SEMESTER – V

SKILL ENHANCEMENT COURSE - III

CHEMINFORMATICS

1. Course Description

Programme: B.Sc.
Course Code: U24/CHE/SEC/301
Type of course: SEC
No. of credits: 2

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

2. Course Objectives

- To provide a basic learning in the emerging area of chemical sciences and usage of cheminformatics in the industry.

3. Course Outcome

This SEC paper will help students to enhance their overall skills

CO 1: Introduce students to different methods of cheminformatics, provide examples on the use of cheminformatics in modern drug research.

CO 2: Gain practical experience through exercises with representative methods used in cheminformatics.

4. **Course Content**

MODULE I: COMPUTER AIDED DRUG DESIGN **10 Hrs**

Introduction to CADD, Drug design and discovery, Lead Compounds, Lead optimization, Pharmacophore, Pharmacokinetics, ADME property, Toxicity. Prodrugs and Soft drugs, Introduction to Ligand-Based and Structure Based Drug design.

MODULE II: PRACTICE OF CHEMISTRY SOFTWARE **20 Hrs**

1. Construction of small molecules.
2. Energy minimization and generation of SMILES Notation.
3. Property calculation.
4. Searching RCSB for protein information, download protein and Literature search.
5. Protein preparation.
6. Active site identification and grid Generation.
7. Docking of ligands.
8. Protein ligand interaction studies.

5. References

1. Leach A.R., Gillet V.J., (2007): *An introduction to Chemoinformatics*. Springer: The Netherlands.
2. Gasteiger, J. & Engel, T. (2003) *Chemoinformatics: A text-book*. Wiley-VCH.
3. Gupta, S. P. (2011) *QSAR & Molecular Modelling*. Anamaya Pub.: New Delhi.

6. Syllabus Focus

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

Local /Regional/National /Global Development Needs	Relevance
Local	Optimizing and Energy minimization of existing drugs, development of new materials with enhanced properties
Regional	Designing new drugs from SAR drive innovation in computational and medicinal chemistry
National	Formulating symbiosis, understanding drug activities in the regulation of pharmacodynamic and pharmacokinetic properties, innovation in healthcare
Global	Improved energy efficiency and sustainability, development of new synthetic strategies, broad implications for industries and technologies

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b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Module 1	Medicinal chemists play a crucial role in the drug discovery process through the selection and synthesis of compounds that establish structure–activity relationships by using softwares.
EMP	Module 2	Involves the study of the effects of drug interactions on the target systems.

7. Pedagogy

S. No.	Student Centric Methods Adopted	Type / Description of Activity
1	Participative Learning	Online search engines for ADMET properties.
2	Experiential Learning	Practice of Chemistry software.

8. Course Assessment Plan

a. Weightage of Marks in Formative and Summative Assessments

Formative Assessment - FA (40%)	Summative Assessment - SA (60%)
CIA-20 marks Mini project/Assignment/ Problem solving/Case studies	End Semester exam-30 Marks

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b. Question Paper Pattern

EXTERNAL- MODEL QUESTION PAPER

PRACTICAL

Course Code: U24/CHE/SEC/301
Credits: 2

Max Time: 1 Hr
Max. Marks: 25

Answer the following.

1. Write about Molecular docking by iGEM Docking software and interpret the results. (CO 2) **L2** — 10M
2. Write a short note on generation of SMILES Notation. **(CO1) L1** — 5M
3. Viva — 5M
4. Record

Prepared by	Checked & verified by	Approved by
Name and Signature of the teaching faculty	Name and Signature of the HoD	Name and Signature of Principal
Dr. K. Susmitha Dr. M. Bhargavi M.Bhargavi	Dr. D. Sumalatha D. Sumalatha	Dr. Uma Joseph

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SEMESTER V

GENERIC ELECTIVE

CHEMISTRY OF COSMETICS AND FOOD TECHNOLOGY

1. Course Description

Programme: B.Sc
Course Code: U24/CHE/GE/501
Course Type: GE
No. of credits: 4

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

2. Course Objectives

- To learn the history of cosmetics and the importance of self grooming
- To learn the chemistry involved in cosmetics,chemicals/ natural products present in them. their usage in personal care.
- To understand the significance of various technological methods of food for better health.

3. Course Outcomes

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

CO1: Identify the types of cosmetics and learn about their chemistry.
CO2: Articulate the ingredients present in personal care products and apply it in their preparation.
CO3: Understand water purification process, and role of additives in food
CO4: Analyze the adulterants in food samples; learn steps involved in food processing and preservation

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4. Course Content

MODULE I: CHEMISTRY OF COSMETICS **15 hrs**

History of cosmetics, classification of cosmetics, professional image of self grooming, beauty and wellness.

Cosmetics emulsions: cream, cleansers, powders, moisturisers, sun screen, acne and anti aging creams.

Chemical peels and peeling agents, lasers and light devices, Electro Chemistry, bath salts, gels, soaps, bubble baths and scrubs.

MODULE II: PERSONAL CARE **15 hrs**

Skin Care

General Anatomy and Physiology of skin, Structure of skin, Growth and nutrition, dermal fillers

Hair Care

Structure of hair, growth of hair, Cosmetics used for hair – Shampoos, conditioners, Bleaches, hair dyes, hair gels, hair perms and hair relaxers/straighteners.

Nail Care

Structure of nail, cosmetics used for nail – Nail lacquer, nail polish remover, Manicure and Pedicure, nail care techniques.

Eye Care

Cosmetics used for the eye – eyebrow pencil, eye liner, eye shadows, mascaras. Eye concealer and eye creams.

Practical – Cosmetics Preparations

1. Preparation of Cold cream
2. Preparation of Talcum Powder.
3. Preparation of Bath salt.
4. Preparation of Lip Balm
5. Preparation of Nail Polish Remover
6. Preparation of Hand Wash.

MODULE III: INTRODUCTION TO FOOD, FOOD ADDITIVES & WATER PURIFICATION **15 Hrs**

Introduction - Food: source, functions of food- food groups- food guide- basic five food groups, usage of the food guide- food in relation to health- objectives of cooking.

Food Additives: Food additives: artificial sweeteners- saccharin, cyclomate, aspartame- food flavours- esters, aldehydes and heterocyclic compounds. Antioxidants. Food colours- changes in cooking, Restricted use. Spurious colours.Emulsifying agents, preservatives- leavening agents.Baking powder- Yeast. Taste Enhancers- MSG- vinegar.

Water: Purification processes- Ion exchangers , reverse osmosis, activated charcoal treatment. Use of chlorination, ozone and UV light disinfection. Specification of drinking water.

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MODULE IV: FOOD ADULTERATION, PROCESSING & PRESERVATION 15 hrs

Adulterants: Common adulterants in different foods- milk and milk products, vegetable oils, and fats, spices and condiments, cereals, pulses, sweetening agents and beverages.

Contamination with toxic chemicals- pesticides and insecticides. Methods involved in the analysis of detection and prevention of food adulteration.

Food deterioration, chemical methods of preservation and processing, and by freezing.

Heat processing of milk – pasteurization.Preservation of milk.Deep freeze preservation. Spray drying technique- milk powder, infant food preparation.

Practicals:

1. Estimation of total hardness of water.

2. Testing for the presence of adulterants in food samples.

5. References

1. Perry Romanowski, *Beginning Cosmetic Chemistry*, Allured Pub Corp.2009.
2. Dr. Ramesh Kumari, *Chemistry of Cosmetics*, Prestige Publishers.
3. Srilakshmi B., *Food Science*, New age International Pvt. Ltd. Publishers, III ed. 2003.
4. Shakuntala Manay N. and Shadaksharaswamy M. *FOODS: Facts and Principles*. New Age. International Pvt. Ltd. Publishers, II ed. 2002.
5. Norman N. Potter, *Food Science*, CBS publishers and distributors, New Delhi. 1994.
6. Swaminathan M. *Text Book on Food Chemistry*, Printing and Publishing CO., Ltd., Bangalore. 1993.
7. Swaminathan M. *Advanced Text Book on Food and Nutrition*, volume I and II Printing and Publishing CO., Ltd., Bangalore. 1993.

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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 cosmetic and food chemistry helps to have a well groomed healthy life
Regional	Learning the concepts of cosmetology and processing involved in the food industry, helps to choose the best products.
National	Acquire knowledge to identify and choose better health products.
Global	The widespread increase in the adoption of skin care and personal care products rise along with the global ageing population.

b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Module 1 & 2	Students are taught to prepare various cosmetics using natural products and non toxic chemicals
EMP		
SD	Module 3 & 4	Students are trained to check the quality parameters of food and water samples.
EMP		

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7. Pedagogy

S. No.	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiments	Students are taught to prepare cosmetics
2.	Presentations	Students present the toxic chemicals involved in various cosmetics products, and their alternatives
3.	Case studies	Students are made to evaluate various market samples of the same product.

8. Course Assessment Plan

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

CO	Continuous Internal Assessments CIA - 40%	End Semester Examination- 60%
CO1	CIA 1 Written exam 10 M	Written Exam
CO2	Practical Skill test 10 M	
CO3	CIA 1 Written exam 10 M	
CO4	Practical Skill test 10 M	

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b. Model Question Paper- End Semester Exam

CHEMISTRY OF COSMETICS AND FOOD TECHNOLOGY
B.SC. III YEAR SEMESTER -V

TIME: 2hrs **Course Code: U24/CHE/GE/501**
Max. Marks: 60

SECTION –A (Essay Questions)

I.Answer the following **4X10 =40 Marks**

1. Classify cosmetics on the basis of their raw materials. (**L2**) 10M

OR

2. a) Outline the history of cosmetics. (**L2**) 5 M
b) Discuss the importance of self grooming and professional image. (**L2**) 5 M
3. a) Describe the structure of the nail with the help of a neat diagram. (**L1**) 5 M
b) List out the ingredients used in Shampoos. (**L1**) 5 M

OR

4. a) Describe chemical peels and types of peeling agents? (**L2**) 5 M
b) Explain the structure and growth cycle of hair. (**L2**). 5 M
5. a)Classify foods based on their function. (**L4**) 5 M
b) Explain the advantages of cooking. (**L2**) 5 M

OR

6. a) Define reverse osmosis. How does it help in water purification? (**L3**) 5 M
b) Emphasize the significance of chlorination of water. (**L2**) 5 M
7. a) Define food adulteration . Write any two tests to determine adulteration of food of your choice. (**L3**) 5 M
b) Illustrate the methods involved in the preservation of milk. (**L3**) 5 M

OR

8. a) Write a brief note on contamination of food by toxic chemicals. (**L1**) 5 M
b) Discuss about the various factors which lead to food deterioration. (**L2**) 5M

SECTION – B (Short answer questions)

II. Answer any four questions. **4 X 5 = 20 Marks**

9. What is the scope of beauty and wellness? (**L1**)
10. How do fillers work? (**L1**)
11. Outline five functions of talcum powder? (**L2**)
12. How is UV radiation used in water purification plants? (**L4**)
13. Elaborate the role of leavening agents in the food industry. (**L5**)
14. Explain Chemical methods of food preservation. (**L5**)

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FACULTY OF SCIENCE- DEPARTMENT OF CHEMISTRY
PRACTICAL SYLLABUS CBCS-2024
SEMESTER -V
EXPERIMENTS IN MEDICINAL & SUSTAINABLE CHEMISTRY
CHEMISTRY PRACTICALS – ELECTIVES 2

Program: B.Sc. Max. Hours: 30 Hrs
Course Code: U24/CHE/DSE/502/P Max. Marks: 50
Course: DSE 2 Hours per week: 2 Hrs
No. of Credits: 1

Course Objectives

- To apply the knowledge of synthetic methods in Chemistry to prepare drugs, nanoparticles.
- To design chemical products and processes for Green Chemistry.

Course Outcomes

CO1: Synthesize drugs, nanoparticles and developing green and sustainable methods.
CO2: Cut down the stream of chemicals pouring into the environment.

Synthesis and analysis

1. Preparation of Aspirin (conventional and green method)
2. Preparation of Paracetamol.
3. Preparation of Thiobarbeturic acid.
4. Preparation of Fluorescein.

