

DEPARTMENT OF BOTANY

**CURRICULUM PLAN 2025-2026 ((EVEN- SEMESTER 2nd January to
30th April)**

Dr Kalpana Kumari

Course: B.Sc. (H) Botany (NEP) Semester IV

Paper: DSC 11: Ecology and Conservation

Topic	Approximate Schedule (Month wise)	Assignment/Class Test/Presentation	Suggested Reading
Theory			
Unit 1: Introduction Basic concepts, Interrelationships between the living world and the environment Unit 2: Soil Origin & Formation; physical, chemical and organic components; soil profile; forms of water in soil Unit 3: Water Importance; States of water in the environment; Atmospheric moisture; Water table Unit 4: Abiotic Interactions Variations in light, temperature & wind conditions and related plant adaptations	January - February		1. Singh, J. S., Singh S. P. and Gupta, S.R. 2014. Ecology Environmental Science and Conservation. S. Chand Publishing, New Delhi. 2. Ecology 2nd Edition by N. S. Subrahmanyam and A. V. S. S. Sambamurty
Unit 5: Biotic Interactions Definition; types of positive and negative biotic interactions Unit 6: Population Ecology Characteristics of populations; population growth models and	February –March	Power Point Presentation	3. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders
introduction to population regulation (density-dependent and independent); ecotypes; metapopulation (concept and applications) Unit 7: Plant Communities Community characters (General account of analytical and synthetic characters); Ecotone; Succession: processes, types [Hydrosere and Lithosere (Xerosere/Psammosere)]			

<p>Unit 8: Ecosystems Types, Components, Trophic organisation; Food chain & food webs, Ecological pyramids. Models of Energy Flow; Production and Productivity; Brief outline of Biogeochemical Cycles (Carbon and Nitrogen) Unit 9: Phytogeography Principles; Continental drift; Theory of tolerance; Endemism (concept; types – palaeo-endemics and neo-endemics); Phytogeographical Divisions of India Unit 10: Conservation In-situ, ex-situ; Gene Banks, Institutions - National & International; Sacred Groves and On-farm Conservation (concept)</p> <p>Revision of Syllabus</p>	<p>March-April</p>	<p>Class Test</p>	
<p>Practicals Group: G1</p>			
<p>1. Principle and operation of instruments (soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge and lux meter) used to measure microclimatic variables and their importance for plants. 2. Determination of pH and detection of carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency from at least</p>	<p>January to February</p>		<p>1. Experimental Plant Ecology by Pratima Kapoor and Sudha Rani Govil , CBS Publishers and Distributers</p>
<p>two soil samples by rapid field tests. 3. Determination of pH & dissolved oxygen content of at least two water samples (polluted and unpolluted). 4. Determination of soil organic carbon and organic matter of different soil samples (at least two) by Walkley & Black rapid titration method. 5. Study of ecological adaptations (morphological only) of hydrophytes and xerophytes (four each).</p>			

<p>6. Study of biotic interactions: Stem parasite (<i>Cuscuta</i>), Root parasite (<i>Orobanche</i>), Epiphytes, Predation (Insectivorous plants).</p> <p>7. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by Species Area Curve method (at least three sites, species to be listed).</p> <p>8. Quantitative analysis of herbaceous vegetation in the college campus for Frequency and comparison with Raunkiaer's Frequency Distribution Law.</p>	<p>February –March</p>		
<p>9. Quantitative analysis of herbaceous vegetation in the college campus for Density and Abundance.</p> <p>10. Calculation of Abundance /Frequency (A/F) ratio to assess Species distribution patterns (regular, random, clumped).</p> <p>11. Field visit to familiarize students with Ecology/conservation of different sites.</p>	<p>March-April</p>		
<p>Revision of Syllabus</p>	<p>March-April</p>	<p>Mock Examination</p>	

B.Sc. P) Life Sciences 3rd Year, Semester VI

Paper: DSC-6 Economic Botany and Biotechnology

Topic	Approximate Schedule (Monthly)	Assignment/Class Test/Presentation	Suggested Reading
PRACTICALS: G1 Group			
<p>Practicals :</p> <p>1. Study of economically important plants through: specimens (Millets, Pigeon pea, Chickpea, Tea, and Cotton), Sections (Wheat, Maize, Black pepper, Clove), Micro-chemical Tests (Wheat, Soybean, Groundnut and Cotton).</p> <p>Principle and working of equipment used in Tissue culture: Laminar air flow cabinet, Autoclave.</p>	<p>January – February</p>		<p>Bhojwani, S.S., Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Amsterdam, Netherlands: Elsevier Science.</p> <p>Kochhar, S.L. (2011). Economic Botany in the Tropics, 4th edition. New Delhi, Delhi: MacMillan Publishers India Ltd.</p>
<p>3. Preparation of culture medium (MS medium), sterilisation and inoculation of explants (Demonstration)</p> <p>4. Study of Micropropagation, Anther culture, Somatic embryogenesis, Endosperm and Embryo culture</p>	<p>February –March</p>		
<p>5. Study of Molecular techniques: PCR, Blotting techniques</p> <p>6. Extraction and separation of DNA.</p> <p>7. Visit to any tissue culture/biotechnology laboratory</p>	<p>March-April</p>		

Revision of syllabus	March-April	Mock Examination	
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Course: B.Sc. (H) Botany (NEP) Semester

Paper: DSC -4: Microbiology and Plant Microbe Interactions

Topic	Approximate Schedule (Monthly)	Assignment/Class Test/Presentation	Suggested Reading
PRACTICALS: G1 Group			
Practicals : 1. Study of Viruses: Electron micrographs / Models - T-Bacteriophage and TMV; specimens/digital resources/ Line drawings of Lytic and Lysogenic Cycle. 2. Study of Bacteria: Electron micrographs of bacteria; Types of Bacteria from Temporary / permanent slides. 3. Endospore, Binary fission, Conjugation, Root nodule through specimens/digital resources.	January – February		1. Pelczar, M.J. (2001). Microbiology, 5th edition. New Delhi, Delhi, Tata McGrawHill Co. 2. Tortora, G.J., Funke, B.R., Case, C.L. (2016). Microbiology: An Introduction, Indian edition, Pearson India Education Services Pvt. Limited, Noida, India 3. Prescott, L.M., Harley J.P., Klein D. A. (2005). Microbiology, 6th edition: McGraw Hill, New Delhi.
4. Study of Plant Growth Promoting Rhizobacteria (PGPR) through specimens/digital resources (at least three). 5. Gram staining to differentiate between Gram-positive and Gram-negative bacteria. 6. Study of Rhizobium from root nodules of a leguminous plant. 7. Isolation of Anabaena from Azolla leaves.	February –March		4. Gupta, R., Chugh, G. (2022). Plants, Microbes and Diseases 1st Edition, I.K. International Pvt. Ltd., Delhi. 5. Subba Rao, N.S. (2000). Soil Microbiology, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi
7. Histochemical staining to observe Arbuscular Mycorrhizal Fungi (AMF) colonization in roots. 8. Study of bacterial diseases (Citrus canker, Angular leaf spots of cotton) and viral diseases of plants (mosaic and vein clearing disease) through specimens/digital resources.	March-April		

Revision of syllabus	March-April	Mock Examinati on	
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