

SEMESTER I

ENVIRONMENTAL STUDIES

1. Course Description

Program: BSC

Max. Hours: 30

Course Code: U24/EVS/AECC/101

Hours per week: 2

Course Type: AECC

Max. Marks: 50

No. of credits: 2

2. Course Objectives:

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

3. Course Outcomes:

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

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

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

3

DEPARTMENT OF ENVIRONMENTAL STUDIES
 CHAIR PERSON B.O.
 Environmental Science
 University College of Science
 Osmania University
 Hyderabad-500 007.

ST. FRANCIS COLLEGE FOR WOMEN, HYDERABAD

Johnalakshmi
 Dept. of Environmental Studies
 St. Francis College for Women
 (Autonomous)
 Begumpet, Hyderabad-16

4. COURSE CONTENT

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

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

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

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

Field visit:

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

5. REFERENCES:

Books:

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

Magazines:

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

E-Resources:

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

6. Syllabus Focus

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

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

b) Components on Skill Development/Entrepreneurship Development/Employability

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

7. Pedagogy

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

8. Course Assessment Plan**a) Weightage of Marks in Internal Assessments and End Semester Examination**

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

b) Model Question Paper- End Semester Exam

ENVIRONMENTAL STUDIES

Course Code: U24/EVS/AECC/101

Time: 1 Hour

Max. Marks: 30

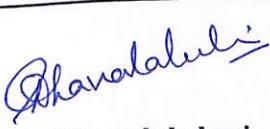
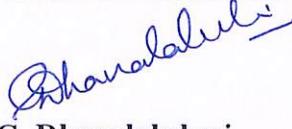
Answer any five of the following:

5X6=30

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

c) Question Paper Blueprint

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

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

SEMESTER II

ENVIRONMENTAL STUDIES

6. Course Description

Program: BA, BMS & BCOM

Max. Hours: 30

Course Code: U24/EVS/AECC/201

Hours per week: 2

Course Type: AECC

Max. Marks: 50

No. of credits: 2

7. Course Objectives:

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

8. Course Outcomes:

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

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

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

9. COURSE CONTENT

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

1. Definition, Scope & Importance of Environmental Studies
2. Structure of Ecosystem – Abiotic & Biotic Components, Ecological Pyramids
3. Definition of Biodiversity, Genetic, Species & Ecosystem Diversity, IUCN Red list, Hotspots of Biodiversity, Threats and Conservation of Biodiversity (*Insitu & Exsitu*)
4. Renewable Energy Resources – Solar, Wind and Biomass
5. Water Conservation, Water Footprint, Rain Water Harvesting
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UNIT – II: Environmental Pollution, Global Issues & Legislation (15 hrs.)

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

Field visit:

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

b) Components on Skill Development/Entrepreneurship Development/Employability

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

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiential learning	Field trips, Documentary watching, Demonstrations, Student volunteering days, Plantation drives, Clean up drives
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3.	Problem Solving	Case Studies, Projects

8. Course Assessment Plan

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

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

b) Model Question Paper- End Semester Exam

ENVIRONMENTAL STUDIES

Course Code: U24/EVS/AECC/201

Time: 1 Hour

Max. Marks: 30

Answer any five of the following:

5X6=30

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

c) Question Paper Blueprint

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

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

SEMESTER - II

ARCHEGONIATAE AND PALAEOBOTANY

1. Course Description

Program:	B. Sc	Max. Hours:	60
Course Code:	U24/ BOT/ DSC/201	Hours per week:	4
Type of Course:	DSC-2	Max. Marks:	60
No. of Credits:	4		

2. Course Objectives

1. Discuss the morphology, structure and importance of the lower plants.
2. Review the meaning of scientific terms.

3. Course Outcomes

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

- CO1: Assess the key characteristics, life cycles, structure, and reproduction of selected classes of bryophytes and trace the evolution of sporophyte.
- CO2: Classify pteridophytes according to their distinguishing characteristics, and trace their evolutionary history.
- CO3: Examine gymnosperm morphology, anatomy, and reproduction and discuss their economic significance.
- CO4: Describe the different types of fossils, the geological time scale, and discuss the relevance of fossil pteridophytes & gymnosperms.

