

**Generic Elective**  
**Code: Bot GE 18301**  
**Title: Plant Ecology and Taxonomy**  
**(Credits: Theory-4, Practical-2)**  
**THEORY**  
**Lectures: 60**

**Unit 1: Ecology, Ecological factors and Plant communities** (18 lectures)

Introduction to ecology, Ecological factors: Soil; Origin, formation, composition, soil profile. Water: States of water in the environment, precipitation types. Light and temperature: Variation Optimal and limiting factors; Shelford law of tolerance. Adaptation of hydrophytes and xerophytes

Plant communities: Characters; Ecotone and edge effect; Succession; Processes and types

**Unit 2: Ecosystem and Phytogeography** (12 lectures)

Structure; energy flow trophic organisation; Food chains and food webs, Ecological pyramids production and productivity; Biogeochemical cycling; Cycling of carbon, nitrogen and Phosphorous

**Phytogeography** - Principle biogeographical zones; Concept of Endemism

**Unit 3: Introduction to plant taxonomy** (14 lectures)

**Introduction to plant taxonomy:** Types of classification-artificial, natural and phylogenetic. Bentham and Hooker (upto series), Angiosperm Phylogeny Group 2016 (upto order level).

**Numerical taxonomy:** Characters; OTUs, character weighting and coding; cluster analysis; phenograms, cladograms (definitions and differences).

Functions of Herbarium, important herbaria and botanical gardens of the world and India.

**Unit 4: Identification and Nomenclature** (16 lectures)

**Documentation:** Flora, Keys: single access and multi-access; Taxonomic evidences from palynology, cytology, phytochemistry and molecular data.

**Taxonomic hierarchy:** Ranks, categories and taxonomic groups

**Botanical nomenclature:** Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations.



## Practicals

1. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus. (Species to be listed)
2. To study frequency and density of plant species in a grassland ecosystem
3. Comparison of bulk density and porosity of soil of three habitats.
4. Determination of moisture content and water holding capacity of grassland and forest soil.
5. Determination of pH, and analysis of two soil samples for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency by rapid field test.
6. Estimation of transparency, pH and temperature of different water bodies.
7. Study of vegetative and floral characters of the following families (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification): Brassicaceae – *Brassica/ Raphanus*; Asteraceae -*Sonchus/Taraxacum/Helianthus*, Solanaceae -*Solanum nigrum/ Withania*; Lamiaceae –*Salvia/Ocimum*; Liliaceae - *Tulipa /Allium*.
8. Mounting of a properly dried and pressed specimen of any 5 wild plant with herbarium label (to be submitted in the record book).

## Suggested Readings

1. Kormondy, E.J. (1996). Concepts of Ecology. Prentice Hall, U.S.A. 4th edition.
2. Sharma, P.D. (2010) Ecology and Environment. Rastogi Publications, Meerut, India. 8<sup>th</sup> edition.
3. Simpson, M.G. (2006). *Plant Systematics*. Elsevier Academic Press, San Diego, CA, U.S.A.
4. Singh, G. (2012). *Plant Systematics: Theory and Practice*. Oxford & IBH Pvt. Ltd., New Delhi. 3rd edition.

