

SEMESTER-3

	Course	Paper(s)	Nomenclature of Paper	Credits	Hours/ Week	Internal marks	External Marks	Total Marks	Exam Duration
Scheme B & C	CC-3 MCC-4 4 credit	24UN- BOT-301	Gymnosperms & Plant Anatomy	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	4 hrs.
Scheme B & C	MCC-5 4 credit	24UN- BOT-302	Ecology	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	4 hrs.
Scheme A & C	CC-M3 4 credits	From Available CC-M3/MCC-3 of 4 credits as per NEP							
Scheme B only	CC-M3(V) 4 credits	From Available CC-M3(V) of 4 credits as per NEP							
Scheme A, B & C	MDC-3 3 credits	From available pool of Multidisciplinary Courses from a subject of different discipline as per NEP							
Scheme A, B & C	AEC-3 2 credit	From Available AEC-3 of two credits as per NEP							
	SEC-3 3 credit	From Available SEC-3 of three credits as per NEP							
Scheme C only	VAC-3 2 credits	From Available VAC-3 of two credits as per NEP							
Scheme B only	MCC-3	MCC-2 FROM SCHEME C OF FIRST SEMESTER							

Handwritten signatures and initials:
 Mahant Singh
 [Signature]
 [Initials]

Syllabus
Subject: Botany
Third Semester

Part A - Introduction

Subject	BOTANY		
Semester	3rd		
Name of the Course	Gymnosperms and Plant Anatomy		
Course Code	24UN-BOT-301		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VAC)	CC-3/MCC-4		
Level of the course (As per Annexure-I)	100-109		
Pre-requisite for the course (if any)			
Course Learning Outcomes(CLO):	After completing this course, the learner will be able to: 1. Students will gain knowledge of general characteristics of gymnosperms. 2. Students will gain knowledge about comparison between gymnosperms and economic importance. 3. Students will gain an understanding of various kind of tissue system in plants and secondary growth. 4. Students will acquire knowledge about leaf and root, morphology and anatomy. 5*. Students will gain the knowledge of practical aspects of gymnosperms and plant anatomy.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5

THEORY

Max. Marks: 70
Internal Assessment Marks: 20
End Term Exam Marks: 50

Time: 3 Hours

PRACTICAL

Max. Marks: 30
Internal Assessment Marks: 10
End Term Exam Marks: 20

Time: 4 Hours

Part B- Contents of the Course

Instructions for Paper- Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No.1 will be short answer type covering the entire syllabus and will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each unit. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
I	Gymnosperms- General characteristics, classification up to classes (Pelger and Melchior, 1954), Affinities of gymnosperms with Pteridophytes and angiosperms, geological time scale, Economic importance	11



II	Morphology, anatomy and reproduction of Cycas, Pinus (developmental details not to be included).	11
III	Tissues system in Plants: Shoot apical meristems, Meristematic and permanent tissue (Simple, complex and secretory tissue), Tissue system (Epidermal, ground and vascular). Secondary growth: Vascular cambium-structure and function, Primary Structure of monocot stem, Secondary growth in dicot stem, Wood (heartwood and sapwood), Abnormal Secondary growth in <i>Dracaena</i> and <i>Boerhavia</i> .	11
IV	Leaf and protective systems in plants: Types of leaves (Simple and compound), Phyllotaxy, Epidermal appendages and their morphological Types, Anatomy of monocot and dicot leaf, Stomatal apparatus and their morphological types, Leaf abscission, Venation, Function of Leaf. Root system & its modification: Root apical meristem, Structure of monocot and dicot root, Secondary growth in dicot root.	12
V*	1. Morphological study of Cycas and Pinus. 2. Anatomical studies of Cycas and Pinus. 3. Study of Tissues through Permanent slides/photographs/ charts. 4. To prepare the double stain permanent mount of monocot and dicot stem and root (normal / abnormal secondary growth) 5. To study morphology and anatomy of Dicot and Monocot leaf. 6. To study types of leaves and their collection.	30

Suggested Evaluation Methods

Internal Assessment: ➤ Theory • Class Participation: • Seminar/presentation/assignment/quiz/class test etc.: • Mid-Term Exam: ➤ Practicum • Class Participation: • Seminar/Demonstration/Viva-voce/Lab records etc.: • Mid-Term Exam:	End Term Examination:
---	------------------------------

Part C-Learning Resources

Recommended Books/e-resources/LMS:

