown compounds. Students solve the problems
ED	Organic preparations and analysis. Structural investigation of organic compounds based on spectroscopy	Students prepare organic compounds, analyse the functional groups and carry out the structural analysis based on spectral data
EMP	Inorganic, Organic, Physical Chemistry and Spectroscopy	Tutorials and assignments

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7. Pedagogy

S. No.	Student Centric Methods Adopted	Type / Description of Activity
1	Experiential	Experiments, attending seminars/workshops and field visits
2	Participative	Group discussion, quiz, presentations etc.
3	Problem solving	Solving problems in Physical Chemistry and structural elucidation based on spectral data.

8. Course Assessment Plan

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

CO	Continuous Internal Assessments CIA - 40%	End Semester Examination-60%
CO1	CIA1-Written Exam	Written Exam
CO2	CIA 2- Skill based test like poster/powerpoint presentation, collage, 3D model making, problem solving and quiz.	
CO3	CIA1-Written Exam	
CO4	CIA 2- Skill based test like poster/powerpoint presentation, collage, 3D model making, problem solving and quiz.	

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b. Model Question Paper - End Semester Exam

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Faculty of Science – Department of Chemistry

MODEL PAPER

B.Sc. II YEAR SEMESTER -IV

CHEMISTRY - PAPER IV

Course Code: U24/CHE/DSC/401

TIME: 2 hrs
Max. Marks: 60

SECTION –A (Essay Questions)

.Answer the following

4X10=40 Marks

1. a) Explain the classification of organometallic compounds based on metal-carbon bonds. (CO1) **L1** 5M
   b) Discuss the reactions in liquid ammonia with suitable examples. (CO1) **L2** 5M

OR

2. a) Describe the preparation, properties and applications of Grignard reagent. (CO1) **L3** 6M
   b) How does fixation of carbon dioxide occur in photosynthesis? (CO1) **L2** 4M
3. a) Derive an expression for the rate constant of first order reaction. (CO2) **L3** 5M
   b) A first order reaction is 50% complete in 100 minutes. How long will it take for 90% completion? (CO2) **L5** 5M

OR

4. Explain different methods of experimental determination of order oa a reaction. (CO2) **L2** 10M
5. a) Discuss the open chain structure of Glucose. (CO3) **L2** 5M
   b) Write the equations involved in Killiani-Fischer synthesis. (CO3) **L2** 5M

OR

6. a) Explain the synthesis of Furan, Pyrrole and Thiophene from 1,4-dicarbonyl compounds. (CO3) **L2** 5M
   b) What are pericyclic reactions? Give their classification with an example each. (CO3) **L4** 5M
7. a) What is a dipole moment? Predict the structure of CO_2 and SO_2 based on dipole moment. (CO4) **L4** 5M
   b) Explain the various molecular vibrations seen in IR spectroscopy. (CO4) **L2** 5M

OR

8. a) Describe in detail about the electronic transitions observed in UV-VIS spectroscopy. (CO4) **L2** 5M
   b) Explain the basic principles of Raman spectroscopy. (CO4) **L2** 5M

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SECTION –B

II. Answer any four. **4x5=20 Marks**

9. Write a note on the biological significance of calcium and chloride ions. (CO1) **L1**
10. Give two methods of preparation of ferrocene. (CO1) **L1**
11. Discuss briefly about collision theory. (CO2) **L2**
12. Explain the factors affecting the rate of a reaction. (CO2) **L2**
13. Explain mutarotation taking glucose as an example. (CO3) **L2**
14. Explain the concept of chromophore and auxochrome. (CO4) **L2**

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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. II YEAR SEMESTER -IV

TIME: 2 hrs
Max. Marks: 60

Course Code: U24/CHE/DSC/401
Credits: 4

SECTION –A (Essay Questions)
SECTION –A

SECTION A - INTERNAL CHOICE			**4 X 10 M = 40M**	
Question Number	**Question**		**CO**	**BTL**
1	**Module 1**	a) Explain the classification of organometallic compounds based on metal-carbon bonds. 5M b) Discuss the reactions in liquid ammonia with suitable examples. 5M **OR**	**CO 1**	**(Level I,II)**
2	**Module 1**	a) Describe the preparation, properties and applications of Grignard reagent. 6M b) How does fixation of carbon dioxide occur in photosynthesis? 4M	**CO 1**	**(Level III,II)**
3	**Module 2**	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 **OR**	**CO 2**	**(Level III, V)**
4	**Module 2**	Explain different methods of experimental determination of order oa a reaction. 10M	**CO 2**	**(Level II)**
5	**Module 3**	a) Discuss the open chain structure of Glucose. 5M b) Write the equations involved in Killiani-Fischer synthesis. 5M **OR**	**CO 3**	**(Level II)**

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6	**Module 3**	a) Explain the synthesis of Furan, Pyrrole and Thiophene from 1,4-dicarbonyl compounds. (CO3) **L2** 5M b) What are pericyclic reactions? Give their classification with an example each. (CO3) 5M	**CO 3**	**(Level II, IV)**
7	**Module 4**	a) What is a dipole moment? Predict the structure of CO_2 and SO_2 based on dipole moment. 5M b) Explain the various molecular vibrations seen in IR spectroscopy. 5M **OR**	**CO 4**	**(Level II, IV)**
8	**Module 4**	a) Describe in detail about the electronic transitions observed in UV-VIS spectroscopy. 5M b) Explain the basic principles of Raman spectroscopy. 5M	**CO 4**	**(Level II)**
SECTION B - ANSWER ANY 4 OUT OF 6				**4 X 5M = 20 M**
9	**Module 2**	Write a note on the biological significance of calcium and chloride ions.	**CO 1**	**(Level I)**
10	**Module 1**	Give two methods of preparation of ferrocene.	**CO 1**	**(Level I)**
11	**Module 2**	Discuss briefly about collision theory.	**CO 2**	**(Level II)**
12	**Module 2**	Explain the factors affecting the rate of a reaction.	**CO 2**	**(Level II)**
13	**Module 3**	Explain mutarotation taking glucose as an example.	**CO 3**	**(Level II)**
14	**Module 4**	Explain the concept of chromophore and auxochrome.	**CO 4**	**(Level II)**