4. Course content**Module I: Bryophytes 14 Hours**

- 1.1 General Account: Origin of bryophytes; Amphibian nature, Classification up to class with diagnostic characters and examples, Range of thallus.
- 1.2 Morphology and Life-cycles of the following: *Marchantia*, *Anthoceros*, *Polytrichum*.
- 1.3 Phylogeny: Origin of Alternation of Generations (Homologous and Antithetic theory) Evolution of Sporophytes (Progressive and Regressive concept).

Module II: Pteridophytes 18 Hours

- 2.1 General Account: Colonization and rise of early land plants.
- 2.2 Classification of vascular plants up to division with diagnostic characters and examples. Morphology and Life-cycles of the following: *Lycopodium*, *Equisetum* & *Marsilea*
- 2.3 Evolutionary trends – Heterospory and Origin of Seed habit. Stelar evolution. Telome concept and its significance in the origin of different groups of Pteridophytes.

Module III: Gymnosperms**14 Hours**

3.1 Classification of Gymnosperms: General characteristics, classification (up to family).

3.2 Morphology and Life-cycles of the following: *Pinus* and *Gnetum*

3.3 Ecological and economic importance.

Module IV: Palaeobotany**14 Hours**

4.1 Fossil formation and types of fossils, Importance of fossil study. Geological time scale with dominant plant groups through ages.

4.2 Fossil Pteridophytes: Structural features, Geological distribution and evolutionary significance of *Rhynia*.

4.3 General account of Bennettitales (Williamsoniaceae and Cycadeoidaceae).

Sushma

Mayoba, Nimm

A. Sarita Rani

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B. A. N.

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5. Reference Books

1. Watson, E. V. 1974. *The structure and life of Bryophytes*, B. I. Publications, New Delhi.
2. Pandey, B. P. 2006. *College Botany, Vol. II: Pteridophyta, Gymnosperms and Paleobotany*. S. Chand & Company Ltd, New Delhi.
3. Srivastava. H.N., 1993. *Introductory Botany Vol II*. Pradeep Publications, Jalandhar.
4. Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. *Botany - Pteridophyta (Vascular Cryptogams)*. Chand & Company Ltd, New Delhi.
5. Singh, V., Pande, P.C and Jain, K. 2008. *Diversity of Microbes and Cryptogams (4thEd.)*, Rastogi Publications, Meerut.
6. Pandey, B. P. 2001. *College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta*. S. Chand & Company Ltd, New Delhi.
7. Pandey, B. P. 2007. *Botany for Degree Students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics*. S. Chand & Company Ltd, New Delhi.
8. Vashishta, B. R., A. K. Sinha and Adarsha Kumar. 2008. *Botany for Degree Students: Bryophyta*. S. Chand & Company Ltd, New Delhi.
9. Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. *Botany for Degree Students: Gymnosperms*. Chand & Company Ltd, New Delhi.
10. Shukla A.C and S.P Misra, 1975. *Essentials of Paleobotany*, Vikas Publishing House Pvt.Ltd., Delhi
11. Taylor T N, 1981. *Paleobotany: An Introduction to Fossil Plant Biology*. Ms. Graw Hill, New York.

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Sushma

M. S. R.

A. Sabitha Rao
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HYDERABAD-500 007

6. Syllabus Focus

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

Local /Regional/National /Global Development Needs	Relevance
Global Development Needs	<p>Archegoniates have wide range of ecological and economic value - for example</p> <ul style="list-style-type: none"> • Bryophytes - bioindicators of heavy metals in air pollution, material for seed beds, fuel, food, medicine, pesticides, nitrogen fixation, waste treatment etc • Pteridophytes - food, shelter, medicine, biofertilizers, horticulture value etc. • Gymnosperms - food, commercial wood, oil, medicine etc.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Module I: Bryophytes	Identification of few bryophytes based on morphological and anatomical characters (by observing slides and specimens)
	Module II: Pteridophytes	Identification of few pteridophytes based on morphological and anatomical characters (by observing slides, specimens and by taking anatomical sections)
	Module III: Gymnosperms	Identification of few gymnosperms based on morphological and anatomical characters (by observing slides, specimens and by taking anatomical sections)