Green Methods for the preparation of the following:

1. Preparation of Acetanilide.
2. Preparation of p-Bromo acetanilide.
3. Preparation of Dihydropyrimidinone.

Synthesis of Nanoparticles:

1. Preparation of nano silver.
2. Preparation of nano ZnO.
3. Preparation of Ferrofluid.
4. Preparation of nano CuO.

References

1. Krupadanam.D, VijayaPrasad.D, Varaprasad Rao.K, Reddy.K.L.N, Sudhakar.C, (2001), *Drugs,* Universities Press (India) Limited.
2. Patrick.G, (2001), Medicinal Chemistry, BIOS Scientific Publications
3. Ahluwalia V.K ,*Green Chemistry :Greener Alternatives for Synthetic Organic Transformation* :Narosa Publishing House
4. Ahluwalia V.K ,*Green Chemistry : Environmentally benign reaction* : Ane books Pvt.Ltd,2006
5. Kulkarni.K.S, (2011), *Nanotechnology- Principles & Practices*, Co-Published by Springer International Publishing Company, Switzerland, New Delhi, Capital Publishing Company.

6. Syllabus Focus

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

Local /Regional/National /Global Development Needs	Relevance
Local	To develop products that benefit the environment either directly or indirectly.
Regional	Nanotechnology helps in improving many technology and industry sectors and even revolutionize.
National	The concepts of Green Chemistry reduces the use of energy and fuel by using renewable inputs wherever possible
Global	Recent advances in Medicinal Chemistry, Green Chemistry and Nanotechnology provide reliable synthetic pathways for sustainable development goals.

b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	All	Educational tour to industries/factories to make students learn outside the classroom
ED	All	Case studies relevant to the problems, challenges and help students to develop solutions
EMP	All	Systematic and sustained effort to adapt specific skills for improving career goals

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7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiential Learning	Field Trips
2.	Participative Learning	Role play
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	CIA1-Written Exam	Written Exam
CO2	CIA1-Written Exam	
CO3	CIA2- Case Study	
CO4	CIA2- Presentations (poster/ ppt)	

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b. Model Question Paper - End Semester Exam

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FACULTY OF SCIENCE – DEPARTMENT OF CHEMISTRY

B.Sc. III YEAR SEMESTER -V

MEDICINAL & SUSTAINABLE CHEMISTRY

TIME: 2hrs **Course Code: U24/CHE/DSE/502**

Max. Marks: 60 **Credits: 4**

SECTION –A (Essay Questions)

SECTION A - INTERNAL CHOICE			**4 X 10 M = 40M**	
Question Number	**Question**		**CO**	**BTL**
1	**Module 2**	a) Evaluate the structure of Penicillin G & discuss its commercial production 5M b) Explain briefly about diluents and stabilizing agents with examples. 5M **OR**	**CO 2**	**(Level I, V)**
2	**Module 2**	Outline the synthetic route and brief therapeutic action of i) Ciprofloxacin ii) Aspirin iii) Salbutamol iv) Omeprazole 10M	**CO 2**	**(Level II)**
3	**Module 1**	a) Summarize briefly about agonist and antagonist. 5M b) What are anaesthetic and antipyretic drugs? 5M **OR**	**CO 1**	**(Level I, II)**
4	**Module 1**	Describe in detail about ADME. 10M	**CO 1**	**(Level I)**
5	**Module 3**	a) List out the basic principles of green chemistry. 5M b) Simplify the atom economy? Calculate atom economy using suitable examples. 5M **OR**	**CO 3**	**(Level I, IV)**
6	**Module 3**	a) Assess the need for green chemistry. 5M b) Interpret the selection of solvents in green synthesis. 5M	**CO 3**	**(Level V)**

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7	Module 4	a) Give two methods for synthesis of Nanoparticles. 5M b) Compose a note on carbon nanotubes.5M **OR**	CO 4	(Level I, VI)
8	Module 4	a) Elaborate a note on Zeolites? 5M b) Compile the principle and working of STM. 5M	CO 4	(Level VI)
SECTION B – (Short answer questions) **ANSWER ANY 4 OUT OF 6**				**4 X 5M = 20 M**
9	Module 1	How would you explain drugs acting on the renal system?	CO 1	(Level II)
10	Module 2	Build a short note on clinical trials.	CO 2	(Level III)
11	Module 1	What are chemotherapeutic agents? Discuss about antimalarial drugs.	CO 1	(Level I)
12	Module 2	Construct briefly about computer aided drug designing.	CO 2	(Level III)
13	Module 3	Analyze the role of phase transfer catalyst in green synthesis.	CO 3	(Level IV)
14	Module 4	Give any four applications of Nanomaterials.	CO 4	(Level I)

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b. Model Question Paper - End Semester Exam

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FACULTY OF SCIENCE – DEPARTMENT OF CHEMISTRY

b. MODEL PAPER - B.Sc. III YEAR SEMESTER -V

MEDICINAL & SUSTAINABLE CHEMISTRY

TIME: 2hrs **Course Code: U24/CHE/DSE/502**

Max. Marks: 60

SECTION –A (Essay Questions)

I. Answer the following **4X10=40 Marks**

1. a) Evaluate the structure of Penicillin G & discuss its commercial production(CO2) **L5** 5M
   b) Explain briefly about diluents and stabilizing agents with examples. (CO 2) **L1** 5M

OR

2. Outline the synthetic route and brief therapeutic action of 10M
   i) Ciprofloxacin ii) Aspirin iii) Salbutamol iv) Omeprazole (CO 2) **L2**
3. a) Summarize briefly about agonist and antagonist. (CO 1) **L2** 5M
   b) What are anaesthetic and antipyretic drugs? (CO 1) **L1** 5M

OR

4. Describe in detail about ADME. (CO 1) **L1** 10M
5. a) List out the basic principles of green chemistry. (CO3) **L1** 5M
   b) Simplify atom economy? Calculate atom economy using suitable examples.(CO3) **L4** 5M

OR

6. a) Assess the need for green chemistry. (CO3) **L5** 5M
   b) Interpret the selection of solvents in green synthesis. (CO3) **L5** 5M
7. a) Give two methods for synthesis of Nanoparticles. (CO4) **L1** 5M
   b) Compose a note on carbon nanotubes. (CO4) **L6** 5M

OR

8. a) Elaborate a note on Zeolites? (CO4) **L6** 5M
   b) Compile the principle and working of STM. (CO4) **L6** 5M

SECTION –B (Short Answer Questions)

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

9. How would you explain drugs acting on the renal system? (CO 1) **L2**
10. Build a short note on clinical trials. (CO 2) **L3**
11. What are chemotherapeutic agents? Discuss about antimalarial drugs. (CO 1) **L1**
12. Construct briefly about computer aided drug designing.(CO2) **L3**
13. Analyze the role of phase transfer catalyst in green synthesis. (CO3) **L4**
14. Give any four applications of Nanomaterials. (CO4) **L1**

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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	1	2	10	2	5
2	15	2	2	10	2	5
3	15	3	2	10	1	5
4	15	4	2	10	1	5

5. 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
Shikha Chander M. Deepthi Name and Signature of the teaching faculty Dr. Shikha Chander M. Deepthi	D. Sumalatha Name and Signature of the HoD Dr. D. Sumalatha	Name and Signature of the Principal Dr. Uma Joseph

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DEPARTMENT OF NUTRITION

SEC-3	DIETETICS AND COUNSELING SEMESTER- V	30 HRS
Module 1 - Introduction to nutrition counselling and communication skills **Module 2 - Tools in nutrition education**		

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

SEMESTER - V

DIETETICS AND COUNSELING

1. Course Description

Programme: B.Sc. **Max. Hours: 30**
Course Code: U24/NUT/SEC/501 **Hours per week: 2**
Course Type: SEC -3 **Max. Marks: 50**
No. of credits: 2

2. Course Objectives

- To gain knowledge on various aspects and application of nutrition software program in nutrition counseling.
- The students will use new technology to enhance their counseling skills.

3. Course Outcomes

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

- Apply the knowledge of Nutrition counseling using appropriate software for easy communication.
- Create a client friendly environment using technology for patient counseling.

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4. Course Content

MODULE- 1. INTRODUCTION TO NUTRITION COUNSELING AND COMMUNICATION SKILLS **(15 Hrs)**

1.1. Practical consideration in giving dietary advice and counseling - determining the role of nutrition counselor and responsibilities of the nutrition counselor, Factors affecting and individual food choice.

1.2. Communication and attributes in dietary advice, behavior modification ,motivation and negotiation skills.

1.3.Steps in diet counseling and educating patients,

MODULE- 2. TOOLS IN NUTRITION EDUCATION **(15 Hrs)**

Preparation of teaching aids (Charts, leaflets, posters etc) for community.

1. Preparation of teaching aids.
2. Case study analysis
3. Questionnaire construction (Tools for Dietary Assessment)
4. Use of computer software- Diet cal for dietary computation.

5. References

1. Kathy King and Bridget Klawitter, 2007, Nutrition Therapy: Advanced Counseling Skills, Third Edition, Lippincott
2. Williams and Wilkins,Sylvia Escott Stump,2008, Nutrition and Diagnosis Related Care, Sixth Edition, Lippincott.
3. Krause M, Kathleen. L Mahan and Sylvia Escott Stump, 2004, Food Nutrition and Diet Therapy, 11th Edition, W.B Saunders Co, Philadelphia.
4. Kathy King and Bridget Klawitter, 2007, Nutrition Therapy: Advanced Counseling Skills, Third Edition, Lippincott
5. Williams and Wilkins,Sylvia Escott Stump,2008, Nutrition and Diagnosis Related Care, Sixth Edition, Lippincott.
6. Krause M, Kathleen. L Mahan and Sylvia Escott Stump, 2004, Food Nutrition and Diet Therapy, 11th Edition, W.B Saunders Co, Philadelphia.

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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	Preparation of teaching aids which is used in nutrition education

b)Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
ED	Module1	Enhancing communication skills for diet counseling.

7. Course Assessment Plan

a) Weightage of Marks in Formative and Summative Assessments

Formative Assessment - FA (40%)	Summative Assessment - SA (60%)
CIA - I (20 M) **Teaching aids**	**End Semester exam-30 Marks**

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MODEL QUESTION PAPER
PRACTICAL

Course Code: U24/NUT/SEC/501 **Marks:30**
No. Of Credits: 2 **Time: 1 Hrs**

Answer the following:

1. Prepare a teaching aid (Chart/Poster/Tree chart/ leaflet) **10M**
2. Mr X is admitted in the hospital with severe pain in the abdomen. He was diagnosed with peptic Ulcer. His Height is 180 cms and weight is 85 kgs respectively. He is a business man by occupation and eats a lot of outside food . Analyze this case and suggest the changes to be made in Mr.X's diet. **15 M**
3. 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

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Skill Enhancement Course III

GREENHOUSE TECHNOLOGY

1. Course Description

Programme:	**B. Sc**	**Max. Hours:**	**30**
Course Code:	**U24/BOT/SEC/501**	**Hours per week:**	**2**
Type of Course:	**SEC - 501**	**Max. Marks:**	**30**
No. of Credits:	**2**		

2. Course Objectives

1. To Define the concepts, meaning, definitions & fundamentals of life skills.
2. To Adapt a thorough grounding in the basics of the subject and to develop and articulate respect for the diversity of talents, ways of knowing and learning

3. Course Outcomes

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

CO 1: Explain the concepts of greenhouses and the various irrigation methods and fertilizers used in greenhouse cultivation.
CO 2: Analyze various plant protection practices in green houses and identify the applications of greenhouse technology.

4. Course Content

Module I **15 hours**

1.1 Introduction; scope- classification of greenhouses- construction of greenhouse- heating unit-cooling unit-environmental control (light and temperature). Net-poly houses-low-cost green houses. Root media for greenhouses

1.2 Fertilizers: Organic and inorganic, liquid fertilizers, application of fertilizers. Water in the Greenhouse; Irrigation system in green houses-misting, Drip irrigation- micro irrigation, water quality, water sanitation

Module II **15 hours**

2.1 Plant Protection in Greenhouses; Diseases of greenhouse plants (bacterial, fungal, nematodes and viral diseases). Management of pest and diseases- integrated peat management

2.2 Applications of greenhouse Technology: Importance of greenhouse technology. Micropropagation and greenhouse planting of tissue culture transplants. Advantages and disadvantages of greenhouse technology. Seed production, cut flower gardening.

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5. Reference Books

1. Dubey R.C.2006. A text book of Biotechnology. S. Chand and Company. New Delhi
2. Sheela V.L.2011. Horticulture. MJP Publishers. Chennai,
3. Prasad S; Kumar U. 2012. Green House Management for Horticulture Crops. Agrobios India.
4. Pant V and Nelson. 1991. Green House Operation and Management. Bali publication. New Delhi
5. Introduction to soil science: http://www.agrimoon.com/wpcontent/uploads/Introduction- to soil- sciences.pdf
6. Greenhouse applications: http://www.lingegas.com/en/products_and-supply /fumigants/ carbon dioxide in agriculture/greenhouse_application/index.html
7. Role of greenhouse technology in agricultural engineering

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6. Syllabus Focus

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

Local /Regional/National /Global Development Needs	**Relevance**
Regional needs	The course can offer employment opportunities, empowers local farmers, conserves water resources, and supports sustainable farming practices, contributing to overall regional prosperity.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	**Syllabus Content**	**Description of Activity**
SD	Module I	Students can develop the skill set in understanding the precise structural assembly, and strategic placement of materials to create a controlled environment conducive to optimal plant growth in the greenhouse and poly houses.
	Module II	Students can develop the skill set in understanding to manage to protect and prevent various diseases in the greenhouse plants.