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SEMESTER-IV

CYTOLOGY, GENETICS & DEVELOPMENTAL BIOLOGY

1. Course Description

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

Course Code: U24/ZOO/DSC/401 **Hours per week: 4**

Course Type: DSC - IV **Max. Marks: 100**

No. of credits: 4

2. Course Objectives

- To understand the Ultrastructure of an Animal cell and its organelles
- To analyse the two aspects of nature: Heredity & Variation.
- To understand the developmental processes that lead to the establishment of the body plan of vertebrates and the corresponding cellular and genetic mechanisms.

3. Course Outcomes

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

CO1: To remember animal cell structure, organelles and its functions.

CO2: To understand the fundamental principles of molecular biology.

CO3: To analyze that genes are the units of inheritance for individual characteristics and the chemical basis of heredity and the role of the X and Y chromosomes in determining sex and how they are inherited.

CO4: To create an understanding of fundamentals of developmental biology such as gametogenesis, formation of primary germ layers, extra embryonic membranes and placentation in mammals.Develops knowledge concerning the beginnings of life and the changes occurring during prenatal development

4. Course Content

MODULE I: CELL BIOLOGY **15 HRS**

1.1 Ultra structure of animal cell

1.2 Structure and functions of plasma membrane proteins.

1.3 Structure and functions of cell organelles -Endoplasmic reticulum, Golgi body, Ribosomes, Lysosomes, centrosomes, Mitochondria and Nucleus

1.4 Chromosomes - Structure, types, giant chromosomes

1.5 Cell Division - Mitosis, Meiosis; Cell cycle and its regulation.

MODULE II: MOLECULAR BIOLOGY **15 HRS**

2.1 DNA - Structure and RNA - Structure, types

2.2 DNA Replication

2.3 Protein Synthesis - Transcription and Translation

2.4 Gene Expression - Genetic Code; operon concept

2.5 Molecular Biology Techniques- Polymerase Chain Reaction, Electrophoresis

MODULE III: GENETICS **15 HRS**

3.1 Mendel's laws of Inheritance and Non- Mendelian Inheritance :Codominance ,Incomplete Dominance , Epistasis, lethal alleles

3.2 Linkage and Crossing over

3.3 Sex determination and Sex-linked inheritance

3.4 Chromosomal Mutations- Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy; Gene mutations- Induced versus Spontaneous mutations.

3.5 Inborn errors of metabolism.

MODULE IV: DEVELOPMENTAL BIOLOGY **15 HRS**

4.1 Gametogenesis (Spermatogenesis and Oogenesis) Fertilization; Types of eggs; Types of cleavages

4.2 Development of Frog up to formation of primary germ layers

4.3 Formation of Foetal membrane in chick embryo and their functions

4.4 Types and functions of Placenta in mammals

4.5 Regeneration in Turbellaria and Lizards.

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5. References

1. Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnell 'Molecular Cell Biology' W.H. Free man and company New York..

2. Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). Principles of Genetics. VIII Edition. Wiley India.

3. Snustad, D.P., Simmons, M.J. (2009). Principles of Genetics. V Edition. John Wiley and Sons Inc.

4. Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics. X Edition. Benjamin Cummings.

5. Russell, P. J. (2009). Genetics- A Molecular Approach. III Edition. Benjamin Cummings.

6.Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B. Introduction to Genetic Analysis. IX Edition. W. H. Freeman and Co.

7. Gilbert, S. F. (2010). Developmental Biology, IX Edition, Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA

8. Balinsky B. I. and Fabian B. C. (1981). An Introduction to Embryology, V Edition, International Thompson Computer Press

9. Carlson, R. F. Patten's Foundations of Embryology

10. Kalthoff (2008). Analysis of Biological Development, II Edition, McGraw-Hill Publishers

11. Lewis Wolpert (2002). Principles of Development. II Edition, Oxford University Press

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6.Syllabus Focus

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

Local /Regional/National /Global Development Need	Relevance
Local needs	The course will help the students to identify basic cell structural and functional concepts, which motivate them to a diverse career options.
National needs	The course gives an opportunity to go for training in Genetic counselling , Lab technicians which in turn can help them serve in the field of national medical bodies.
Global needs	To comprehend the inheritance of characters and diseases, mutations and influence of environmental factors at genetic level.

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B)Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development	Module I & II	To enhance the identification and preparation of various histological slides.
Employability	Module I,II,III & IV	Field visits Projects Internships in institutes such as CCMB, IICT, IOG etc.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiential Learning	Field Trips Science Experiments Internship Opportunities
2.	Participative learning	Presentations Seminars 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 I- Written Test	Written Exam
CO2	CIA I- Written Test	
CO3	CIA II Assignment	
CO4	CIA II Objective Test	

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b) Model Question Paper- End Semester Exam

CYTOLOGY, GENETICS & DEVELOPMENTAL BIOLOGY

MODEL QUESTION PAPER

Course Code: U24/ZOO/DSC/401 **Max Marks: 60**

Credits : 4 **Time : 2Hrs**

ILLUSTRATE WITH DIAGRAMS WHEREVER NECESSARY

SECTION-A

I. Answer the following: - **10x4=40 M**

1. Identify the powerhouse of the cell and elaborate on its structure and functions.

OR

2. Define cell division. Explain the meiotic division in detail.

3. Distinguish between the DNA and RNA.

OR

4. Explain the mechanism of Proteins Synthesis.

5. Analyse the three laws of Mendelian inheritance.

OR

6. Classify mutations and illustrate gene mutations.

7. What is Gametogenesis? Explain Spermatogenesis.

OR

8. How would you prove that animals show regeneration ability, give justification to your explanation?

SECTION- B

II. Answer any FOUR **5x4=20 M**

9. Describe the structures that are characteristic of an animal cell.

10. Compare the eukaryotic and prokaryotic ribosomes.

11. How can you separate the mixture of compounds using gel electrophoresis technique?

12. The genes of a chromosome inherited to the next generation in the same combination.Prove this statement has limitations and explain why?

