B.Sc. I Year

Semester – II
BBO-C201
DSC-2 Plant Ecology and Taxonomy

MM : 100
Time : 3 hrs

Sessional : 30
ESE : 70
Pass Marks : 40

Learning objective:

- To understand the importance of natural resources like soil, water and air.
- To acquire knowledge of various ecosystems components and their functioning.
- To acquire an overall knowledge on ecological factors and plant communities.
- To become familiar with plant identification, nomenclature and taxonomy and taxonomic hierarchy, evidences, botanical nomenclature, and classification.

Learning outcomes:

At the end of course student will be able

- The student will be able to understand natural resources importance and functioning for sustainable development.
- The student will be able to structural and functional ecological web.
- The student will be able identify key points for biogeochemical cycling, and various methods used in taxonomy, palynology, cytology, photochemistry and molecular data collection and utilization.
- The student will be able take the decisions for carrier point of views in research, industries and academia.

Unit 1: Introduction to Ecology and Ecological Factors **(12 Lectures)**

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.

Unit 2: Plant communities, Ecosystem and Phytogeography **(15 Lectures)**

Characters; Ecotone and edge effect; succession; processes and types. Structure; energy flow trophic organization; food chains and food webs, ecological pyramids production and productivity; biogeochemical cycling; cycling of carbon, nitrogen and phosphorous. Principle bio-geographical zones; endemism.

Unit 3: Introduction to Plant Taxonomy and Identification **(5 Lectures)**

Identification, classification, nomenclature. Functions of herbarium, important herbaria and botanical gardens of the world and India; documentation: flora.

Unit 4: Taxonomic Hierarchy and Evidences **(6 Lecture)**

Ranks, categories and taxonomic groups. Taxonomic evidences from palynology, cytology, Phytochemistry and molecular data.

Unit 5: Botanical Nomenclature and Classification **(10 Lectures)**

Principles and rules (ICBN); binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations. Types of classification-artificial, natural and phylogenetic. Bentham and Hooker (up to series), Engler and Prantal (up to series). Introduction to Angiosperm Phylogeny Group (APG) system of classification.

DSC-2 SEMESTER-II BBO-C251(LAB COURSE-CC-02)

1. Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge and lux meter.
2. Determination of pH, and analysis of two soil samples for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency by rapid field test.
3. Comparison of bulk density, porosity and rate of infiltration of water in soil of three habitats.
4. (a) Study of morphological adaptations of hydrophytes and xerophytes (four each). (b)Study of biotic interactions of the following: Stem parasite (*Cuscuta)*, Root parasite (Orobanche), Epiphytes, Predation (Insectivorous plants)
5. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method. (species to be listed)
6. Quantitative analysis of herbaceous vegetation in the college campus for frequency and comparison with Raunkiaer's frequency distribution law
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,Alyssum / Iberis;* Asteraceae -*Sonchus/Launaea, Vernonia/Ageratum, Eclipta/Tridax;* Solanaceae - *Solanumnigrum, Withania;*Lamiaceae -*Salvia, Ocimum*; Liliaceae - *Asphodelus / Lilium / Allium.*
8. Mounting of a properly dried and pressed specimen of any wild plant with herbarium label (to be submitted in the record book).

Suggested readings: Ecology

1. Singh, J.S., Singh, S.P. and Gupta, S. (2006) Ecology Environment and Resource Conservation. Anamaya Publications, New Delhi
2. Wilkinson, D.M. (2007). Fundamental Processes in Ecology. An Earth System Approach. Oxford.
3. Daubenmier, R.F. (1970). Plants and Environment: A text book of Plant Autoecology, Wiley Eastern Private Limited
4. Daubenmier, R.F. (1970), Plant Communities, Wiley Eastern Private Limited
5. Odum, E. (2008) Ecology. Oxford and IBH Publisher.
6. Sharma, P.D. (2010) Ecology and Environment, (8th Ed.) Rastogi Publications, Meerut.

Taxonomy

1. Porter, C.L. (1969): Taxonomy of flowering Plants, Eurasia Publishing House, New Delhi.
2. Lawrence, G.H.M. (1953): Taxonomy of Vascular Plants, Oxford & IBH Publishers, New Delhi, Calcutta.
3. Jefferey, C.(1968) : An Introduction to Plant Taxonomy J.A. Churchill, London.
4. Mathur, R.C.(1970) : Systematic Botany (Angiosperms) Agra Book Stores-Lucknow, Ajmer, Allahabad, Delhi.