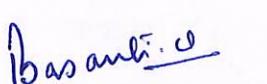
Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative Learning	Presentations and Group discussions
2.	Experiential Learning	Field Trips to research organizations / Botanical gardens
3.	Problem solving	Research Projects

8. Course Assessment Plan

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

CO	Continuous Internal Assessments CIA - 40%	End Semester Examination- 60%
CO1	CIA 2 – Test 1: MCQ's, Quiz test or subjective	
CO2		
CO3	CIA 1 - Subjective	Written Exam
CO4	CIA 2 – Test 2: MCQ's or Presentation	



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b) Model Question Paper – End Semester Exam Theory

ARCHEGONIATAE AND PALAEOBOTANY

Course Code: U24/ BOT/ DSC/201

MAX MARKS: 60

Credits: 4

TIME: 2 hours

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

SECTION – A (Long Essay Type)

Answer ALL questions:

Marks: 4 x 10 - 40

1. Describe the structure of the Sporophyte of *Marchantia*.
OR
2. Explain the process of evolution of Sporophyte in Bryophytes.
3. Describe the internal structure of an *Equisetum* stem.
OR
4. Explain the internal structure of *Marsilea* sporocarp.
5. Describe the morphology and anatomy of *Pinus* needle. Comment on its Xeric nature.
OR
6. Describe the primary structure and secondary growth in *Gnetum* stem.
7. What are fossils? Explain the types and process of fossil formation
OR
8. Outline the characteristic features of Bennettitales.

SECTION –B (Short Essay Type)

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

Marks: 4 x 5 - 20

9. Explain the internal structure of *Anthoceros* thallus.
10. Describe the Strobilus of *Lycopodium*
11. Describe *Pinus* female cone.
12. Explain the methods of Compressions and petrifactions
13. Illustrate with examples on the Endangered gymnosperms.
14. Describe the Stelar Evolution.

Sathare *Megha* *Parmar*

A. Sabitha Rehman

SECTION A - INTERNAL CHOICE			4Q X 10 M = 40 M	
Question Number	Question	Question	CO	BTL (Blooms Taxonomy Level)
1	Module 1	Describe the structure of the Sporophyte of <i>Marchantia</i> .	CO 1	Level I
2	Module 1	Explain the process of evolution of Sporophyte in Bryophytes.	CO 1	Level II
3	Module 2	Describe the internal structure of an <i>Equisetum</i> stem.	CO 2	Level I
4	Module 2	Explain the internal structure of <i>Marsilea</i> sporocarp.	CO 2	Level II
5	Module 3	Describe the morphology and anatomy of <i>Pinus</i> needle. Comment on its Xeric nature.	CO 3	Level I
6	Module 3	Describe the primary structure and secondary growth in <i>Gnetum</i> stem.	CO 3	Level I
7	Module 4	What are fossils? Explain the types and process of fossil formation	CO 4	Level I , Level II
8	Module 4	Outline the characteristic features of Benettitales	CO 4	Level II

SECTION B - ANSWER ANY 4 OUT OF 6

4Q X 5 M = 20 M

(To compulsorily have ONE question from each module)

9	Module 1	Explain the internal structure of <i>Anthoceros</i> thallus.	CO 1	Level II
10	Module 2	Describe the Strobilus of <i>Lycopodium</i> .	CO 2	Level I
11	Module 3	Describe <i>Pinus</i> female cone.	CO 3	Level I
12	Module 4	Explain the methods of Compressions and petrifactions	CO 4	Level II
13	Module 3	Illustrate with examples on the Endangered gymnosperms.	CO 3	Level II
14	Module 2	Describe the Stelar Evolution.	CO 2	Level I

Basant D
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St. Francis College,
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Sushmae