13. How would you disagree with mendel laws of inheritance?

14. Assess the importance of placentation in mammals and list out different types of placentation

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CYTOLOGY, GENETICS & DEVELOPMENTAL BIOLOGY

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	Identify the powerhouse of the cell and elaborate on its structure and functions.	CO 1	Level II
2	Module 1	Define cell division. Explain the meiotic division in detail.	CO 1	Level I & Level II
3	Module 2	Distinguish between the DNA and RNA.	CO 2	Level IV
4	Module 2	Explain the mechanism of Proteins Synthesis.	CO 2	Level V
5	Module 3	Analyze the three laws of Mendelian inheritance.	CO 3	Level IV
6	Module 3	Classify mutations and illustrate gene mutations.	CO 3	Level IV
7	Module 4	What is Gametogenesis? Explain Spermatogenesis.	CO 4	Level I & Level II
8	Module 4	How would you prove that animals show regeneration ability, give justification to your explanation?	CO 4	Level VI

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

9	Module 1	Describe the structures that are characteristic of an animal cell.	CO 1	Level II
10	Module 2	Compare the eukaryotic and prokaryotic ribosomes.	CO 2	Level IV
11	Module 3	How can you separate the mixture of compounds using gel electrophoresis technique?	CO 3	Level VI
12	Module 4	The genes of a chromosome inherited to the next generation in the same combination.Prove this statement has limitations and explain why?	CO 4	Level IV
13	Module 3	How would you disagree with mendel laws of inheritance?	CO 3	Level V
14	Module 4	Assess the importance of placentation in mammals and list out different types of placentation.	CO 4	Level V

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CYTOLOGY, GENETICS & DEVELOPMENTAL BIOLOGY

PRACTICALS

Programme: B.Sc. **Max. Hours: 30**

Course Code: U24/ZOO/DSC/401/P **Hours per week:2**

Course Type: DSC-IV **Max. Marks: 50**

No. of credits: 1

Course Objectives:

- To study the structure and types of chromosomes and different stages of cell division.
- To study the Mendelian laws, Linkage and Pedigree Analysis.
- To understand the developmental processes that lead to the establishment of the body plan of vertebrates and the corresponding cellular and genetic mechanisms.

Course Outcomes:

CO1: To remember the different stages of cell cycle.

CO2: To apply the skills to solve genetic problems and demonstrate how genetic analysis can be used to investigate aspects of genetics.

CO3: To remember the various developmental stages in Chick and Frog

CYTOLOGY:

1. Preparation and Identification of slides of Mitotic divisions with onion root tips
2. Preparation and Identification of different stages of Meiosis in Grasshopper Testis
3. Identification and study of the following slides

i) Different stages of Mitosis and Meiosis
ii)Lampbrush and Polytene chromosomes

GENETICS:

4. Problems on Genetics - Mendelian inheritance, Linkage and crossing over, Sex linked inheritance

EMBRYOLOGY:

5. Study of T.S. of Testis and Ovary of a mammal
6. Study of different stages of cleavages (2, 4, 8, 16 cell stages); Morula, Blastula
7. Study of chick embryos of 18 hours, 24 hours, 33 hours, 48 hours & 96 hours of incubation.

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CYTOLOGY, GENETICS & DEVELOPMENTAL BIOLOGY
MODEL QUESTION PAPER PRACTICAL

Course Code: U24/ZOO/DSC/401/P **Max Time: 2 Hrs**

Credits: 1 **Max. Marks: 50**

I. PERFORM THE EXPERIMENT; WRITE THE PRINCIPLE, PROCEDURES, RESULTS. **15M**

(Principle 1M; Procedure 2 M; Experiment 8M;Slide 4 M)

1. Preparation and Identification of slides of Mitotic divisions with onion root tips
2. Preparation and Identification of different stages of Meiosis in Grasshopper Testes

II. PROBLEMS BASED ON GENETICS **3 X 5=15 M**

1. Problems on Mendelian in heritance
2. Problems Linkage and crossing over
3. Problems Sex linked inheritance

III. IDENTIFY THE GIVEN SPOTS **5X 3=15 M**

1. Identification and study of the following slides Different stages of Mitosis and Meiosis Lamp brush and Polytene chromosomes

2. Study of T.S.of Testis and Ovary of mammal

3. Study of different stages of cleavages(2,4,8,16cellstages); Morula ,Blastula

4. Study of Chick Embryos of 18 Hours,24hours, 33 hours, 48 hours& 96 hours of incubation

IV. RECORD **5 M**

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

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SEMESTER- IV
INTELLECTUAL PROPERTY RIGHTS

1. Course Description

Programme: B. Sc.
Course Code: U24/CHE/SEC/401
Course Type: SEC
No. of credits: 2

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

2. Course Objectives

- To create awareness on the concept of Intellectual Property Rights that has assumed a great importance in recent times because of the recognition that "knowledge is property".
- To understand the importance of international treaties and organizations involved in the protection of Intellectual property.
- To enable students to comprehend the various aspects of Patent.