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7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative Learning	Presentations and Group discussions based on syllabus topics.
2.	Experiential Learning	Field Trips to research organizations having greenhouse facility.
3.	Problem solving	Minor research Projects like setting up small green houses at home and monitoring plant growth.

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 Theory

GREENHOUSE TECHNOLOGY

Course Code: U24/ BOT/ SEC/501 **Max. Marks: 30**

Time: 1 Hour

Answer any FIVE of the following **5 x 6 – 30**

1. Define greenhouse and list the classification of greenhouse
2. Outline the advantages and disadvantages of greenhouse technology
3. Discuss on the root media for green houses
4. Define fertilizers and illustrate their applications.
5. Explain the construction of Irrigation system in greenhouse
6. Illustrate the methods involved in pest and disease management
7. Compute the application of greenhouse technology.
8. Explain the Seed production in cut flower gardening

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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CBCS 2024

HERBALS FOR BEAUTY & PRIMARY HEALTH CARE

SEMESTER V

GENERIC ELECTIVE

HERBALS FOR BEAUTY & PRIMARY HEALTH CARE

1. Course Description

Program:	**B. Sc**	**Max. Hours:**	**60**
Course Code:	**U24/ BOT/ GE/501**	**Hours per week:**	**4**
Type of Course:	**GE**	**Max. Marks:**	**60**
No. of Credits:	**4**		

2. Course Objectives

1. To interpret the appropriate use of herbal medicines; and
2. To integrate herbal medicines into the mainstream health maintenance.

3. Course Outcomes

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

CO1: Develop an increased awareness and appreciation of medicinal plants.
CO2: Recognize the function of therapeutic herbs.
CO3: Interpret the utilization and preservation of locally accessible natural remedies for first-aid.
CO4: Analyze the knowledge concerning medicinal plants and pharmacognosy and the methods of evaluation of crude drugs.

4. Course Content

Module I: Medicinal Plants **15 Hours**

1.1. Importance of medicinal plants – role in human health care – health and balanced diet.
1.2. Plants in day-to-day life – *Ocimum sanctum,* Turmeric, Mint, *Hibiscus, Aloe vera.* Nutritive and medicinal value of some fruits (Guava, Sapota, Orange, Mango, Banana, Lemon, Pomegranate) and vegetables–Greens (*Moringa,* Cabbage, Spinach, Fenugreek, Amaranth).
1.3. Root – Sarpagandha, Fruit – Amla, Bulb –Garlic, Rhizome – Ginger, Seed – Castor, Bark – Cinchona, Leaves – Neem: Flower – Clove.

Module II: Herbal & crude drugs preparation **15 Hours**

2.1. Herbal Preparation.
2.2. Classification of medicinal plants based on their effects with special reference to India.
2.3. Preparation of crude and commercial drugs. Making infusion, decoction, lotion, washers, insect repellents, suppositories, tincture, making herbal syrups, poultice, plasters, ointments, herbal oils and herbal salves.

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Module III: Cultivation of Medicinal plants & nutraceuticals **15 Hours**

3.1 Cultivation of Medicinal plants – *Aloe vera*, *Ocimum* and Mint.
3.2. Plants as nutraceuticals – *Moringa oleifera*, Wheat grass, Fenugreek.
3.3. Visit a well-maintained medicinal plant garden and submit a report.

Module IV: Pharmacognosy & Adulteration **15 Hours**

4.1 Pharmacognosy: Introduction and scope. Traditional plant medicines as a source of new drugs – the process of modern drug discovery using ethnopharmacology – Taxol and Artemisinin, as examples.
4.2 Adulteration of crude drugs and methods of identification – some examples.
4.3 Plant crude drugs: Types, methods of collection, processing and storage practices. Evaluation Of crude drugs.

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5. Reference Books

1. Sumathi, R., Madambi and Rajagopal, M. v. 1997. Fundamentals of foods and nutrition. New Age International Pvt. Ltd., New Delhi.
2. Girija Khanna.1986. Herbal Remedies –Vikas Publishing house Ltd, New Delhi.
3. Kokate and Gokhale – Pharmacognosy -Nirali Prakashan, New Delhi.
4. Rastogi R. R and B.N. Mehrotra.1993. *Compendium of Indian Medicinal Plants*. Vol.I & Vol.II. CSIR, Publication and Information Directorate, New Delhi.
5. Kirtikar K.R. and Basu B.D.1995.*Indian Medicinal Plants*.VolI. International Book Distributors, Booksellers &Publishers. Dehradun.
6. T. Pullaiah. *Medicinal Plants* in A.P., 2002.Regency Publications, Meerut.
7. Ashutosh Kar,2006. *Pharmacognosy and Pharmabiotechnology*. New age International, New Delhi

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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
Local needs	Herbals for beauty and health support local development through natural remedies and wellness solutions.

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)
ED	Module II	Prepare herbal oils, washes, insect repellents and ointments
	Module III	Cultivation of medicinal plants

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7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative Learning	• Information collection from Online Video Resources • Cultivated medicinal herb or plants- seminar presentation
2.	Experiential Learning	• Cultivation of Medicinal Plants at home. • To examine the active component present in the grown medicinal plants
3.	Problem solving	• Homemade Organic Pesticide Preparation and spray Methods in varied concentrations.

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 – Growing medicinal herbs / Assignment	

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b) Model Question Paper – End Semester Exam Theory

HERBALS FOR BEAUTY & PRIMARY HEALTH CARE

Course Code: U24/ BOT/ GE/501
TIME: 2 Hours **MAXMARKS: 60**

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

Section – A (Long Essay Type)

I. Answer All questions: **Marks: 4 x 10 - 40**

1. Describe the importance of medicinal plants and its role in health.
   OR
2. Assess the nutritive and medicinal value of orange and clove

3. Describe in detail the classification of medicinal plants.
   OR
4. Explain the method of preparation of crude and commercial drugs with examples
5. Describe in detail the cultivation of Mint.
   OR
6. What are Nutraceuticals? Explain in detail about Wheat grass and Moringa plant as Nutraceuticals

7. Explain adulteration in crude drug and methods for identification.
   OR
8. Discuss types, collection and processing of crude extracts.

Section-B (Short Essay Type)

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

9. Explain the medicinal role of Turmeric
10. Formulate the preparation of any natural insect repellent
11. Discover the role of Aloe vera
12. Explain the characters of Artemisinin as a crude drug
13. Elaborate the use of herbal syrups
14. Evaluation of crude drugs

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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	Describe the importance of medicinal plants and its role in health.	CO 1	Level I, II
2	Module 1	Assess the nutritive and medicinal value of orange and clove	CO 1	Level V
3	Module 2	Describe in detail the classification of medicinal plants.	CO 2	Level I, II
4	Module 2	Explain the method of preparation of crude and commercial drugs with examples	CO 2	Level II
5	Module 3	Describe in detail the cultivation of Mint	CO 3	Level I, II
6	Module 3	What are Nutraceuticals? Explain in detail about Wheat grass and Moringa plant as Nutraceuticals	CO 3	Level I, II
7	Module 4	Explain adulteration in crude drug and methods for identification.	CO 4	Level II
8	Module 4	Discuss types, collection and processing of crude extracts.	CO 4	Level II
SECTION B - ANSWER ANY 4 OUT OF 6 (To compulsorily have ONE question from each module)				4Q X 5 M = 20 M
9	Module 1	Explain the medicinal role of Turmeric	CO 1	Level II
10	Module 2	Formulate the preparation of any natural insect repellent	CO 2	Level VI
11	Module 3	Discover the role of Aloe vera	CO 3	Level IV
12	Module 4	Explain the characters of Artemisinin as a crude drug	CO 4	Level II
13	Module 2	Elaborate the use of herbal syrups	CO 2	Level VI
14	Module 4	Evaluation of crude drugs	CO 4	Level V

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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	1-7	Creating	15
2	1-7	Remembering	15
3	1-7	Understanding	15
4	1-7	Analyzing	15

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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
THEORY SYLLABUS CBCS-2024
SEMESTER -V
INSTRUMENTAL METHODS OF ANALYSIS

1. Course Description

Program: B.Sc.
Course Code: U24/CHE/DSE/501
Course: DSE- 1
No. of Credits: 4

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

2. Course Objectives

- To understand the importance of separation techniques such as solvent extraction and to explore the principles and procedures of chromatographic techniques including paper, thin layer,
- To learn the principles of column, ion exchange chromatography, HPLC and GLC.
- To delve into the principle and instrumentation of UV/Visible spectrophotometry, and its application to the quantitative analysis of various ions.
- An approach towards the principle and application of electroanalytical analysis.

3. Course Outcomes

CO1: Understand various separation techniques and choose the most appropriate analytical technique for a variety of samples.
CO2: Explain the theoretical principles of various separation techniques in chromatography and their typical applications.
CO3: Interpret the theoretical principles of selected instrumental methods with spectrophotometric methods.
CO4: Review and assessment of electro analytical methods.

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4. Course Content

MODULE I: CHROMATOGRAPHY I — 15 Hrs

Solvent Extraction- Principle, Methods of extraction: Batch extraction, continuous extraction and counter current extraction. Application – Determination of Iron (III).

Chromatography: Classification of chromatographic methods, principles of differential migration, adsorption phenomenon, nature of adsorbents, solvent systems.

Thin layer Chromatography (TLC): Advantages, preparation of plates, development of the chromatogram, Detection of the spots, factors affecting R_f values and applications.

Paper Chromatography: Principle, choice of paper and solvent systems, development of chromatogram – ascending, descending, radial and two dimensional chromatography and applications.

MODULE II: CHROMATOGRAPHY II — 15 Hrs

Column Chromatography: Principle, Types of stationary phases, Column packing – Wet packing technique, Dry packing technique. Selection criteria of mobile phase (solvents) for eluting, polar, non-polar compounds and its applications.

Ion exchange chromatography: Principle, cation and anion exchange resins, its application in separation of ions.

Gas Chromatography: Theory and instrumentation (Block Diagram), Types of stationary phases and carrier gases (mobile phase).

High performance liquid chromatography: Theory and instrumentation, stationary phases and mobile phases. Analysis of paracetamol.

MODULE III: COLORIMETRY AND SPECTROPHOTOMETRY — 15 Hrs

General features of absorption – spectroscopy, transmittance, absorbance, and molar absorptivity. Beer Lambert's law and its limitations, difference between Colorimetry and Spectrophotometry.

Instruments – Single beam UV- Visible Spectrophotometer, Double beam UV- Visible Spectrophotometer. Lamps used as energy sources. Verification of Beer's law. Estimation of iron in water samples by thiocyanate method. Estimation of (i) Chromium and (ii) Manganese in steel.

IR Spectrophotometer: Principle, Sources of Radiations, Sampling, Block diagram of FT-IR Spectrophotometer.

MODULE IV: ELECTROANALYTICAL METHODS — 15 Hrs

Types of Electroanalytical Methods.

I) Interfacial methods – a) Potentiometry: Principle, Electrochemical cell, Electrodes- (i) Indicator and (ii) Reference electrodes – Normal Hydrogen Electrode, Quinhydrone Electrode,

Saturated Calomel Electrode. Numerical Problems. Application of Potentiometry – Assay of Sulphanilamide

b) Voltammetry – three electrode assembly; Introduction to types of voltammetric techniques, micro electrodes, over potential and Polarization.

II) Bulk methods – Conductometry, Conductivity Cell, Specific Conductivity, Equivalent Conductivity. Numerical problems. Applications of conductometry. Estimation of Cl - using $AgNO_3$. Determination of Aspirin with KOH.