Megha
Mamta

A. Sabitha Par
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HYDERABAD UNIVERSITY
HYDERABAD-500 007

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	14	CO 1	2	10 each	1	5
2	18	CO 2	2	10	1	5
3	14	CO 3	2	10	1	5
4	14	CO 4	2	10	1	5

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions (hrs)
1	1, 5	Evaluate	14
2	1, 2, 5	Analysing	18
3	1, 5, 7	Analysing	14
4	1, 2, 3, 5, 7, 8	Understanding	14



 Sugathne Meenal Hemalatha A. Saritha Rao



 Basanti

Head of the Department
 St. Francis College,
 Begumpet.

CHAIRPERSON
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 OSMANIA UNIVERSITY
 HYDERABAD-500 007

ARCHEGONIATAE AND PALAEOBOTANY

Practical Syllabus

1. Course Description

Programme:	B. Sc	Max. Hours:	30
Course Code:	U24/ BOT/ DSC/201/P	Hours per week:	2
Type of Course:	DSC-2	Max. Marks:	50
No. of Credits:	1		

2. Course Objectives

1. To develop critical understanding of the morphology and anatomy of archegoniate.
2. To acquire knowledge on few fossil plants.

3. Course Outcomes

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

CO 1: Examine the morphology, anatomy, reproduction and life cycle of Bryophyte types mentioned in the syllabus

CO 2: Examine the morphology, anatomy, reproduction and life cycle of Pteridophyte types mentioned in the syllabus

CO 3: Examine the morphology, anatomy, reproduction and life cycle of Gymnosperm types mentioned in the syllabus

CO 4: Devise Techniques to Preserve and Study Plant Materials

4. Course Content

1. Study of Morphology (vegetative and reproductive structures) and anatomy of the following Bryophytes: *Marchantia*, *Anthoceros* & *Polytrichum*.
2. Study of Morphology (vegetative and reproductive structures) and anatomy of the following Pteridophytes: *Lycopodium*, *Equisetum* and *Marsilea*.
3. Study of Anatomical features of *Lycopodium* stem, *Equisetum* stem and *Marsilea* petiole & rhizome by preparing double-stained permanent mount.
4. Study of Morphology (vegetative and reproductive structures) of the following taxa: Gymnosperms: *Pinus* and *Gnetum*
5. Study of Anatomical features of *Pinus* needle and *Gnetum* stem by preparing double-stained permanent mount.
6. Fossil forms using permanent slides / photographs: *Rhynia* and *Cycadeoidea*.
7. Brief study of the fossil deposits in India, Important Indian Paleobotanical Institutes and Contributions of Indian Paleobotanists - Birbal Sahni.

5. Model Question Paper – End Semester Exam Practical

ARCHEGONIATAE AND PALAEOBOTANY

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

Time: 2 Hours

Maximum Marks: 50 Marks

QI. Prepare a single stain or double stain mount of the transverse section of the given material 'A'. Identify, classify, draw and describe the same.

Scheme for valuation: (slide preparation- 3; stains used-1; classification- 1; diagram-3; description -4
12 marks

QII. Identify the fossil 'B' and describe with the help of a diagram.

Scheme for valuation: (Identification-1; diagram-2; description-2) 5 marks

QIII. Identify, classify giving reasons with suitable diagrams of the given

Specimens and slides. **C, D, E, F, G, H** 6 x 3 – 18 marks

QIV. Seminar topic on study of the fossil deposits in India, Important Indian Paleobotanical Institutes and Contributions of Indian Paleobotanists-Birbal Sahni or Project. 10 marks

QV. Record. 5 marks

Prepared by	Checked & verified by	Approved by
<p><i>Basanti Ch</i> Dr. Basanti Chintapalli Teaching faculty</p>	<p><i>Basanti Ch</i> Dr. Basanti Chintapalli HoD</p>	 Dr. Uma Joseph Principal

Basanti Ch
Head of the Dept.
St. Francis College,
Begumpet.