3. Course Outcomes

CO 1: Recall the various types of Intellectual properties and their importance.

CO 2: Recognise the importance of international treaties and organisations in promoting and protecting intellectual property rights.

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4. Course Content

MODULE I: INTRODUCTION TO I.P.R & INTERNATIONAL TREATIES 15 Hrs

Concept of Property, Kinds of Property, General concept and Significance of Intellectual Property (IP), Introduction to Intellectual Property Rights (IPR) and their protection, Recent Developments, Introduction to Patents, Trademarks, Copyrights, Trade secrets, Industrial designs and Geographical indications. Paris Convention for the Protection of Industrial Property, Trade Related Aspects of Intellectual Property TRIPS, TRIMS, WIPO, Budapest treaty on the international recognition of the deposit of microorganisms for the purpose of patent procedure.

MODULE 2: PATENTS 15 Hrs

Introduction, The Patent's act 1970, Protectable Subject Matter- patentable invention, Procedure for Obtaining patent, Provisional And Complete Specifications, Rights conferred on a Patentee, Transfer of Patent, Revocation and surrender of Patents, Infringement of patents, Action for Infringement, Patent Agents, Patent Cooperation Treaty (PCT) Brief Discussion on Case Law on Patents.

5. References

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2. Dwivedi S.P. *Jurisprudence of Legal Theory.* Allahabad Central Law Agency.
3. *Treaties on Intellectual Property Rights* Blackstone.
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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, Regional	Allow students to own their innovations in the same way that physical property can be owned.
National, Global	Enables students to develop innovative and valuable work with a strong IP system.

b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	All	Establish guidelines for creating intellectual property and analyse third party interactions.
ED	All	IPR can be used to protect the technology, brand name, design and creativity behind the concept.
EMP	All	Multifacet involves a variety of responsibilities like research and development, experimentation, data analysis, documentation, collaboration and innovation.

7. 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-Mock courts	Written Exam

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CO2	CIA1-Case Studies	

b). Question Paper Pattern

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CHEMISTRY
Model Paper
B.Sc. II - Semester IV
SKILL ENHANCEMENT COURSE
INTELLECTUAL PROPERTY RIGHTS (IPR)

Time: 1 Hr **Course Code: U24/CHE/SEC/401**
Max. Marks: 30

SECTION A - Answer any six questions **6 x 5 = 30 Marks**

Question Number	Question		CO	BTL
1	Module 1	1.Illustrate the importance of Trademarks and Geographical indications.	CO 1	(Level II)
2	Module 1	2. Explain the significance of intellectual property rights.	CO 1	(Level I)
3	Module 2	3. Outline the importance of TRIPS in promoting IPR. (CO 2) **L2**	CO 2	(Level I)
4	Module 1	4. What is the Budapest treaty on the international recognition of microorganisms?	CO 1	(Level I)
5	Module 1	5. Describe in brief the role of WTO in promoting IP.	CO 1	(Level I)
6	Module 2	6. Summarize a note on rights conferred on a patentee.	CO 2	(Level II)

7	Module 2	7. Give a description on patentable subject matter.	CO 2	(Level I)
8	Module 2	8. Explain briefly the action for infringement of patents.	CO 2	(Level I)

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CHEMISTRY
Model Paper
B.Sc. II - Semester IV
SKILL ENHANCEMENT COURSE
INTELLECTUAL PROPERTY RIGHTS (IPR)

Time: 1 Hr **Course Code: U24/CHE/SEC/401**
Max. Marks: 30

SECTION A - Answer any six questions **6 x 5 = 30 Marks**

1.Illustrate the importance of Trademarks and Geographical indications. (CO 1)**L2**
2. Explain the significance of intellectual property rights. (CO 1)**L1**
3. Outline the importance of TRIPS in promoting IPR. (CO 2)**L2**
4. What is the Budapest treaty on the international recognition of microorganisms? (CO 1)**L1**
5. Describe in brief the role of WTO in promoting IP. (CO 1)**L1**
6. Summarize a note on rights conferred on a patentee. (CO 2)**L2**
7. Give a description on patentable subject matter. (CO 2) **L1**
8. Explain briefly the action for infringement of patents. (CO 2)**L1**

Prepared by	Checked & verified by	Approved by
Name and Signature of the teaching faculty Dr. Shikha Chander Ms. Deepthi	Name and Signature of the HoD Dr. D. Sumalatha	Name and Signature of the Principal Dr. Uma Joseph

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Dept of Chemistry
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SEMESTER IV

Skill Enhancement Course II

NURSERY MANAGEMENT

1. Course Description

Programme:	**B. Sc**	**Max. Hours:**	**30**
Course Code:	**U24/BOT/SEC/401/P**	**Hours per week:**	**2**
Type of Course:	**SEC - 401**	**Max. Marks:**	**30**
No. of Credits:	**2**		

2. Course Objectives

1. Describe the methods of growing plants in a safe and sustainable way, and how to run their own successful gardens.
2. Interpret various methods of plant propagation and maintenance.

3. Course Outcomes

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

CO 1: Describe the process of nursery bed preparation for growing plants along with various vegetative propagation methods.

CO 2: Describe the methods for skill acquisition in garden creation and horticultural practices

4. Course content

1. Preparation of nursery bed and polybag filling
2. Preparation of potting mixture – Potting and repotting.
3. Vegetative propagation methods – Cutting, grafting, budding and layering
4. Identification and use of garden tools and implements.
5. Laying out drip irrigation & sprinklers.
6. Establishment and management of vegetable garden.
7. Identification of common plant pests and diseases.