5. References

1. David Krupadanam, *Analytical Chemistry*, Universities Press (India) Limited.
2. S. M. Khopkar, *Basic concepts of Analytical Chemistry*, New Age International Publishers.
3. Gurdeep R. Chatwal, Sham K. Anand, *Instrumental methods of Chemical analysis*, Himalaya Publishing House.
4. D.A. Skoog, F.J. Holler, T.A. Nieman, *Principles of Instrumental Analysis*, Engage earning India Edn.
5. D. A. Skoog, D.M. West, F.J. Holler, *Fundamentals of Analytical Chemistry* 6 th Edn., Saunders College Publishing, Fort worth (1992).
6. Cooper, T.G. *The Tools of Biochemistry*, John Wiley and Sons, N.Y. USA.16, 1977.
7. Vogel, A. I. *Vogel's Qualitative Inorganic Analysis* 7th Edn, Prentice Hall.
8. Vogel, A. I. *Vogel's Quantitative Chemical Analysis* 6th Edn, Prentice Hall.
9. Gary D. Christian, *Analytical Chemistry* 7th edition. (2004).
10. B. K. Sharma, *Industrial Chemistry* (including Chemical Engineering). edn. (1997).

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FACULTY OF SCIENCE- DEPARTMENT OF CHEMISTRY
PRACTICAL SYLLABUS CBCS-2024
SEMESTER -V
~~CHEMISTRY PRACTICALS – ELECTIVES 1~~ Experiments in Physical Chemistry & Sustainable Chemistry

Program: B.Sc.
Course Code: U24/CHE/DSE/501/P
Course: DSE 1 & 2
No. of Credits: 1

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

Course Objectives

- To equip the students with required analytical skills for potentiometry, TLC and determination of partition coefficient.
- To investigate analytes with the use of scientific instruments.

Course Outcomes

CO 1: Acquire the skills to determine partition coefficient, perform TLC and potentiometric titrations.
CO 2: The techniques such as spectroscopy, electrochemical analysis provides adequate knowledge and applications.

Distribution Experiments:

1. Distribution of partition coefficient of acetic acid in water and butanol.
2. Distribution of benzoic acid in benzene and water.

Potentiometry:

3. Titration of strong acid vs strong base (HCl vs NaOH)

4,

Thin Layer Chromatography :

4. Determination of Rf values and identification of Organic compounds: preparation of and separation of 2,4-dinitrophenylhydrazone of acetone and acetophenone using toluene and light petroleum (40:60)
5. Separation of ortho & para-nitroaniline mixtures.

Electrochemistry

6 Titration of Strong acid Vs Strong base (HCl Vs NaOH)

~~6~~ 7. Determination of dissociation constant (Ka) of acetic acid by conductivity measurements

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Colorimetry

7. Verification of Beer's Law using $KMnO_4$ and determination of the concentration of the given solution.

Adsorption

8. Adsorption of acetic acid on animal charcoal, Verification of Freundlich adsorption isotherm.

Reference Books

1. Khosla, B. D.; Garg, V. C. &Gulati, A. Senior Practical Physical Chemistry, R.
2. Chand & Co.: New Delhi (2011).
3. Mendham, J, *Vogel's Quantitative Chemical Analysis:* Pearson, 2009.
4. Analytical Chemistry 7th edition by Gary D. Christian (2004)
5. Vogel, A. I. Vogel's Qualitative Inorganic Analysis 7th Ed., Prentice Hall. 11. Vogel, A. I.
6. Vogel's Quantitative Chemical Analysis 6th Ed., Prentice Hall.

(9) Green Synthesis of Acetanilide

(10) Green Synthesis of (P-Bromo acetanilide) Aspirin

(11) Green Synthesis of Dihydropyrimidinone

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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	To produce graduates with sound theoretical knowledge and technical skills.
Regional	To motivate students towards research.
National	To address the challenges with their innovative contributions for the benefit of mankind.
Global	To instill the essence of professionalism, ethical commitment to become researchers with core human values.

b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	1,2,3,4	Upskilling, cross skilling and reskilling
ED	1,2,3,4	Guest lecture Skill test involving creative thinking and problem solving
EMP	1,2,3,4	Using an engaging curriculum for career exploration

7. Pedagogy

S.No.	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiential Learning	Science Experiments
2.	Participative Learning	Presentation
3.	Problem solving	Research Projects

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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	CIA1-Written Exam	
CO3	CIA2- Mini Project	
CO4	CIA2- Paper Presentation	

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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. III YEAR SEMESTER -V
INSTRUMENTAL METHODS OF ANALYSIS
Course Code: U24/CHE/DSE/501

TIME: 2 Hrs
Max. Marks: 60

SECTION –A

I.Answer the following **4X10=40 Marks**

1. Evaluate the principle of paper chromatography and development of chromatogram by four methods. (CO1) **L5** 10M

OR

2. a) Explain the Craig's counter current process of solvent extraction. (CO2) **L1** 5M
   b) Summarize a short note on Soxhlet extraction technique. (CO1) **L2** 5M

3. a) Apply the theory involved in Gas chromatography and draw the block diagram. (CO2) **L3** 5M
   b) Give the analysis of paracetamol by HPLC (CO3) **L1** 5M

OR

4. Describe the principle of Ion exchange chromatography. Give an account of cation and anion exchange resins. (CO1) **L2** 10M
5. a) Estimation of iron in water sample samples by thiocyanate method. (CO3) **L6** 5M
   b) Explain the instrumentation of the double beam spectrophotometer. (CO3) **L1** 5M

OR

6. Analyse the Principle, Sources of Radiations, Sampling technique in IR spectrophotometry. (CO3) **L4** 10M
7. a) Describe the working of Calomel electrode with a neat diagram (CO4) **L2** 5M
   b) How chloride ions are estimated using silver nitrate by conductometry. (CO4) **L1** 5M

OR

8. Determine the EMF of a cell initially of an acid- base titration where 25 ml 0.1 M of HCl is titrated potentiometrically against standard 0.1 M NaOH using hydrogen electrode as indicator electrode and saturated calomel electrode as reference electrode. What would be the EMF after the addition of 20, 25 and 30 ml of NaOH solution? (CO4) **L5** 10M

SECTION –B

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

9. Illustrate any two applications of TLC (CO2) **L2**
10. Give an account of different types of column packing. (CO1) **L1**
11. Distinguish between Colorimetry and Spectrophotometry. (CO3) **L4**
12. Classify chromatographic methods and explain any two. (CO1) **L1**
13. Outline a short note on three electrode assembly. (CO4) **L2**
14. Explain the instrumentation and principle of HPLC. (CO2) **L1**

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 -V
INSTRUMENTAL METHODS OF ANALYSIS

TIME: 2 Hrs **Course Code: U24/CHE/DSE/501**
Max. Marks: 60 **Credits: 4**

SECTION –A

SECTION A - INTERNAL CHOICE				**4 X 10 M = 40M**
Question Number	**Question**		**CO**	**BTL**
1	**Module 1**	Evaluate the principle of paper chromatography and development of chromatogram by four methods. 10M **OR**	**CO 1**	**(Level V)**
2	**Module 1**	a) Explain the Craig's counter current process of solvent extraction. 5M b) Summarize a short note on Soxhlet extraction technique. 5M	**CO 1**	**(Level I, II)**
3	**Module 2**	a) Apply the theory involved in Gas chromatography and draw the block diagram. 5M b) Give the analysis of paracetamol by HPLC 5M **OR**	**CO 2**	**(Level I, III)**
4	**Module 2**	Describe the principle of Ion exchange chromatography. Give an account of cation and anion exchange resins. 10M	**CO 2**	**(Level II)**
5	**Module 3**	a) Estimation of iron in water sample samples by thiocyanate method. 5M b) Explain the instrumentation of the double beam spectrophotometer. 5M **OR**	**CO 3**	**(Level I,VI)**
6	**Module 3**	Analyze the principle, sources of radiations, sampling technique in IR spectrophotometry. 10M	**CO 3**	**(Level IV)**

7	**Module 4**	a) Describe the working of Calomel electrode with a neat diagram 5M b) How chloride ions are estimated using silver nitrate by conductometry. 5M **OR**	**CO 4**	**(Level I, II)**
8	**Module 4**	a) What is the principle and instrumentation of potentiometry 5M b) Explain the three electrode assemblies of voltammetry. 5M	**CO 4**	**(Level I)**
SECTION B – (Short answer questions) **ANSWER ANY 4 OUT OF 6** **4 X 5M = 20 M**				
9	**Module 2**	Illustrate any two applications of TLC	**CO 2**	**(Level II)**
10	**Module 1**	Give an account of different types of column packing.	**CO 1**	**(Level I)**
11	**Module 3**	Distinguish between Colorimetry and Spectrophotometry.	**CO 3**	**(Level IV)**
12	**Module 1**	Classify chromatographic methods and explain any two.	**CO 1**	**(Level I)**
13	**Module 4**	Calculate the equivalent conductivity 0.1N concentrated sulphuric acid solution given specific conductivity is equal to 4×10^{-2} Sm-1.	**CO 4**	**(Level II)**
14	**Module 2**	Explain the instrumentation and principle of HPLC.	**CO 2**	**(Level I)**

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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
THEORY SYLLABUS CBCS-2024
SEMESTER -V
MEDICINAL & SUSTAINABLE CHEMISTRY

1. Course Description

Program: B.Sc.
Course Code: U24/CHE/DSE/502
Course: DSE 2
No. of Credits: 4

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

2. Course Objectives

- To introduce students to the action of drugs on biological systems.
- To explain & discuss the drug formulation, synthetic routes and discovery process.
- To study the effects of chemical synthesis upon the environment and the importance of developing green techniques.
- Introduce students to the importance of nanoparticles, their properties and applications.

3. Course Outcomes

CO 1: Learn and understand the action of drugs on biological systems.
CO 2: Discuss the synthetic routes and therapeutic activity for some commonly used drugs.
CO 3: Acquire the ability to design green synthetic routes replacing conventional pathways.
CO 4: Apply the knowledge of Nanotechnology to synthesize, characterize Nanoparticles and explain their properties.

4. Course Content

MODULE I: MEDICINAL CHEMISTRY I **12 Hrs**

Terminology in Medicinal Chemistry **2 Hrs**
Disease, Drug, Pharmacology, Pharmacophore, Pharmacodynamics, Pharmacokinetics, metabolites, antimetabolites, agonist, antagonist and therapeutic index.

Nomenclature **1 Hr**
Chemical name, Generic name and Trade names. Trade names for the given generic names – (i) Aspirin (ii) Amoxycillin (iii) Ciprofloxacin (iv) Paracetamol (v) Mebendazole.

ADME **3 Hrs**
a) Absorption: Definition, absorption of drugs across the membrane – active and passive absorption, routes of administration of drugs. b) Distribution: definition and effect of plasma protein binding. c) Metabolism: definition, phase I and phase II reactions. d) Elimination: definition and renal elimination.

Classification of Drugs
Classification of Drugs based on therapeutic action–Chemotherapeutic agents, and Pharmacodynamic agents (brief explanation for the following)
(i) Chemotherapeutic agents **1 Hr**

Antimalarials – Chloroquine; Antibiotic – Amoxicillin; Antitubercular drugs – isoniazid; Antiprotozoals – metronidazole: Antibacterial – Sulphanilamide; Anthelmintics – Albendazole.

(ii) Pharmacodynamic agents **5 Hrs**

(a) Drugs acting on CNS: General (thiopental sodium)and local anaesthetics (Benzocaine),Analgesics (Ibuprofen),Antipyretics (Aspirin, Paracetamol), Sedatives & Hypnotics (Phenobarbital), Anticonvulsants (Diazepam), Anti-psychotics (Chlorpromazine) and Antidepressants (Fluoxetine).

(b) Drugs acting on PNS: Adrenergic (Salbutamol, Propranolol) & Cholinergic (Carbachol, Diphenhydramine) Drugs.

(c) Drugs acting on Cardiovascular System-Antihypertensive Drugs (Captopril, Nifedipine)

(d) Drugs acting on renal system- Diuretic drugs (Furosemide, Acetazolamide)

MODULE II: MEDICINAL CHEMISTRY II **11 Hrs**

SAR studies **1 Hr**

Introduction to Structure Activity Relationship Studies, Lead modification strategies.SAR of benzodiazepines.

Antibiotics **1 Hr**

Discovery- Isolation of Penicillin, Structure of Penicillin G, Penicillin-V, Penicillin-O &Amoxycillin.

Synthetic route and brief therapeutic action of the following drugs: **4 Hrs**

Chemotherapeutics: Chloroquine, Ciprofloxacin, Sulphanilamide, Metronidazole.

Drugs to treat metabolic disorders: Paracetamol, Salbutamol, Omeprazole, Mephensin, Aspirin, Thiobarbituric acid, L-Dopa, Phenobarbital, Oil of wintergreen, Nifedipine

Formulations **2 Hrs**

(a) Introduction: Need of conversion of drugs into medicine. Additives & their role (Brief account only). (b) Classification of Drug formulations: Oral, parenterals and topical dosage forms – advantages and disadvantages.