Sushma

Megha

Janardhan

A. Sathish Reddy
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OSMANIA UNIVERSITY
HYDERABAD-500 007

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

DEPARTMENT OF CHEMISTRY

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

Module 1: Inorganic Chemistry

p-block elements

Interhalogen Compounds

Chemistry of Zero group elements

Boranes and Carboranes

Metal carbonyls

Module 2: Physical Chemistry

Electrochemistry

Module 3: Organic Chemistry

Aromatic Hydrocarbons

Halogen compounds

Alcohols, Phenols, Ethers

Module 4: General Chemistry

Solutions

Symmetry of molecules

Stereochemistry of Carbon Compounds

CHEMISTRY - II

Course Description

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

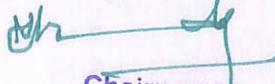
Course Code: U24/CHE/DSC/201 Hours per week: 4 Hrs

Course Type: DSC-2 Max. Marks: 100

No. of credits: 4

Course Objectives

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


Chairperson
Board of Studies in Chemistry
Dept of Chemistry
Osmania University, Hyd-07.

process.

- To learn the methods of preparation and reactivity of hydrocarbons with mechanisms and to classify and identify organic molecules by their functional groups.
- To learn the structures of basic organic molecules, the types of reactions they undergo and their stereochemistry and to foster acquisition of knowledge on the concepts of solutions.

Course Outcomes

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

CO1: Acquire knowledge on p-block elements.

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

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

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

Course Content

MODULE I: Inorganic Chemistry

(15 Hrs)

p-block elements

(10 Hrs)

General Characteristics of p block elements.

Group – 13: Synthesis and structure of diborane and higher Boranes (B₂H₆ and B₂H₁₀) Preparation and structure of boron-nitrogen compounds (B₂NH₃ and BN), Lewis acid nature of the BX₃.

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

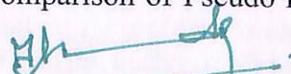
Group – 15: Preparation, structure and reactions of hydrazine, hydroxylamine, Phosphazenes
Group – 16: Classifications of oxides based on (i) Chemical behavior and (ii) Oxygen content. Normal: acid, basic, amphoteric and neutral, Mixed oxides, Sub oxides, Peroxides, Super oxides.

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

Interhalogen Compounds

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

Chemistry of Zero group elements



Chairperson
Board of Studies in Chemistry
Dept of Chemistry
Osmania University, Hyd-07.

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

Boranes and Carboranes

(2 Hrs)

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

Metal carbonyls

(3 Hrs)

Preparation and properties of $\text{Ni}(\text{CO})_4$. Structural features of $\text{Ni}(\text{CO})_4$, $\text{Fe}(\text{CO})_5$, $\text{Fe}_2(\text{CO})_9$, $\text{Fe}_3(\text{CO})_{12}$ and $\text{Cr}(\text{CO})_6$.-18 valence electron rule.

MODULE II: Physical Chemistry

(15 Hrs)

Electrochemistry

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

MODULE III: Organic Chemistry

(15 Hrs)

Aromatic Hydrocarbons

(6 Hrs)

Concept of aromaticity –definition, Huckel's rule – application to Benzenoids and Non – Benzenoids (cyclopropenyl cation, cyclopentadienyl anion and tropylidium cation).

Preparations: From acetylene, phenols, benzene carboxylic acids and sulphonic acids

Reactions - General mechanism of electrophilic substitution, mechanism of nitration, sulphonation, and halogenation, Friedel Craft's alkylation and acylation. Orientation of aromatic substitution - Definition of ortho, para, and meta directing groups. Ring activating and deactivating groups with examples. Orientation – (i) activating groups: Amino, methoxy and alkyl groups. (ii) Deactivating groups - carboxyl, nitro, nitrile, carbonyl and sulphonic acid & halo groups.

Halogen compounds

(4 Hrs)

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

Alcohols, Phenols, Ethers

(5 Hrs)

Alcohols: Preparation of 1-, 2- and 3- alcohols using Grignard reagent, Ester hydrolysis, Reduction of aldehydes, ketones, carboxylic acid and esters. Reactions: With sodium, HX (Lucas test), esterification (mechanism), oxidation (with PCC, alk. KMnO_4 , acidic dichromate, conc. HNO_3). Oppenauer oxidation

Diols: oxidation of diols, Pinacol – Pinacolone rearrangement.