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5. Reference Books

1. Bose T.K. & Mukherjee, D., 1972, Gardening in India, Oxford & IBH Publishing Co., New Delhi.
2. Sandhu, M.K., 1989, Plant Propagation, Wile Eastern Ltd., Bangalore, Madras.
3. Kumar, N., 1997, Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.
4. Edmond Musser & Andres, Fundamentals of Horticulture, McGraw Hill Book Co., New Delhi.
5. Agrawal, P.K. 1993, Hand Book of Seed Technology, Dept. of Agriculture and Cooperation, National Seed Corporation Ltd., New Delhi.
6. Janick Jules. 1979. Horticultural Science. (3rd Ed.), W.H. Freeman and Co., San Francisco, USA.

6. Syllabus Focus

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

Local /Regional/National /Global Development Needs (Mention any ONE at a time)	**Relevance** (Describe how the course addresses the need) Maximum 15 words
Local developmental needs	Integrating nursery and gardening practices into local development can create sustainable environment that address socio-economic and health challenges.

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b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
ED	Practical paper	• Run a profitable nursery business • Laying out irrigation set up for the nursery

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative Learning	• Presentations and Group discussions • Quiz and Just a Minute (JAM)
2.	Problem solving	• Minor projects • Reviewing research articles on syllabus topics

8. Course Assessment Plan

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

CO	Continuous Internal Assessments CIA - 20%	End Semester Examination- 30%
CO1	CIA 2 – Test 1: MCQ's, Quiz test, Practical project	Written Exam
CO2	CIA 2 – Test 2: MCQ's / Presentation / Seminar topics	

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b) Model Question Paper – End Semester Exam Practical

NURSERY MANAGEMENT

Course Code: U24/ BOT/ SEC/401/P **Max. Marks: 30**
Time: 1 Hour

Q I. Demonstrate the type of Grafting Technique with the given plant.	8 Marks
Q II. Demonstrate the Propagation Technique.	5 Marks
Q III. Identify the Spots A & B	5 Marks
Q IV. Project + Viva	7 + 3 - 10 Marks
Q V. Record	2 Marks

Prepared by	Checked &verified by	Approved by
Basanti. ch **Dr. Basanti Chintapalli** **Teaching faculty**	Basanti. ch **Dr. Basanti Chintapalli** **HoD**	**Dr. Uma Joseph** **Principal**

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SEMESTER IV

PLANT ANATOMY & EMBRYOLOGY

1. Course Description

Program:	**B. Sc**	**Max. Hours:**	**60**
Course Code:	**U24/ BOT/ DSC/401**	**Hours per week:**	**4**
Type of Course:	**DSC-4**	**Max. Marks:**	**60**
No. of Credits:	**4**		

2. Course Objectives

1. To explain anatomical structure and functions of various tissues.
2. To describe Pollen formation and morphology to shape, Megaspore formation, pollen pistil interaction and relationship between embryo and endosperm.

3. Course Outcomes

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

CO1: Describe the tissue systems, structure of stomata and recognize the anatomy and ontogeny of leaves

CO2: Compare the normal and anomalous secondary growth in plants in addition to examining the properties and economic importance of wood.

CO3: Explain the scope of Embryology alongside the structure of anther and ovule; discuss microsporogenesis, megasporogenesis, pollination types and pollen – pistil interaction.

CO4: Describe the structure and functions of embryo, endosperm and seed.

4. Course content

Module I: Meristematic and permanent tissues **15 Hours**

1.1 Meristems: Types, histological organization of shoot and root apices and theories. Simple Tissues.

1.2 Complex (Xylem and Phloem) and Secretory tissues (Hydathodes, Laticiferous, Salt glands and Nectaries

1.3 Leaf: Ontogeny, diversity of internal structure; stomata and epidermal outgrowths.

Module II: Secondary growth **15 Hours**

2.1. Secondary growth in Dicot stem and root, Vascular cambium – Formation and function.

2.2. Anomalous secondary growth – A*chyranthes, Boerhaavia, Bignonia* & *Dracaena*

2.3. Wood structure: General account. Study of local timbers – Teak (*Tectona grandis*), Rosewood (*Dalbergia latifolia*), Red sanders (*Pterocarpus santalinus*), Nallamaddi (*Terminalia tomentosa)*, Neem (*Azadiracta indica*).

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Module III: Structural organization of Flower **15 Hours**

3.1 Structure of anther and pollen; microsporogenesis and development of male gametophyte.
3.2 Structure and types of ovules; megasporogenesis; types and development of female gametophyte.
3.3 Types of embryo sacs, Pollination types & Pollen – Pistil interaction; Double fertilization.

Module IV: Embryo & Endosperm **15 Hours**

4.1 Endosperm: Types, structure and functions; Dicot and monocot embryo; Embryo-endosperm relationship.
4.2 Seed-structure (Dicot and Monocot), Appendages and dispersal mechanisms.
4.2 Apomixis and Polyembryony

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5. Reference Books

1. Esau, K. 1971. *Anatomy of Seed Plants*. John Wiley and Son, USA.
2. Bhojwani, S. S. and S. P. Bhatnagar. 2000. *The Embryology of Angiosperms (4th Ed.),* Vikas Publishing House, Delhi.
3. Singh, V., Pande, P.C and Jain, K.2004. *Embryology of Angiosperms (1st Ed.),* Rastogi Publications, Meerut.
4. Maheswari, P. 1971. *An Introduction to Embryology of Angiosperms*. McGraw Hill Book Co., London.
5. Fahn.1997. *Plant Anatomy*. Aditya Book (P) Ltd. New Delhi.
6. P.C. Vasishta. 1991.*Plant Anatomy*. Pradeep Publications, Jalandhar, New Delhi.
7. M.S. Tayal. 1990. *Plant Anatomy*. Rastogi Publications, New Delhi.
8. H.N. Srivastava. 1993. *Introductory Botany, Volume II*. Pradeep Publications, New Delhi.
9. Esau, K.1971.Anatomy *of Seed Plants*. John Wiley and Son, USA.
10. Mauseth, J.D. (1988). Plant Anatomy. The Benjamin/Cummings Publisher, USA.
11. Eames.A.J and Laurence H. Mac Daniels. (1953). An introduction to plant anatomy. New York ;London : McGraw-Hill, 1925.