Brief Overview of Drug Development Process: **3 Hrs**

(a) Lead drug-Definition & example (b) Drug design-i) Based on Lead compound ii) Based on Target Structure(De novo drug design) iii) Computer aided Drug Design (Molecular modelling) (c) Drug Testing-Clinical trials.

MODULE III: GREEN CHEMISTRY **15 Hrs**

Principles of Green Chemistry and some real world cases

What is Green Chemistry? Twelve principles of Green Chemistry with their explanation and examples. Atom economy, Evaluation of the type of the reaction: Rearrangements, Addition, Substitution, elimination and Pericyclic reactions. Selection of solvent: Aqueous phase reactions, Reactions in ionic liquids, Solid supported synthesis, Solvent free reactions (solid phase reactions). Green catalysts: Phase transfer catalysts (PTC), Biocatalysts. Energy requirements for reactions – alternative sources of energy: use of microwaves and ultrasonic energy.

Microwave assisted reactions in water: Oxidation of toluene and alcohols, Claisen rearrangement, Pinacol pinacolone rearrangement.

Microwave assisted reactions in organic solvents, Diels-Alder reaction and Decarboxylation reaction, Fries rearrangement.

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Ultrasound assisted reactions: sonochemical Simmons-Smith Reaction (Ultrasonic alternative to Iodine), Cannizaro reaction, Strecker synthesis, Friedal crafts acylation.
Green Synthesis of the following compounds: adipic acid, catechol, disodium iminodiacetate (alternative to Strecker synthesis).

MODULE IV: NANOTECHNOLOGY 15 Hrs

Nanotechnology: Introduction, types of crystalline nano materials, synthesis of nano materials- physical, chemical and biological methods (one method each).
Characterization of nanoparticles using electron microscope, tunneling microscope and X-ray diffraction. (Elementary treatment only)
Properties of nanomaterials-structure of nanomaterials, mechanical, electrical conductivity, optical, melting point, luminescence, magnetic properties
Special nanomaterials- fullerenes, carbon nanotubes, porous silicon, zeolites, aerogels, self-assembled nanoparticles, their preparation and structure.
Applications-- Electronics, energy, automobiles, fuel cells, home appliances, Nanolithography, defense, medicine, nanotechnology and environment.

5. References

1. G.L. David Krupadanam, D.Vijaya Prasad, K.Varaprasad Rao, K.L.N. Reddy, C. Sudhakar, *Drugs*, Universities Press (India) Limited 2007.
2. Graham L. Patrick, *An Introduction to Medicinal Chemistry,* Oxford University Press, New York. 1995
3. *Chemistry text book for B.Sc., Vol. IV* published by Telugu Academy, Govt. of Telangana.
4. Ahluwalia V.K, *Green Chemistry: Environmentally benign reaction*: Ane books Pvt.Ltd,2006.
5. Ahluwalia V.K & Kidwai M, *New Trends in Green Chemistry:* Springer,1 edition (29thFeb 2004)
6. Kulkarni. K.S, (2011), *Nanotechnology- Principles & Practices* Co-Published by Springer International Publishing Company, Switzerland, New Delhi, Capital Publishing Company.
7. Nanochemistry- A Chemical Approach to Nano World by Kusum Sharma
8. Poole Jr. C.P & Owens. J.F (copyright, reprint, 2006). *Introduction to Nanotechnology*, New Delhi, Wiley India(P) Ltd.
9. Thomas Nogrady, Medicinal Chemistry, Oxford Univ. Press, New York.2005.
10. David William and Thomas Lemke, Foye's Principles of Medicinal Chemistry, Lippincott Williams & Wilkins, 2008.
11. AshutoshKar Medicinal Chemistry, New Age International, 2005.
12. O.D. Tyagi & M.Yadav Synthetic Drugs by, Anmol Publications, 1998.
13. Medicinal Chemistry by Alka L. Gupta, Pragati Prakashan.
14. Samuel Delvin, *Green Chemistry* :Sarup & Sons(2005)
15. Anastas, P.T & Warner, J.C, *Green Chemistry: Theory and Practice:* Oxford University Press (1998).
16. T. Pradeep *Nano: The Essentials* , McGraw-Hill Education.
17. CNR Rao et.al. *Chemistry of nanomaterials: Synthesis, Properties and applications*
18. Gurdeep R. Chatwal *Chemistry and industry*
19. https://www.electrical4u.com/properties-of-superconductors/
20. Poole Jr. C.P & Owens. J.F(copyright, reprint,2006).*Introduction to Nanotechnology*, New Delhi,Wiley India(P) L

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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	To develop products that benefit the environment either directly or indirectly.
Regional	Nanotechnology helps in improving many technology and industry sectors and even revolutionize.
National	The concepts of Green Chemistry reduces the use of energy and fuel by using renewable inputs wherever possible
Global	Recent advances in Medicinal Chemistry, Green Chemistry and Nanotechnology provide reliable synthetic pathways for sustainable development goals.

b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	All	Educational tour to industries/factories to make students learn outside the classroom
ED	All	Case studies relevant to the problems, challenges and help students to develop solutions
EMP	All	Systematic and sustained effort to adapt specific skills for improving career goals

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7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiential Learning	Field Trips
2.	Participative Learning	Role play
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	CIA1-Written Exam	Written Exam
CO2	CIA1-Written Exam	
CO3	CIA2- Case Study	
CO4	CIA2- Presentations (poster/ ppt)	

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b. Model Question Paper - End Semester Exam

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FACULTY OF SCIENCE – DEPARTMENT OF CHEMISTRY

B.Sc. III YEAR SEMESTER -V

MEDICINAL & SUSTAINABLE CHEMISTRY

TIME: 2hrs **Course Code: U24/CHE/DSE/502**

Max. Marks: 60 **Credits: 4**

SECTION –A (Essay Questions)

SECTION A - INTERNAL CHOICE			**4 X 10 M = 40M**	
Question Number	**Question**		**CO**	**BTL**
1	**Module 2**	a) Evaluate the structure of Penicillin G & discuss its commercial production 5M b) Explain briefly about diluents and stabilizing agents with examples. 5M **OR**	**CO 2**	**(Level I, V)**
2	**Module 2**	Outline the synthetic route and brief therapeutic action of i) Ciprofloxacin ii) Aspirin iii) Salbutamol iv) Omeprazole 10M	**CO 2**	**(Level II)**
3	**Module 1**	a) Summarize briefly about agonist and antagonist. 5M b) What are anaesthetic and antipyretic drugs? 5M **OR**	**CO 1**	**(Level I, II)**
4	**Module 1**	Describe in detail about ADME. 10M	**CO 1**	**(Level I)**
5	**Module 3**	a) List out the basic principles of green chemistry. 5M b) Simplify the atom economy? Calculate atom economy using suitable examples. 5M **OR**	**CO 3**	**(Level I, IV)**
6	**Module 3**	a) Assess the need for green chemistry. 5M b) Interpret the selection of solvents in green synthesis. 5M	**CO 3**	**(Level V)**

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7	**Module 4**	a) Give two methods for synthesis of Nanoparticles. 5M b) Compose a note on carbon nanotubes.5M **OR**	**CO 4**	**(Level I, VI)**
8	**Module 4**	a) Elaborate a note on Zeolites? 5M b) Compile the principle and working of STM. 5M	**CO 4**	**(Level VI)**
SECTION B – (Short answer questions) **ANSWER ANY 4 OUT OF 6**			**4 X 5M = 20 M**	
9	**Module 1**	How would you explain drugs acting on the renal system?	**CO 1**	**(Level II)**
10	**Module 2**	Build a short note on clinical trials.	**CO 2**	**(Level III)**
11	**Module 1**	What are chemotherapeutic agents? Discuss about antimalarial drugs.	**CO 1**	**(Level I)**
12	**Module 2**	Construct briefly about computer aided drug designing.	**CO 2**	**(Level III)**
13	**Module 3**	Analyze the role of phase transfer catalyst in green synthesis.	**CO 3**	**(Level IV)**
14	**Module 4**	Give any four applications of Nanomaterials.	**CO 4**	**(Level I)**

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b. Model Question Paper - End Semester Exam

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FACULTY OF SCIENCE – DEPARTMENT OF CHEMISTRY

b. MODEL PAPER - B.Sc. III YEAR SEMESTER -V

MEDICINAL & SUSTAINABLE CHEMISTRY

TIME: 2hrs **Course Code: U24/CHE/DSE/502**

Max. Marks: 60

SECTION –A (Essay Questions)

I. Answer the following **4X10=40 Marks**

1. a) Evaluate the structure of Penicillin G & discuss its commercial production(CO2) **L5** 5M

   b) Explain briefly about diluents and stabilizing agents with examples. (CO 2) **L1** 5M

OR

2. Outline the synthetic route and brief therapeutic action of 10M
   i) Ciprofloxacin ii) Aspirin iii) Salbutamol iv) Omeprazole (CO 2) **L2**
3. a) Summarize briefly about agonist and antagonist. (CO 1) **L2** 5M

   b) What are anaesthetic and antipyretic drugs? (CO 1) **L1** 5M

OR

4. Describe in detail about ADME. (CO 1) **L1** 10M
5. a) List out the basic principles of green chemistry. (CO3) **L1** 5M

   b) Simplify atom economy? Calculate atom economy using suitable examples.(CO3) **L4** 5M

OR

6. a) Assess the need for green chemistry. (CO3) **L5** 5M

   b) Interpret the selection of solvents in green synthesis. (CO3) **L5** 5M
7. a) Give two methods for synthesis of Nanoparticles. (CO4) **L1** 5M

   b) Compose a note on carbon nanotubes. (CO4) **L6** 5M

OR

8. a) Elaborate a note on Zeolites? (CO4) **L6** 5M

   b) Compile the principle and working of STM. (CO4) **L6** 5M

SECTION –B (Short Answer Questions)

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

9. How would you explain drugs acting on the renal system? (CO 1) **L2**
10. Build a short note on clinical trials. (CO 2) **L3**
11. What are chemotherapeutic agents? Discuss about antimalarial drugs. (CO 1) **L1**
12. Construct briefly about computer aided drug designing.(CO2) **L3**
13. Analyze the role of phase transfer catalyst in green synthesis. (CO3) **L4**
14. Give any four applications of Nanomaterials. (CO4) **L1**

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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	1	2	10	2	5
2	15	2	2	10	2	5
3	15	3	2	10	1	5
4	15	4	2	10	1	5

5. 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
Shikha Chander M. Deepthi Name and Signature of the teaching faculty Dr. Shikha Chander M. Deepthi	D. Sumalatha Name and Signature of the HoD Dr. D. Sumalatha	Name and Signature of the Principal Dr. Uma Joseph

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ST.FRANCIS DEGREE COLLEGE FOR WOMEN BEGUMPET
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DEPARTMENT OF NUTRITION

GE	NUTRITION AND WELLNESS SEMESTER- V	60 HRS
Module 1 - Introduction To Nutrition **Module 2 - Meal Planning** **Module 3 - Nutrition For Women** **Module 4 - Fitness Check**		

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

SEMESTER -V

NUTRITION AND WELLNESS

1. **Course Description**
   Programme: B.Sc
   Course Code: U24/NUT/GE/501
   Course Type: GE
   No. of credits: 4

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

2. Course Objectives

- To learn the basics of nutrition, meal planning and balanced diet.
- To understand personal health and check fitness levels with help of different indicators and exercise.

3. Course Outcomes

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

CO1: Understand the basics of nutrition and the various nutrients.
CO2: Remember the role of the food pyramid and food groups and plan a balanced meal.
CO3: Understand the nutritional requirements and problems of young adolescent girls.
CO4: Evaluate fitness levels of individuals with the help of different health and fitness indicators.

4. Course Content

MODULE I: INTRODUCTION TO NUTRITION **(15 Hrs)**

1.1.Basics of Nutrition: Definitions, Nutrients and its role, classification of nutrients, Functions of Food.
1.2.Macronutrients: Carbohydrates, Proteins & Fats (Types, functions and deficiency).
1.3.Micronutrients: Vitamins and Minerals (Types, functions and deficiency), Water.

MODULE 2: MEAL PLANNING **(15 Hrs)**

2.1.Balanced diet: Definition, RDA, Importance , Food groups & Food pyramid
2.2.Meal Balance: Principles of meal planning, Serving sizes, steps involved in planning a balanced meal.
2.3.FAD Diet –Types and ill effects, Processed Foods, Ill-effects of Junk Foods,Importance of Breakfast.

MODULE 3: NUTRITION FOR WOMEN **(15 Hrs)**

3.1.Nutritional requirements: RDA, Food requirements- Energy, proteins, Fats, Vitamins, Minerals, Special foods, dietary guidelines,
3.2.Nutritional Problems: Eating disorders-Bulimia, Anorexia Nervosa, Binge Eating, Anaemia, PCOS,Osteoporosis.
3.3.Obesity and Undernutrition: Causes, Dietary management,Dietary guidelines.