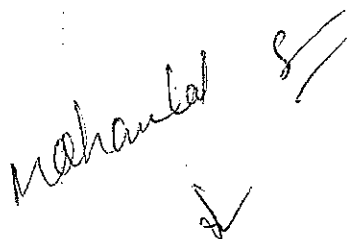
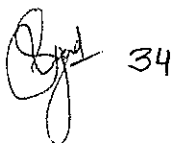
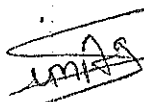
- Bhaniagar, S.P. and Moitm, A, Gymnosperms. New Age International Pvt. Ltd., New Delhi.
- Singh, H. Embryology of Gymnosperms, Encyclopedia of Plant Anatomy Gebruder Bortraeger, Berlin, Germany
- Vashishta, P.C., Sinha, A.K., Kumar, A., (2010). Gymnosperms, S. Chand. Delhi, India
- Mauseth, J.D., Plant Anatomy. Publisher: The Blackburn Press.
- Cutter, E.G., Plant Anatomy Part-I, Cells and Tissues, Edward Arnold, London. 2nd edition.
- Esau, K., Anatomy of Seed Plants, John Wiley & Sons, New York. 2nd edition.
- Stace, C.A., Plant Taxonomy and Biosystematics. Edward Arnold, London. 2nd edition.

Session : 2024-25**Part A - Introduction**

Subject	BOTANY		
Semester	3 rd		
Name of the Course	Ecology		
Course Code	24UN-BOT-302		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VAC)	MCC-5		
Level of the course (As per Annexure-I)	100-109		
Pre-requisite for the course (if any)			
Course Learning Outcomes(CLO):	After completing this course, the learner will be able to: 1: Students will comprehend the fundamental principles of biodiversity. 2: Students will acquire a conceptual understanding of the classifications used by the IUCN. 3: Students will acquire knowledge about the principles of conservation laws and international legislation. 4: Students will develop a foundational understanding of international legislation. 5*: Student will learn about the practical approaches to protect and restore the biological communities.		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	3	2	5
THEORY			
Max. Marks: 70 Internal Assessment Marks: 20 End Term Exam Marks: 50	Time: 3 Hours		
PRACTICAL			
Max. Marks: 30 Internal Assessment Marks: 10 End Term Exam Marks: 20	Time: 4 Hours		

Part B- Contents of the Course**Instructions for Paper- Setter**

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No.1 will be short answer type covering the entire syllabus and will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each unit. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.



Unit	Topics	Contact hours
I	Introduction to Ecology: Autoecology and Synecology, Laws of limiting factors, Study of physical factors: Temperature and Light. Population: Unique and group attributes of population: density, natality, mortality, life tables, fecundity tables, survivorship curves, age ratio, sex ratio, dispersal and dispersion; Exponential and logistic growth, equations and patterns, r and k strategies.	11
II	Species Interactions: Types of species interactions, Habitat and Niche concept; Predation- predator defense mechanisms. Community: Community characteristics: species richness, dominance, diversity, abundance, guilds, ecotone and edge effect; Ecological succession with examples and types.	11
III	Ecosystem: Types of Ecosystems: Terrestrial ecosystem, vertical stratification in tropical forest; Food chain: detritus and grazing food chains, linear and Y-shaped food chains, food web; Energy flow through the ecosystem; Ecological pyramids and Ecological efficiencies.	11
IV	Applied Ecology: Ecology in wildlife conservation and management, Protected areas: National Parks, Biosphere reserves and Sanctuaries; Restoration ecology, Principles of Environmental impact assessment.	12
V *	• Study of life tables and plotting of survivorship curves of different types from hypothetical/ real data • Determination of population density, abundance and frequency in a natural or a hypothetical community by quadrat method. • Study of an aquatic ecosystem: a) Phytoplankton and zooplankton b) Measurement of temperature, turbidity/penetration of light, determination of pH c) Dissolved oxygen content, chemical oxygen demand d) Free carbon dioxide and alkalinity • Study of ten endemic plants of India with slides/pictures/videos. • Report on a visit to a National Park/Biodiversity Park/Wildlife Sanctuary.	30
Suggested Evaluation Methods		
Internal Assessment: ➤ Theory • Class Participation: • Seminar/presentation/assignment/quiz/class test etc.: • Mid-Term Exam:		End Term Examination:

➤ Practicum

- Class Participation:
- Seminar/Demonstration/Viva-voce/Lab records etc.
- Mid-Term Exam:

Part C-Learning Resources

Recommended Books/e-resources/LMS:

- Odum, E.P. and Barrett G. W. Fundamentals of Ecology. Indian Edition Publisher: Brooks/Cole.
- Smith T. M. and Smith R. L. Elements of Ecology. Publisher: Benjamin Cummings.
- Saha G.K. and Mazumdar S. Wildlife Biology, An Indian Perspective. Publisher: PHI Learning Private Limited
- Zimmer C. and Emlen D. J. Evolution: Making Sense of Life, Roberts & Co.
- Futuyma, Douglas and Mark, Kirkpatrick. Evolutionary Biology, Oxford University Press

[Signature]

[Signature]

Neelam

[Signature]

[Signature]