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6. Syllabus Focus

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

Local /Regional/National /Global Development Needs (Mention any ONE at a time)	**Relevance** (Describe how the course addresses the need) Maximum 15 words
Regional needs	Research in plant anatomy provides sustainable agricultural practices to mitigate environmental degradation. Insights into embryonic development aid in breeding programs.

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	Module II: Secondary growth	Understanding the anatomical structures of root, leaf and stem through hand sectioning of samples and observing under microscope

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7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative Learning	• Presentations and Group discussions • Reading and gathering information from library
2.	Experiential Learning	• Preparing models • Testing viability of pollen grains from different flowers specific examples
3.	Problem solving	• Research Projects • Reviewing research articles

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 2 – Test 1: MCQ's, Quiz test or subjective	Written Exam
CO2	CIA 1 - Subjective	
CO3		
CO4	CIA 2 – Test 2: MCQ's / Presentation / Seminar topics	

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b) Model Question Paper – End Semester Exam Theory

PLANT ANATOMY & EMBRYOLOGY

Course Code: U24/ BOT/ DSC/401 **MAX MARKS: 60**

Credits: 4 **TIME: 2 hours**

Note: This question paper consists of Section A and B. The answer to Section A and B must be written in the answer book given.

Section A (Long Essay Type)

I. Answer all Questions **Marks: 4 x 10 – 40**

1. Explain different types of meristematic tissues.
   OR
2. Describe in detail about stomata.

3. What is anomalous secondary growth? Describe secondary growth in *Boerhaavi*a stem.
   OR
4. Describe in detail about a. Teakwood b. Red sanders.

5. Illustrate in detail about the nuclear behavior in tapetal cells.
   OR
6. Describe the Bisporic Embryosac.

7. Describe in detail structure and functions of endosperm.
   OR
8. What are the different seed dispersal mechanisms?

Section B (Short Essay Type)

II. Write short notes on any **FOUR** of the following: **Marks: 4 x 5 - 20**

9. What is Xylem? List out its components and function
10. What is vascular cambium? Mention its functions.
11. Explain the anther structure.
12. Describe the structure of dicot embryo
13. List types of ovules
14. Describe Apomixis

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SECTION A - INTERNAL CHOICE				4Q X 10 M = 40 M
Question Number	Question	Question	CO	BTL (Blooms Taxonomy Level)
1	Module 1	Explain different types of meristematic tissues.	CO 1	Level I
2	Module 1	Describe in detail about stomata.	CO 1	Level II
3	Module 2	What is anomalous secondary growth? Describe secondary growth in *Boerhaavia* stem.	CO 2	Level I, II
4	Module 2	Describe in detail about a. Teakwood b. Red sanders	CO 2	Level I, II
5	Module 3	Illustrate in detail about the nuclear behavior in tapetal cells.	CO 3	Level II
6	Module 3	Describe the Bisporic Embryosac.	CO 3	Level I, II
7	Module 4	Describe in detail structure and functions of endosperm.	CO 4	Level I, II
8	Module 4	What are the different seed dispersal mechanisms?	CO 4	Level I
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	What is Xylem? List out its components and function	CO 1	Level I
10	Module 2	What is vascular cambium? Mention its functions.	CO 2	Level I
11	Module 3	Explain the anther structure.	CO 3	Level II
12	Module 4	Describe the structure of dicot embryo	CO 4	Level I, II
13	Module 3	List types of ovules	CO 3	Level I, IV
14	Module 4	Describe Apomixis	CO 4	Level I, II

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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	CO 1	2	10 each	1	5
2	15	CO 2	2	10	1	5
3	15	CO 3	2	10	1	5
4	15	CO 4	2	10	1	5

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions (hrs)
1	1, 5	Understand	15
2	1, 2, 3, 5, 7, 8	Analyzing	15
3	1, 5	Understand	15
4	1, 5	Understand	15

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PLANT ANATOMY & EMBRYOLOGY

Practical Syllabus

1. Course Description

Programme:	**B. Sc**	**Max. Hours:**	**30**
Course Code:	**U24/ BOT/ DSC/401/P**	**Hours per week:**	**2**
Type of Course:	**DSC - 4**	**Max. Marks:**	**50**
No. of Credits:	**1**		

2. Course Objectives

1. To develop skills in taking anatomical sections of stem & root along with observing the distribution of various tissues.
2. To analyze knowledge on pollen morphology, viability, microsporogenesis, and megasporogenesis embryo types through slides and specimens.

3. Course Outcomes

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

CO 1: Identify the Individual Cells and Tissues by observing permanent slides and by taking anatomical sections

CO 2: Describe the concepts of palynology and embryology.

4. Course Content

1. Apical meristem of root, shoot and vascular cambium. Distribution and types of parenchyma, collenchyma and sclerenchyma.
2. Epidermal system: cell types, stomatal types.
3. Preparation of double stained Permanent slides: Primary structure: Root - *Cicer, Canna*; Stem – *Tridax, Sorghum*; Secondary structure: Root – *Tridax* sp.; Stem – *Pongamia*; Anomalous Secondary Structure: *Boerhaavia, Bignonia, Dracaena.*
4. Structure of anther and microsporogenesis using permanent slides.
5. Structure of pollen grains using whole mounts (*Catheranthus, Hibiscus, Acacia*, and Ocimum).
6. Pollen Viability test using in - vitro germination- *Hibiscus.*
7. Study of ovule types; Development stages of monocot and dicot embryos using permanent slides.