MODULE 4: FITNESS CHECK **(15 Hrs)**

4.1. Fitness : Definition of Fitness and Health, tips for healthy living; Food Hygiene
4.2. Indicators of Fitness: Assessment – IBW,BMI, W/H ratio,Body Fat percentage, Activity Factor.
4.3. Physical Activity: Introduction, Importance, frequency, intensity time, type , physical activity pyramid.

5. Reference Books:

1. Chalkey M.A, 2014, A Textbook For The Health Worker, volume I, New Age International Publishers.
2. Park K, 2011, Preventive and Social Medicine, 21" edition, Banarsidas Bhanot Publishers.
3. Epidemiology And Public Health by Victor Clarence Vaughan, Henry Frieze Vaughan, Arkose Press.
4. Srilakshmi B, 2014, Nutrition Science, New Age International Publishers, New Delhi.
5. Begum R. M, 2014, A Textbook of Foods, Nutrition and Dietetics, 3rd revised edition, Sterling Publishers Pvt. Ltd New Delhi.
6. Food Facts and Principles – ShakuntalaManay, New Age International Publishers
7. ICMR, 2011, Dietary Guidelines For Indians, a manual, NIN.
8. WHO child growth standards, 2006, Methods and Development Height, University Press Oxford
9. Public Health Nutrition – Michale J. Gibney, Barrie M. Margetts, John M. Kearney and Lenore Arab (Eds.) – Nutrition Society Textbook Series, Blackwell Publishing.
10. Mudambi R.S, Rao M.S, Rajagopal V.M, 2014, Food Science, Second Revised Edition, New Age International Publishers.

6.Syllabus Focus

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

Local /Regional/National /Global Development Needs	Relevance
National	Enables the students to assess the fitness status of individuals with the help of health indicators

b)Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	4	Assessment of nutritional status and fitness
SD	2	Learning the principles of planning a balanced diet

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Presentation , Assignments	Participative Learning
2.	Quiz	Experiential Learning
3.	Group Discussion, Seminar	Participative 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 examination
CO2	CIA-1	
CO3	CIA-2 MCQ/Fill in The blanks	
CO4	CIA-2 Quiz/ crossword	

SECTION A - INTERNAL CHOICE
5 Q X 10 M = 50 M

Question Number	Question	Question	CO	BTL (Blooms Taxonomy Level)
1	Module 1	Define Nutrients. What are the types? Discuss the role of nutrients in our body.	CO 1	I
2	Module 1	What are the types of Vitamins? Explain the various deficiency disorders related to vitamins.	CO 1	II
3	Module 2	What is a Balanced diet? What are the prerequisites for planning a Balanced diet?	CO 2	I
4	Module 2	Write the principles of Meal planning.	CO 2	I
5	Module 3	What is the RDA of an adolescent woman? Mention the different eating disorders seen in young adults?	CO 3	I
6	Module 3	Define Obesity. What are the causes? How can we prevent Obesity?	CO 3	I
7	Module 4	What is the Physical activity pyramid? Why is Physical exercise very important in our daily life?	CO 4	I
8	Module 4	Explain about the different indicators of fitness.	CO 4	II

SECTION B - ANSWER ANY 5 OUT OF 7
5 Q X 2 M = 10 M
(To compulsorily have **ONE** question from **each** module)

9	Module 1	Write about the Importance of water.	CO 1	I
10	Module 2	Define Food Pyramid.	CO 2	II
11	Module 3	Explain Undernutrition.	CO 3	I
12	Module 4	Define BMI and its uses and limitation.	CO 4	I
13	Module 2	What are the Ill effects of Junk Foods?	CO 2	I
14	Module 1	Explain Minerals.	CO 1	II

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SEMESTER V

PLANT PHYSIOLOGY & METABOLISM

1. Course Description

Program:	**B. Sc**	**Max. Hours:**	**60**
Course Code:	**U24/ BOT/ DSE/501**	**Hours per week:**	**4**
Type of Course:	**DSE-1**	**Max. Marks:**	**60**
No. of Credits:	**4**		

2. Course Objectives

1. To describe physiological and biochemical processes in plants – cell, tissues, organ and whole plant level.
2. To interpret regulation mechanisms of physiological and metabolic processes as well as their dependence on endogenous and environmental signals.

3. Course Outcomes

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

CO1: Interpret the concept of water and mineral absorption in plant system and the significance of stress physiology
CO2: Illustrate the various pathways in photosynthesis and summarise the mechanism of translocation of organic solutes
CO3: Compare the various pathways in respiration and illustrate the mechanism of biological nitrogen fixation and ammonia assimilation
CO 4: Describe the importance of plant growth and development alongside the role of growth regulators and physiology of flowering

4. Course Content

Module I Plant water relations and Mineral Nutrition 15 Hours

1.1. Plant water relations: Diffusion, imbibition, osmosis; osmotic and pressure potentials; absorption, transport of water, ascent of sap; Transpiration; stomatal structure and movement.
1.2. Mineral nutrition: Essential macro and micro mineral nutrients and their role; symptoms of mineral deficiency; absorption of mineral ions; passive and active processes.
1.3.Stress physiology: concept and plant responses to water, salt and temperature stresses.
1.4.Introduction to Hydroponic technology

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Module II Photosynthesis and Translocation **17 Hours**

2.1 Enzymes: Nomenclature, properties, classification and factors regulating enzyme action.

2.2 Photosynthesis: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson Enhancement effect; concept of two photosystems, mechanism of photosynthetic electron transport and evolution of oxygen; photophosphorylation;

2.3 Carbon assimilation pathways: C_3, C_4 and CAM; photorespiration.

2.4 Translocation of organic substances; Mechanism of phloem transport; source-sink relationships.

Module III Respiration and Nitrogen metabolism **16 Hours**

3.1. Respiration: Aerobic and Anaerobic; Glycolysis, Kreb's cycle.

3.2 Electron transport system, mechanism of oxidative phosphorylation, pentose phosphate pathway.

3.3. Nitrogen metabolism: Biological nitrogen fixation, nitrate reduction.

3.4. Ammonia assimilation.

Module IV Plant growth and Development **12 Hours**

4.1. Growth and development: Definition, phases and kinetics of growth. Plant movements: tropic movements - geotropism and phototropism; nastic movements - seismonastic and nyctinastic movements

4.2. Physiological effects of phytohormones- Auxins, Gibberellins, Cytokinins, Abscisic acid, Ethylene and Brassinosteroids.

4.3. Physiology of flowering and photoperiodism, role of phytochrome in flowering.

4.4 Allelopathy

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5. Reference Books

1. Hopkins, W. G. 1995. *Introduction to Plant Physiology*. John Wiley & Sons Inc., New York, USA.
2. Jain, J.L., S. Jain and Nitin Jain. 2008. *Fundamentals of Biochemistry*. S. Chand & Company Ltd., New Delhi.
3. Pandey, B. P. 2007. *Botany for Degree Students: Plant Physiology, Biochemistry, Biotechnology, Ecology and Utilization of Plants.* S. Chand & Company Ltd., New Delhi.
4. Salisbury, F. B. and C. W. Ross. 1992. *Plant Physiology. 4th edn. (India Edition*), Wordsworth, Thomson Learning Inc., USA. Taiz, L. and E. Zeiger. 1998.
5. *Plant Physiology (2nd Ed.).* Sinauer Associates, Inc., Publishers, Massachusetts, USA.
6. G. Ray Noggle & George. J. Fritz, 1982. *Introductory Plant Physiology*. Prentice Hall of India Pvt. Ltd., New Delhi.
7. V. Verma, 2008.*Textbook of Plant Physiology*. Ane Books India, New Delhi.

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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 needs	The concepts of plant physiology and metabolism serve as foundational pillars for addressing the diverse agricultural and environmental needs in relation to crop production.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	**Syllabus Content**	**Description of Activity**
SD	Module I- Plant water relations and Mineral Nutrition	• Implementing the technique of hydroponics for farming
	Module IV Plant growth and Development	• The study of physiological processes determines plant growth, development, and economic production. • The study of phytohormones helps in understanding the technique for improvement of crop production and the quality of food.

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7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative Learning	• Information collection from Library • Teams of three or four to discuss on Stress tolerance, Growth and development • Mineral Nutrition, Live experiments conducted compilation and presentation
2.	Experiential Learning	• Live experiments like Four leaf experiment for transpiration, Effects of different wavelengths of light for photosynthesis etc. • Interactive Class room games/Quiz through Kahoot.
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 PHYSIOLOGY & METABOLISM

Course Code: U24/ BOT/ DSE/501
TIME: 2 Hours **MAXMARKS: 60**

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

Section –A (Long Essay Type)

I. Answer All questions: **Marks: 4 x 10 - 40**

1. List different theories associated with stomatal mechanisms.
   OR
2. Explain the concept of water potential.

3. Describe in detail the Hatch Slack cycle.
   OR
4. Explain the mechanism of enzyme action and factors affecting enzyme action.

5. Elaborate in detail the Biological N_2 fixation.
   OR
6. Elaborate in detail the Kreb's cycle.

7. Describe in detail about Auxins.
   OR
8. What is Photoperiodism? Describe the physiology of flowering.

Section-B (Short Essay Type)

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

9. Explain Osmotic potential
10. Define Pigment system and its function
11. Outline the process of Fermentation
12. What is Phytochrome? Explain its function.
13. Discuss GOGAT
14. Inspect the role of Gibberellins in plant growth.

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PLANT PHYSIOLOGY & METABOLISM

SECTION A - INTERNAL CHOICE				4Q X 10 M = 40 M
Question Number	Question	Question	CO	BTL (Blooms Taxonomy Level)
1	Module 1	List different theories associated with stomatal mechanisms.	CO 1	Level I, IV
2	Module 1	Explain the concept of water potential.	CO 1	Level II
3	Module 2	Describe in detail the Hatch Slack cycle.	CO 2	Level I, II
4	Module 2	Explain the mechanism of enzyme action and factors affecting enzyme action.	CO 2	Level II
5	Module 3	Elaborate in detail the Biological N_2 fixation	CO 3	Level VI
6	Module 3	Elaborate in detail the Kreb's cycle.	CO 3	Level VI
7	Module 4	Describe in detail about Auxins.	CO 4	Level I, II
8	Module 4	What is Photoperiodism? Describe the physiology of flowering.	CO 4	Level I, II
SECTION B - ANSWER ANY 4 OUT OF 6 (To compulsorily have ONE question from each module)				4Q X 5 M = 20 M
9	Module 1	Explain Osmotic potential	CO 1	Level I, II
10	Module 2	Define Pigment system and its function	CO 2	Level I
11	Module 3	Outline the process of Fermentation	CO 3	Level II
12	Module 4	What is Phytochrome? Explain its function.	CO 4	Level I, II
13	Module 3	Discuss GOGAT	CO 3	Level II
14	Module 4	Inspect the role of Gibberellins in plant growth	CO 4	Level IV

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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	17	CO 2	2	10	1	5
3	16	CO 3	2	10	1	5
4	12	CO 4	2	10	1	5

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions (hrs)
1	1-7	Understanding	15
2	1,2,5,6	Applying	17
3	1,5,6	Analyzing	16
4	1,4,5,6	Understanding	12

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PLANT PHYSIOLOGY & METABOLISM

Practical Syllabus

1. Course Description

Programme:	**B. Sc**	**Max. Hours:**	**30**
Course Code:	**U24/ BOT/ DSE/501/P**	**Hours per week:**	**2**
Type of Course:	**DSE - 1**	**Max. Marks:**	**50**
No. of Credits:	**1**		

2. Course Objectives

1. To identify parameters that reflect the physiological status and metabolic activities of plants under different environmental conditions.
2. To interpret various physiological processes through some demonstration experiments.

3. Course Outcomes

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

CO1: Describe the basic physiological aspects in plants by performing experiments
CO2: Devise methods to improve basic skills and techniques related to plant physiology
CO3: Assess the methods used in the separation and estimation of plant components.
CO4: Demonstrate the various physiological processes in plants

4. Course Content

1. Determination of osmotic potential of vacuolar sap by Plasmolytic method using leaves of *Rheo discolor / Tradescantia*
2. Determination of rate of transpiration using cobalt chloride method
3. Determination of stomatal frequency using leaf epidermal peelings / impressions
4. Study of mineral deficiency symptoms using plant material / photographs
5. Determination of catalase activity using potato tubers by titration method
6. Separation of chloroplast pigments using paper chromatography technique
7. Estimation of protein by Biuret method
8. Identification of C_3, C_4 and CAM plants

Demonstration experiments

1. Potato osmoscope
2. Growing plants in Hydroponic system
3. Evolution of CO_2 in aerobic respiration by direct current method
4. Effect of temperature on membrane permeability (Beet root)
5. Demonstrate that CO_2 is necessary for photosynthesis
6. Phototropism in open field

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5. Model Question Paper – End Semester Exam Practical

PLANT PHYSIOLOGY & METABOLISM

Course Code: U24/ BOT/ DSE/501/P

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

Q I. Conduct the Major physiology experiment allotted to you **'A'.** Give the procedure, results and inference.