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

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

MODULE IV: General Chemistry

(15 Hrs)

Solutions

(6 Hrs)

Liquid- liquid mixtures – ideal liquid mixtures, Raoult's and Henry's law. Non – ideal systems. Azeotropes: $\text{HCl}-\text{H}_2\text{O}$, ethanol – water systems. Fractional distillation. Partially miscible liquids – phenol – water, trimethyl amine – water system, Nicotine - water

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

Symmetry of molecules (3 Hrs)

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

Stereochemistry of Carbon Compounds (6 Hrs)

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

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

DSC-II	NUTRITION FOR THE FAMILY	60 HRS
SEMESTER- II		

Module 1 - Balanced Diet and Meal Planning
Module 2 - Pregnancy, Lactation and Infancy
Module 3 - Preschoolers, School Going Children
Module 4 - Adolescence and Geriatrics

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

SEMESTER-I**NUTRITION FOR THE FAMILY****1. Course Description**

Programme: B.Sc

Course Code: U24/NUT/DSC/102

Course Type: DSC -2

No. of credits: 4

Max. Hours: 60

Hours per week: 4

Max. Marks: 100

2. Course Objectives

- To gain knowledge about the nutritional requirements and the basics of meal planning for various physiological age groups
- To apply the principles and nutrition guidelines in meal planning in different stages of life cycle.

3. Course Outcomes

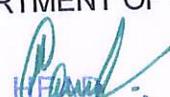
On completion of the course the student will be able to:

CO 1: Understand the importance of a balanced diet, meal planning and nutritional requirements of adults.

CO 2: Understand and remember the different physiological changes during pregnancy, lactation and infancy.

CO 3: Understand the effect of nutrition on the growth and development of children

CO 4: Apply the guidelines and modifications of the diet during adolescence and old age period.



4. Course Content

MODULE I: BALANCED DIET AND MEAL PLANNING

(15 Hrs)

1.1. Balanced Diet: Definition, Benefits, Nutrient requirement, recommended dietary allowances (RDA), Basic four food groups, Food Exchange List, Food pyramid.

1.2. Meal planning: Definition, Principles in meal planning, Points to be considered in planning a diet. Steps involved in planning a diet. Low Cost balanced diet.

1.3. Nutritional requirements of Adults: RDA, Reference Man and Reference Woman. Nutritional and food requirements for an Adult man and woman according to Occupation.

MODULE II: PREGNANCY, LACTATION AND INFANCY

(15 Hrs)

2.1. Pregnancy: Physiological stages during pregnancy, Preconception nutrition status, Nutritional requirements, Dietary Guidelines, General Dietary problems, and complications during pregnancy.

2.2. Lactation: Physiology of lactation, Nutritional requirements during lactation, Dietary guidelines.

2.3. Infancy: Growth and development during infancy, Nutritional requirements during infancy, advantages of Human milk over bottle feeding, Artificial Feeding, Weaning foods

MODULE III: PRESCHOOLERS, SCHOOL GOING CHILDREN

(15 Hrs)

3.1. Pre- School Children: Milestones and growth chart, Nutritional requirements, factors to be considered while planning diets for preschoolers, dietary guidelines, Problems faced during feeding a preschooler.

3.2. School going children: Nutritional requirements, food requirements, Packed lunch, factors to be considered while planning a packed lunch for school going children, Problems in feeding school going children.

3.3. School Lunch Programmes: Objectives of feeding programmes. Intervention programmes in India, Mid - day meal programme, special nutrition programme, ICDS etc.

MODULE IV: ADOLESCENCE AND GERIATRICS

(15 Hrs)

4.1 Adolescence: Role of hormones on growth and development, sequence of developmental changes, nutritional requirements during adolescence, challenges in adolescence, weight control, skipping meals, anorexia, fast foods.