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4. Model Question Paper – End Semester Exam Practical

PLANT ANATOMY & EMBRYOLOGY

Course Code: U24/ BOT/ DSC/401/P

Time: 2 Hours **Maximum Marks: 50 Marks**

Q I. Prepare a double stained permanent mount of transverse section of the given material 'A', with a well labelled diagram. Give description and identify. Mention stains used and leave the slide for valuation by the examiner.

(Slide preparation –2; description – 3; stains used –1; identification –1; Diagram –3) **10 marks**

Q II. Prepare a temporary mount of the pollen from the pre-processed given material **'B'**. Identify, draw and describe.

(Identification – 1; slide preparation – 1; characters – 2; diagram – 1) **5 marks**

Q III. Identify and describe the stomatal type **'C'**.

(Identification – 1; description & diagram – 4) **5 marks**

Q IV. Critical notes on THREE spotters. **D, E, F.** **5 x 3 – 15 marks**

Q V. Project. (Conduct field work for a period of not less than 5 days under the guidance of a teacher and submit field report) **10 Marks**

Q VI. Record **5 Marks**

Prepared by	Checked &verified by	Approved by
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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 -IV
SYNTHESIS OF ORGANIC COMPOUNDS AND FUNCTIONAL GROUP ANALYSIS

Program: B.Sc.
Course Code: U24/CHE/DSC/401/P
Course: DSC-4
No. of Credits: 1

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

Course Objective

- To prepare simple organic compounds and systematically analyse functional groups based on their nature and chemical reactivity.

Course Outcomes

CO1: Utilise the knowledge of organic reaction mechanisms in their preparations.
CO2: Categorise functional groups present in organic compounds using systematic quantitative analysis.

Systematic Qualitative Organic Analysis of Organic Compounds possessing mono functional groups (-COOH, phenolic, aldehydic, ketonic, carbohydrate, amide, nitro, amines) and preparation of one derivative.

Synthesis of organic compounds:

a. Acetylation – Preparation of Acetanilide.
b. Halogenation – Preparation of p-Bromo acetanilide.
c. Oxidation – Preparation of Benzoic acid.
d. Esterification - Preparation of n-butyl acetate.
e. Methylation – Preparation β-Naphthyl methyl ether.
f. Nitration – Preparation of Nitrobenzene
g. Reduction – Preparation of m-Nitroaniline

Reference Books:

- Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., *Textbook of Practical Organic Chemistry*, Prentice-Hall, 5th edition, 1996.
- Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry* Orient-Longman, 1960.
- Ahluwalia, V.K. & Aggarwal, R. *Comprehensive Practical Organic Chemistry,* Universities Press.

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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	Knowledge of the basic principles of Chemistry to help in day-to-day life.
Regional	Learn about the concepts and significance of carbohydrates and bioinorganic chemistry.
National	Understand the basics of organometallic compounds, non-aqueous solvents and dipole moments.
Global	Application of basic principles of rotational, IR, UV-Vis Spectroscopy techniques, concepts of chemical kinetics, heterocyclic compounds and pericyclic reactions.

b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Practical syllabus which includes Organic preparations and Qualitative analysis in Organic Chemistry Problem solving in Physical Chemistry	Students perform the experiments based on the procedure and also analyse the unknown compounds. Students solve the problems
ED	Organic preparations and analysis. Structural investigation of organic compounds based on spectroscopy	Students prepare organic compounds, analyse the functional groups and carry out the structural analysis based on spectral data
EMP	Inorganic, Organic, Physical Chemistry and Spectroscopy	Tutorials and assignments

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7. Pedagogy

S. No.	Student Centric Methods Adopted	Type / Description of Activity
1	Experiential	Experiments, attending seminars/workshops and field visits
2	Participative	Group discussion, quiz, presentations etc.
3	Problem solving	Solving problems in Physical Chemistry and structural elucidation based on spectral data.

8. Course Assessment Plan

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

CO	Continuous Internal Assessments CIA - 40%	End Semester Examination-60%
CO1	CIA1-Written Exam	Written Exam
CO2	CIA 2- Skill based test like poster/powerpoint presentation, collage, 3D model making, problem solving and quiz.	
CO3	CIA1-Written Exam	
CO4	CIA 2- Skill based test like poster/powerpoint presentation, collage, 3D model making, problem solving and quiz.	

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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 -IV

CHEMISTRY - PAPER IV

TIME: 2 hrs **Course Code: U24/CHE/DSC/401**

Max. Marks: 60

SECTION –A (Essay Questions)

.Answer the following

4X10=40 Marks

1. a) Explain the classification of organometallic compounds based on metal-carbon bonds. (CO1) **L1** 5M
   b) Discuss the reactions in liquid ammonia with suitable examples. (CO1) **L2** 5M

OR

2. a) Describe the preparation, properties and applications of Grignard reagent. (CO1) **L3** 6M
   b) How does fixation of carbon dioxide occur in photosynthesis? (CO1) **L2** 4M
3. a) Derive an expression for the rate constant of first order reaction. (CO2) **L3** 5M
   b) A first order reaction is 50% complete in 100 minutes. How long will it take for 90% completion? (CO2) **L5** 5M

OR

4. Explain different methods of experimental determination of order oa a reaction. (CO2) **L2** 10M
5. a) Discuss the open chain structure of Glucose. (CO3) **L2** 5M
   b) Write the equations involved in Killiani-Fischer synthesis. (CO3) **L2** 5M