(Procedure – 3, experimentation – 3, observation –2, inference – 2) **10 Marks**

Q II. Identify the Minor physiology experiment allotted to you **'B'.** Give the procedure, results and inference. **5 Marks**

Q III. Identify the Mineral deficiency and comment on 'C', 'D' and 'E' **5x3-15 Marks**

Q IV. Project. **10 Marks**

Q V. Viva-Voce **5 Marks**

Q VI. Record **5 Marks**

Prepared by	Checked &verified by	Approved by
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ST.FRANCIS DEGREE COLLEGE FOR WOMEN BEGUMPET
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(AN AUTONOMOUS COLLEGE OF OSMANIA UNIVERSITY)
DEPARTMENT OF NUTRITION

DSE-II	PUBLIC HEALTH SEMESTER- V	60 HRS
Module 1 - Epidemiology **Module 2 - Medical Entomology** **Module 3 - Immunology** **Module 4 - Public Health Agencies**		

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

SEMESTER - V

PUBLIC HEALTH

1. Course Description

Programme: B.Sc.
Course Code: U24/NUT/DSE/502
Course Type: DSE -2
No. of credits: 4

Max. Hours: 60
Hours per week: 3
Max. Marks: 100

2. Course Objectives

- To orient students to the organization and delivery of public health activities
- To train students in basic concept of public health and epidemiology, immunology and nutrition as applied to health and disease.

3. Course Outcomes

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

CO 1: Recognize the methods of epidemiology.
CO 2: Acquire knowledge on mode of transmission, prevention and control of disease caused by household pests.
CO 3: Acquire knowledge on immune response and its involvement in development of health and disease.
CO 4: Analyze the benefits of nutritional policies and programmes designed for mother and child care.

4. Course Content

MODULE 1: EPIDEMIOLOGY **(15Hrs)**

1.1. Introduction: Definition of Public health, Hygiene, Social and Preventive medicine- Basic Aspects of personal Hygiene.
1.2. Epidemiology of Diseases: General Epidemiology- Experimental, Descriptive and analytical
1.3. Disease Transmission: Types of disease transmission, communicable and non-communicable diseases.

MODULE 2: MEDICAL ENTOMOLOGY **(15Hrs)**

2.1 Medical Entomology: control of household pests with special reference to mosquitoes environmental chemical, biological and genetic control.
2.2 Mosquito: Habitat, mode of transmission and prevention methods - environmental chemical, biological and genetic control. Environmental, chemical, biological and generic control.
2.3 Housefly: Habitat, mode of transmission and prevention methods - environmental chemical, biological and genetic control. Environmental, chemical, biological and generic control.

MODULE 3: IMMUNOLOGY **(15Hrs)**

3.1. Introduction: Classification, Specific and non- specific immunology, immunoglobulins.
3.2. Types: Cellular immunology and humoral immunology, immune responses.
3.3. Immunization: Active and passive, immunization schedule, immunizing agents, hazards of Immunization.

MODULE 4 : PUBLIC HEALTH AGENCIES **(15Hrs)**

4.1. Primary health care: With special reference to Maternal and Child Health Care and functioning in rural areas
4.2. Primary health indicators: , Immortality (infant & maternal), morbidity & disability .
4.3. Malaria and AIDs Control-NHP, WHO, UNICEF.

5. References

1. Text book of epidemiology, 2nd edition, Wiley
2. A short book of public health, V.K. Muthu, second edition
3. Epidemiology And Public Health by Victor Clarence Vaughan, Henry Frieze Vaughan, Arkose Press.
4. Park's textbook of Preventive and social medicine, 25th edition, 2019.
5. Begum R. M, 2014, A Textbook of Foods, Nutrition and Dietetics, 3rd revised edition, Sterling Publishers Pvt. Ltd New Delhi.
6. Bamji M.S, Krishnaswamy K and Brahman GNV, 2009, TextBook of Human Nutrition, 3rd edition, Oxford and IBH publishing Co Pvt Ltd, New Delhi.
7. ICMR, 2011, Dietary Guidelines For Indians, a manual, NIN.
8. WHO child growth standards, 2006, Methods and Development Height, University Press Oxford
9. Public Health Nutrition – Michale J. Gibney, Barrie M. Margetts, John M. Kearney and Lenore Arab (Eds.) – Nutrition Society Textbook Series, Blackwell Publishing.
10. The Management of Nutrition in Major Emergencies, WHO in collaboration with UNHCR, International Federation of Red Cross and Red Crescent societies and WFP.

6. Syllabus Focus

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

Local /Regional/National /Global Development Needs	Relevance
Global Development Needs	Understanding disease transmission and their control

b. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	1 & 4	Development of tools in carrying out studies in the form of surveys and development of low cost recipes.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Seminar Presentation	Participative Learning
2.	Group discussion/ Visual aid	Experiential Learning
3.	Quiz/MCQ	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)	

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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	Define public health and aspects of personal hygiene	CO 1	I
2	Module 1	What are the types of epidemiology	CO 1	I
3	Module 2	How do you control pests , special reference to mosquito	CO 2	I
4	Module 2	Explain essay on prevention and transmission of diseases caused by housefly.	CO 2	II
5	Module 3	How do you classify immunology , explain specific and non-specific types	CO 3	I
6	Module 3	Explain in detail about immunization	CO 3	II
7	Module 4	What are primary health care centers, write about MCH	CO 4	I
8	Module 4	How are Malaria and AIDS controlled	CO 4	I
SECTION B - ANSWER ANY 5 OUT OF 7 M (To compulsorily have **ONE** question from **each** module)				**5 Q X 2 M = 10**
11	Module 1	Illustrate Disease transmission	CO 1	II
12	Module 2	Define Genetic control of pests	CO 2	I
13	Module 3	Describe Control of mosquitos	CO 3	II
14	Module 4	Explain Immunoglobulins	CO 4	II
16	Module 4	List the function of MCH in a rural area	CO 4	I
17	Module 4	Explain UNICEF	CO 4	II

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PUBLIC HEALTH
PRACTICAL

Max.Hours: 30
Course Code: U24/NUT/DSE/502 /P
Course Type: DSE - 2

Hours per week: 2
Max.Marks: 50

Course Objectives:

- Preparation of visual aids to enable students to educate the community at large
- Conducting Health and Nutrition awareness programme for the community

Course Outcomes:

- To develop and educate the community using teaching aids.
- To formulate and develop Low cost nutritious recipes.

Practical Sessions

1. Preparation of 3 audio visual aids like charts, posters, models related to health and
2. Nutrition.
3. Conduct of health and nutrition education classes on various target groups like slum
4. dwellers, school children, housewives etc.
5. Formulation and preparation of low cost nutritious recipe.
6. Conduct of survey on health and hygiene practices among high and low income groups.
7. Field visit.

PUBLIC HEALTH
MODEL QUESTION PAPER
PRACTICAL

Course Code: U24/NUT/DSE/502/P
No. of Credits: 1

Mark : 50
Time: 2 Hrs

Answer the following

1. Formulate and prepare a low cost recipe.	**25 M**
a. Planning and calculation of nutritive value.	10 M
b. Preparation and display	15 M
2. Visual Aid (Internal)	**15 M**
3. Viva	**5 M**
4. 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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SEMESTER V

SEED TECHNOLOGY

1. Course Description

Program:	**B. Sc**	**Max. Hours:**	**60**
Course Code:	**U24/ BOT/ DSE/502**	**Hours per week:**	**4**
Type of Course:	**DSE-2**	**Max. Marks:**	**60**
No. of Credits:	**4**		

2. Course Objectives

1. Discuss the methods involved in production of quality seed including testing and certification.
2. Develop and strengthen the seed technology research.

3. Course Outcomes

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

CO1: Explain seed structure and related characteristics of seed dormancy and viability
CO2: Illustrate various plant harvesting methods
CO3: Explain the types of pollination and production of hybrid seeds
CO4: Describe seed testing technology and role of seed banks

4. Course Content

Module I: Seed Viability **15 hours**

1.1. Seed: Germination, factors initiating seed germination, mulching, seed structure and types. Seed dormancy: causes and methods of breaking dormancy.
1.2. Seed viability, factors affecting seed viability and genetic erosion.
1.3. Seed storage: long term and short-term storage. Orthodox and recalcitrant seeds. Packing of seeds – Principles, practices, bagging and labelling; Physico and Bio-chemical changes during seed storage.

Module II: Seed Harvest **15 hours**

2.1. Cultural practices and harvesting of Seed: Isolation, Sowing, Cultural practices, (Fertigation, Irrigation, plant protection), Rouging, Harvesting and threshing of the following crops.
   a. Maize
   b. Rice
   c. Cotton
   d. Sunflower
   e. Groundnut

2.2. Seed Treatment to control seed borne disease – General account.

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Module III: Hybrid seed production **15 hours**

3.1. Structure of pollen and ovule-Types of ovules, Collection and storage of pollen.
3.2. Principles of hybrid seed production-Cross pollination, Emasculation, Self-pollination, role of pollinators and their management
3.3. Seed development in cultivated plants, seed quality concept, importance of genetic purity of seed. Hybrid seed production and Heterosis.

Module IV: Seed Testing **15 hours**

4.1. Seed production technology; seed testing- Procedures of seed testing, seed testing laboratories and importance of seed testing
4.2. Seed certification- History, Seed certification agency, Indian minimum, general and specific seed certification standard.
4.3. Seed banks- National, International and Millennium seed banks.

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5. Reference Books

1. Agrawal, P. K. 1993. Hand Book of Seed Technology. Dept. of Agriculture and Cooperation. National Seed Corporation Ltd., New Delhi.
2. Balasubramanian, D., C. F. A. Bryce, K. Dharmalingam, J. Green and K. Jayaraman. 2004. Biotechnology. Universities Press (India) Private Limited, Hyderabad.
3. Bedell, Y. E. Seed Science and Technology. Indian Forest Species. Allied Publishers Limited. New Delhi.
4. Channarayappa. 2007. Molecular Biotechnology – Principles and Practices. Universities Press (India) Private Limited, Hyderabad. Chawala, H. S. 2002.
5. Introduction to Plant Biotechnology. Oxford & IBH Publishing Company, New Delhi.
6. Dubey, R. C. 2001. A Textbook of Biotechnology. S. Chand & Company Ltd., New Delhi.
7. Edmond, J. B., T. L. Senn, F. S. Adrews and R. J. Halfacre. 1977.
8. Hartman, H. T. and D. E. Kestler. 1976. Plant Propagation: Principles and Practices. Prentice & Hall of India, New Delhi. Jha, T.B. and B. Ghosh. 2005. Plant Tissue Culture – Basic and Applied. Universities Press (India) Private Limited, Hyderabad.
9. Ramawat, K. G. 2008. Plant Biotechnology. S. Chand & Company Ltd., New Delhi.
10. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth, Thomson Learning Inc., USA.
11. Tiwari, G. N. and R. K. Goal. Green House Technology – Fundamentals, Design, Modelling and Application. Narosa Publishing House, New Delhi.
12. Tunwar, N. S. and S. V. Singh. 1988. Indian Minimum Seed Certification Standards. The Central Seed Certification Board, Govt. of India, New Delhi.

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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
National needs	Seed technology gives the understanding about the quality seeds, through certified seed facility enabling modern agricultural practices like climate smart agriculture and mitigating climate change impacts

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	Students can understand the betterment about the Seed harvest technology
	Module IV	Students can able to develop the skills in the seed testing methodologies

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7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative Learning	• Presentations and Group discussions
2.	Experiential Learning	• Performing minor experiments to check the seed quality (viability). • Field Trips to seed testing & certification laboratories.
3.	Problem solving	• Research Projects • Reviewing research articles on seed technology

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 / Assignment	

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b) Model Question Paper – End Semester Exam Theory

SEED TECHNOLOGY

Course Code: U24/ BOT/ DSE/502 **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)

Answer ALL questions: **Marks: 4 x 10 – 40**

1. List the causes and methods of breaking of seed dormancy.

OR

2. Elaborate on biochemical changes that occur during seed storage.

3. Describe the culture practices and harvesting of maize.

OR

4. Explain general account on seed treatment to control seed-borne diseases.

5. List the various principals of hybrid seed production.

OR

6. Describe the various methods of collection and storage of pollen.

7. Assess the procedures for seed testing and add a note on its importance.

OR

8. What is seed certification? Explain the Indian seed certification standards.

Section B (Short Essay Type)

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

9. What is Seed viability?
10. List in brief the cultural practices of Sunflower cultivation
11. Define Heterosis in detail
12. Discover the role of National Seed Bank
13. Compare Orthodox and Recalcitrant seeds.
14. Describe the Role of pollinators.