4.2 Geriatrics: Physiological changes during ageing Changes in organ function with ageing, nutritional requirements and dietary modifications. Dietary guidelines.

4.3 Common diseases affecting geriatric: Osteoporosis, obesity, constipation, malnutrition

5. References

1. Dietetics (sixth edition) B. Srilakshmi, New Age publishers.
2. Human Nutrition and Diet, M. Swaminathan, fifth edition, 2008.
3. Nutrition and dietetics, Shubhangini A. Joshi, 2012, (8th reprint).
4. Fundamentals of foods and nutrition, Sumathi R. Mudambi, 4* edition, 1990.
5. Human Nutrition second edition B. Srilakshmi, New Age publishers.
6. Nutrition - A life cycle approach - Ravinder Chadha, Orient Blackswan pvt.ltd.

6. Syllabus Focus

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

Local/Regional/National /Global Development Needs	Relevance
National needs	The course teaches about nutritional needs and emphasizes on planning a balanced diet for different age groups.

b) Components on Skill Development/Entrepreneurship Development/ Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	1,2,3,4	Students are taught to plan balanced diet for different age groups (infancy - geriatrics)

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-50%	End Semester Examination-50%
CO1	CIA-1	
CO2	CIA-1	
CO3	CIA-2 Breakfast foods	Written Exam
CO4	CIA-2 Quiz/ cross word/MCQ	

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

Question Number	Question	Question	CO	BTL (Blooms Taxonomy Level)
1	Mod1	What is meal planning and its objectives?	CO 1	I
2	Mod 1	Write about the nutritional requirements for adults.	CO 1	II
3	Mod2	Explain the food and nutrient requirements during pregnancy.	CO 2	II
4	Mod 2	What makes breast milk an ideal food for infants?	CO 2	I
5	Mod 3	Describe the various School Lunch Programs.	CO 3	I
6	Mod3	Write in detail about the nutrient requirements and problems faced for a pre-school going child.	CO 3	II
7	Mod4	Explain the term Geriatric nutrition. What are the physiological changes occurring during aging?	CO 4	II
8	Mod 4	Elaborate the nutritional requirements during adolescence. Write a note on food choices and eating habits.	CO 4	VI

SECTION B - ANSWER ANY 4 OUT OF 5**4Q X 5 M= 20 M**(To compulsorily have **ONE** question from **each** module)

9	Module 2	Explain the physiology of Lactation	CO 2	II
10	Module 2	What is weaning foods	CO 2	I
11	Module 1	Discuss the Food Pyramid	CO 1	II
12	Module 1	What is Balanced Diet	CO 1	I
13	Module 3	Define Packed Lunch	CO 3	I
14	Module 4	Explain Osteoporosis	CO 4	I

NUTRITION FOR THE FAMILY PRACTICAL

Programme: B.Sc.

Max.Hours : 30

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

Hours per week: 3

Course Type: DSC 2

Max.Marks: 50

No. of credits: 1

Course Objectives:

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

Course Outcome:

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

- To apply the knowledge of planning diet charts of different age groups
- To understand the different age groups and their nutritional requirements

Practical Sessions

1. Adult man - sedentary
2. Adult woman – sedentary,
3. Pregnant woman- Moderate worker.
4. Lactating mother- Sedentary worker.
5. Preschool child
6. School going
7. Adolescent girl
8. Adolescent boy
9. Geriatrics
10. Planning and preparation of a weaning mixture.

**NUTRITION FOR THE FAMILY
MODEL QUESTION PAPER
PRACTICAL**

Course Code: U24/NUT/DSC/101/P
No. of credits: 1

Marks : 50
Time: 2 Hrs

Answer the following

Answer the following

1. Plan a day's diet for the given age group (A, B,C)	20 M
A.	
B.	
C.	
a. Introduction	05M
b. Write the RDA for the above mentioned age group	05M
c. Menu for the day	10M
2. Calculate the nutritive value for the planned diet	25M
a) Calculations	15 M
b) Grand total table	05 M
c) Result	05 M
3) Record	05 M

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