OR

6. a) Explain the synthesis of Furan, Pyrrole and Thiophene from 1,4-dicarbonyl compounds. (CO3) **L2** 5M
   b) What are pericyclic reactions? Give their classification with an example each. (CO3) **L4** 5M
7. a) What is a dipole moment? Predict the structure of CO_2 and SO_2 based on dipole moment. (CO4) **L4** 5M
   b) Explain the various molecular vibrations seen in IR spectroscopy. (CO4) **L2** 5M

OR

8. a) Describe in detail about the electronic transitions observed in UV-VIS spectroscopy. (CO4) **L2** 5M
   b) Explain the basic principles of Raman spectroscopy. (CO4) **L2** 5M

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SECTION –B

II. Answer any four. **4x5=20 Marks**

9. Write a note on the biological significance of calcium and chloride ions. (CO1) **L1**
10. Give two methods of preparation of ferrocene. (CO1) **L1**
11. Discuss briefly about collision theory. (CO2) **L2**
12. Explain the factors affecting the rate of a reaction. (CO2) **L2**
13. Explain mutarotation taking glucose as an example. (CO3) **L2**
14. Explain the concept of chromophore and auxochrome. (CO4) **L2**

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SEMESTER - IV

VECTOR BIOLOGY

1. **Course Description**

Programme: B.Sc. **Max. Hours: 30**
Course Code:U24/ZOO/SEC/401 **Hours per week: 2**
Course Type: SEC - II **Max. Marks: 50**
No. of credits: 2

2. Course Objectives

- To understand the key concepts of vector biology and its importance in public health management.
- To understand the vector, host and parasitic interactions.

3. Course Outcomes

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

CO1: To analyse different types of vectors and their features.

CO2: To describe the major diseases caused by vector borne pathogens and their controlling measures.

4. Course Content

Module I: Vector Biology of Public Health Importance **15 HRS**

1.1 Introduction to vectors and vectors of human diseases — Public health nuisance.

1.2 Salient features and Life cycle of important Mosquito vector species - Anopheles, Aedes Culex and Mansonia.

1.3 Salient features and life cycle of important other Dipteran vectors of public health Importance: Sandflies, Black files, House files and Myiasis causing files.

1.4 Life cycle and public health importance of Fleas and lice

1.5 Life cycle and public health importance of Ticks and Mites.

Module II: Basic sanitation and Public Health **15 HRS**

2.1 Basic sanitation — Hygiene and personal protection — Human wastes and Health - Solid waste and Waste water management.

2.2 Distinguishing characters of different species of human malarial parasites -Life cycle and host Parasite interactions.

2.3 Distinguishing characters of different species of human Filarial parasites- Life cycle and host parasite interactions.

14 Distinguishing characters of different arboviral diseases and their mode of transmission.

2.5 Control Measures - Source reduction.

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PROFESSOR & HEAD
Department of Zoology, UCS,
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5. References

1. Parasitology and Vector biology -William C.Marquardt ,Richard S.Demaree,Robert B.Grieve,2nd edition,Harcourt Academy 2000 Publisher.
2. Vector Biology ,Ecology and Control - Peter W. Atkinson -Springer Science & Business Media, 12 Dec 2009
3. Biology of Disease Vectors - 2nd Edition. E-Book. ISBN 9780080494067. by William H. Marquardt.

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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	Understanding vector life cycle helps in controlling vector borne diseases in our surroundings by following appropriate measures.
National	There is a need to return to vector control approaches based on a thorough knowledge of the determinants of pathogen transmission, which utilise a range of insecticide and non–insecticide-based approaches in a tailored manner for more effective and sustainable vector control in the country.
Global Development	Vector-borne diseases exert a huge burden of morbidity and mortality worldwide, particularly affecting the poorest of the poor.

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b)Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development	Module I & Module II	Field studies and case studies
Entrepreneurship Development	Module I & Module II	Encouraging students to devise sustainable measures to control vector life cycle and disease spread.
Employability	Module I & Module II	Workshops and training in vector controlling measures.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiential Learning	Field Trips
2.	Participative Learning	Group discussion
3.	Problem solving	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 Assignment	Written Exam
CO2	CIA - II Objective test	

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b) Model Question Paper- End Semester Exam

VECTOR BIOLOGY - MODEL QUESTION PAPER

Course Code: U24/ZOO/SEC/401 **Max Marks: 30**

Credits: 2 **Time: 1 Hr**

ILLUSTRATE WITH DIAGRAMS WHEREVER NECESSARY

SECTION-A

I. Answer any five out of seven given questions. **5 x 6 = 30 M**

1.Define Vector. Write a note on its characteristics.

2.Classify the common mosquito diseases and elaborate on preventive measures. .

3.What are Dipteran vectors and analyse their vector nature.

4.Describe the life cycle and public health importance of Fleas .

5. Distinguish between malarial and filarial interactions.

6. Suggest the best practices for Waste management.

7. Explain the scope of Vector biology.?

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VECTOR BIOLOGY - MODEL QUESTION PAPER

SECTION A			5 Q X 6 M = 30 M	
Question Number	**Question**	**Question**	**CO**	**BTL(Bloom's Taxonomy Level)**
1	Module 1	Define Vector. Write a note on its characteristics.	CO 1	I
2	Module 1	Classify the common mosquito diseases and elaborate on preventive measures.	CO 1	III
3	Module 1	What are Dipteran vectors and analyse their vector nature.	CO 1	II
4	Module 1	Describe the life cycle and public health importance of Fleas .	CO 1	IV
5	Module 2	Distinguish between malarial and filarial interactions.	CO 2	IV
6	Module 2	Suggest the best practices for Waste management.	CO 2	III
7	Module 2	Explain the arboreal diseases and their transmission ?	CO 2	II

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