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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	List the causes and methods of breaking of seed dormancy.	CO 1	Level I, IV
2	Module 1	Elaborate on biochemical changes that occur during seed storage.	CO 1	Level VI
3	Module 2	Describe the culture practices and harvesting of maize.	CO 2	Level I, II
4	Module 2	Explain general account on seed treatment to control seed-borne diseases.	CO 2	Level II
5	Module 3	List the various principals of hybrid seed production.	CO 3	Level I, IV
6	Module 3	Describe the various methods of collection and storage of pollen.	CO 3	Level I, II
7	Module 4	Assess the procedures for seed testing and add a note on its importance.	CO 4	Level V
8	Module 4	What is seed certification? Explain the Indian seed certification standards.	CO 4	Level I, II
SECTION B - ANSWER ANY 4 OUT OF 6 (To compulsorily have ONE question from each module)				4Q X 5 M = 20 M
9	Module 1	What is Seed viability?	CO 1	Level I
10	Module 2	List in brief the cultural practices of Sunflower cultivation	CO 2	Level I, IV
11	Module 3	Define Heterosis in detail	CO 3	Level I
12	Module 4	Discover the role of National Seed Bank	CO 4	Level IV
13	Module 1	Compare Orthodox and Recalcitrant seeds.	CO 1	Level IV
14	Module 3	Describe the Role of pollinators.	CO 3	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, 6	Understanding	15
2	1, 5, 6	Applying	15
3	1, 5, 6	Understanding	15
4	1, 5, 6	Understanding	15

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SEED TECHNOLOGY

Practical Syllabus

1. Course Description

Programme:	**B. Sc**	**Max. Hours:**	**30**
Course Code:	**U24/ BOT/ DSE/502**	**Hours per week:**	**2**
Type of Course:	**DSE - 2**	**Max. Marks:**	**50**
No. of Credits:	**1**		

2. Course Objectives

1. To test the seed quality by following some experimental procedures.
2. To describe the method of hybrid seed production along with basic knowledge of palynology and embryology.

3. Course Outcomes

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

CO 1: Examine the seed quality & viability by using experimental methods
CO 2: Demonstrate the concept of seed dressing using biofertilizers and fungicides.
CO 3: demonstrate the experiments related to palynology and embryology.

4. Course Content

Major Experiments

1. Testing of seed viability using 2,3,5-triphenyl tetrazolium chloride (TTC)
2. Estimation of amylase activity of germinating seeds (Qualitative)
3. Demonstration of seed dressing of using fungicides to control plant diseases.
4. Demonstration of seed dressing using Biofertilizers (BGA) to each nutrient supply

Minor Experiments

1. Emasculation, bagging of flower for hybrid seed production.
2. Dissection of Dicot embryo (bean) and Monocot embryo (maize).
3. Pollen viability test using Evan's blue staining. (*Hibiscus*).
4. Harvesting and Importance of following seeds: Rice, Maize, Cotton, Groundnut and sunflower.
5. Types of ovules: Orthotropous, Anatropous and campylotropous.
6. Structure of pollen grains: Hibiscus and grass
7. Study visits to research institutes, seed tests and certification laboratories and places seed banks.

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5. Model Question Paper – End Semester Exam Practical

SEED TECHNOLOGY

Course Code: U24/ BOT/ DSE/502/P

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

Q I. Conduct the experiment allotted to you **'A'**. Give the procedure, results and inference. Scheme for valuation: (Procedure – 2, experimentation – 4, observation – 2, inference – 2)
10 Marks

Q II. Describe the procedure for the experiment **'B'**. Give the procedure, results and inference. Scheme for valuation: (Procedure – 2, experimentation – 2, observation & inference – 1)
5 Marks

Q III. Identify, classify giving reasons with suitable diagrams of the given specimens **E, F, G, H, I, J.** Scheme for valuation: Identification-1 mark; Notes mark for each spotter.
5 x 3 – 15 Marks

Q IV. Project. **10 Marks**

Q V. Viva-voce **5 Marks**
Q VI. Record **5 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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ST.FRANCIS DEGREE COLLEGE FOR WOMEN BEGUMPET
HYDERABAD-500016
(AN AUTONOMOUS COLLEGE OF OSMANIA UNIVERSITY)
DEPARTMENT OF NUTRITION

DSE-I	THERAPEUTIC NUTRITION SEMESTER- V	60 HRS
Module 1 - Diet therapy and nutritional care in energy imbalance **Module 2 -Nutritional care in Gastro-intestinal disorders, Diabetes and Febrile conditions** **Module 3 - Nutritional care in Cardio-vascular diseases, Liver disorders** **Module 4 - Nutritional care in Renal disorders**		

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

SEMESTER – V
THERAPEUTIC NUTRITION

1. **Course Description:**

Programme : B.Sc.
Course Code : U24/NUT/DSE/501
Course Type : DSE – 1
No. of credits : 4

Max. Hours : 60
Hours per week : 4
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 energy imbalance.
CO 2: To determine the etiology, risk factors, clinical features and dietary management of various gastrointestinal disorders and diabetes.
CO 3: Acquire knowledge with respect to the physiology and the dietary intervention in cardiac and liver disorders.
CO 4: Emphasis on nutrition modification in critical conditions such as renal failure and dialysis.

4. Course Content :

MODULE I: DIET THERAPY AND NUTRITIONAL CARE IN ENERGY IMBALANCE **(15 Hrs)**

1.1. Introduction to Dietetics: Principles of Diet Therapy, Therapeutic modification of normal diets, Types of Hospital Diets- Clear-fluid, full fluid and soft diet.
1.2. Obesity: definition, types, etiology, assessment, complications, Management of Obesity- Exercise, Diet, Behaviour modification, Pharmacotherapy and Surgery.
1.3. Underweight: Etiology, Complications, Dietary Modifications

MODULE II: NUTRITIONAL CARE IN GASTRO-INTESTINAL DISORDERS, DIABETES AND FEBRILE CONDITIONS **(15 Hrs)**

2.1. Gastro-intestinal Disorders: Etiology, Symptoms, Diagnosis, Treatment and dietary management of Peptic Ulcer, Diarrhea, Constipation.
2.2. Diabetes Mellitus: Types, Etiology, Symptoms, Diagnosis, Complications, Treatment –Exercise, Hypoglycemic drugs, Insulin and Diet, Dietary Management- Glycemic Index and Food Exchange List.
2.3. Febrile Conditions: Metabolic changes in Fever, Types- Short Duration-Typhoid, Long Duration-Tuberculosis, and Dietary Management.

MODULE III: NUTRITIONAL CARE IN CARDIO-VASCULAR DISEASES, LIVER DISORDERS **(15 Hrs)**

3.1. Cardio-Vascular Diseases: Atherosclerosis-Relationship between dietary fat and development of cardiovascular diseases, Risk Factors and Dietary Management. Hypertension- Types, Causes, Symptoms and dietary management of Hypertension.
3.2. Liver Disorders: Functions of Liver, Liver function tests, agents responsible for liver damage, Jaundice, Non-alcoholic fatty liver disease (NAFLD), Hepatitis.
3.3. Cirrhosis and Hepatic Coma: Causes, symptoms, Dietary management.

MODULE IV: NUTRITIONAL CARE IN RENAL DISORDERS **(15 Hrs)**

4.1. Nephrosis and Nephritis: Functions of kidneys, Renal function tests, Causes, symptoms, Dietary management.
4.2. Chronic kidney Disease and Renal Calculi: Causes, types and Dietary management.
4.3. Dialysis: Types- peritoneal and hemodialysis and Dietary management.

5. Reference Books:

1. Krause M, Kathleen. L Mahan and Sylvia Escott Stump, 2004, Food Nutrition and Diet Therapy, 11th Edition, W.B Saunders Co, Philadelphia,
2. Bamji, M. S., Krishnaswamy, K., & Brahmam, G. N. V. (Eds.). (2013). Textbook of human nutrition. Oxford & IBH.
3. Srilakshmi, B. (2007). Dietetics. New Age International.
4. Zimmermann, M. (2001). Burgerstein's Handbook of nutrition: micronutrients in the prevention and therapy of disease.
5. Nnakwe, N. (2012). Community nutrition: planning health promotion and disease prevention. Jones & Bartlett Publishers.
6. Principles of therapeutic nutrition and dietetics, Avantina Sharma
7. Text book of Human Nutrition, Anjana Agarwal, Shoba A Udipi , 2013
8. Applied Nutrition and Dietetics, M. Amala Seeli et.al, 2023
9. Clinical Nutrition and Dietetics Manual for Nurses, Supriya VO, 2017
10. Therapeutic Nutrition, Neelam Kumari Singh

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	Written examination
CO2	CIA-1	
C03	CIA-2 Presentation/ case study presentation	
C04	CIA-2 Quiz (Crossword puzzles)/ MCQ/ fill in the blanks	

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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	What is Parenteral Nutrition? Explain in detail about it.	CO 1	I, IV&V
2	Module 1	Explain the etiology, complications and dietary modifications in a patient with underweight.	CO 1	V
3	Module 2	Define Diabetes Mellitus and Discuss the types, etiology, diagnosis and dietary management.	CO 2	I&II
4	Module 2	Explain the metabolic changes in fevers. Discuss Tuberculosis its symptoms and role of diet in its treatment.	CO 2	II &V
5	Module 3	Explain the functions of the liver. Write about the causes, symptoms and the role of dietary management of infective hepatitis.	CO 3	I&V
6	Module 3	Explain the types, causes, symptoms, and dietary management of Hypertension.	CO 3	V
7	Module 4	Explain the types, causes, symptoms, and dietary management of Nephrosis.	CO 4	V
8	Module 4	What is cancer? Explain the etiology, symptoms, and dietary management in cancer.	CO 4	IV
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	Make a note on Obesity	CO 1	III
12	Module 2	Explain Constipation	CO 2	V
13	Module 3	Make a note Typhoid	CO 3	III
14	Module 4	Make a note on NAFLD	CO 4	III
16	Module 4	What are Functional foods	CO 4	I
17	Module 4	Explain Dialysis	CO 4	V

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THERAPEUTIC NUTRITION
PRACTICAL

Programme : B.Sc.
Course Code:U24/NUT/DSE/501/P
Course Type: DSE-1
No. of credits : 1

Max.Hours :30
Hours per week: 3
Max.Marks:50

Course Objectives:

- Plan therapeutic diets using Dietary Prescription.
- Gain Knowledge about hospital diets and develop skills in menu planning and preparation of diets for various diseases.

Course Outcomes:

- To apply the concepts of therapeutic condition to plan and calculate the Nutritive value.
- To create and prepare a menu based on various conditions/disorders.

Practical Sessions

Menu planning , Prescription and preparation of the following

1. Hospital Diets – Clear Fluid Diet, Full Liquid Diet, Soft Diet and Normal Diet.
2. Low calorie Diet – Obesity
3. Diet for Diabetes Mellitus – NIDDM
4. Diet for Diseases in GI Disorders
   a. Peptic Ulcer (low fibre and bland diet)
5. Diet for Cardio –vascular diseases
   a. Atherosclerosis
   b. Hypertension
6. Diet for Liver disorders
   a. Hepatitis
7. Kidney Disorders
   a. Chronic Kidney Disease (CKD)

THERAPEUTIC NUTRITION
MODEL QUESTION PAPER
PRACTICAL

Course Code: UG/NUT/DSC/501/P **Marks:50**
No. of credits : 1 **Time: 2 Hrs**

Answer the following

1. Plan a therapeutic diet for the condition (A, B,C).	**15 M**
A. Chronic Kidney Disease (1800 kcal)	
B. Peptic ulcer (1800 kcal)	
C. Diabetes (1600 kcal)	
Calculate the dietary prescription and write the nutrient requirement for the given condition	5 M
Menu for the day	10 M
2. Calculate the nutritive value for the planned diet -	**15 M**
a) Calculations	10 M
b) Grand total table, discussion and result	5 M
3. Prepare and display Lunch/ Dinner	15 M
4. 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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