2. Environment related papers:
Course Code: BC409T
Core Course IX: Plant Ecology and Phytogeography
Semester: 4th Sem (H)

CBCS Undergraduate Programme, 2018 : Botany Honours **(Last updated: 08-04- 2019)**

Course Code: BC409T

Core Course IX: Plant Ecology and Phytogeography

The objective of this course is to expose the students to interaction of plant with its surroundings and also the geographic distribution of different plants

(Credits: Theory-4, Practical-2)

THEORY

Lectures: 60

Unit 1: Introduction **(4 lectures)**

Basic concepts; Levels of organization. Inter-relationships between the living world and the environment, the components and dynamism, homeostasis.

(15 lectures)

Unit 2: Soil : Importance, Origin, Formation, Composition, Physical, Chemical and Biological components, Soil profile, Role of climate in soil development; **Water:** Importance, States of water in the environment, Atmospheric moisture, Precipitation types (rain, fog, snow, hail, dew); Hydrological Cycle, Water in soil, Water table. **Light, temperature, wind and fire** Variations, adaptations of plants to their variation.

Unit 3: Biotic interactions: **(5 lectures)**

Trophic organization, basic source of energy, autotrophy, heterotrophy; symbiosis, commensalism, parasitism;

Unit 4: Population ecology: **(6 lectures)**

Characteristics and Dynamics .Ecological Speciation

Unit 5: Plant communities **(6 lectures)**

Concept of ecological amplitude; habitat and niche; Characters: analytical and synthetic; Ecotone and edge effect; Dynamics: succession – processes, types; climax concepts.

0Unit 6: Ecosystems: Structure and Function **(12 lectures)**

Ecological pyramids. Principles and models of energy flow; Production and productivity; Ecological Biogeochemical cycles; Cycling of Carbon, Nitrogen and Phosphorus.

Unit 7: Phytogeography **(12 lectures)**

Principles; static and dynamic phytogeography, Continental drift; Theory of tolerance; Endemism; Brief description of major terrestrial biomes (one each from tropical, temperate & tundra); Phytogeographical regions of India; Local Vegetation.

Course: Generic Elective
Title of the Paper: Plant Ecology and Taxonomy
Semester: 4th Sem (GE)

Generic Elective

II. Plant Ecology and Taxonomy

The objective of this course is to expose the students to interaction of plant life with the surroundings and also to identification, classification and nomenclature of plants

(Credits: Theory-4, Practical-2)
THEORY
Lectures: 60

Unit 1: Introduction **(2 lectures)**

Unit 2: Ecological factors **(10 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 3: Plant communities **(6 lectures)**

Characters; Ecotone and edge effect; Succession; Processes and types

Unit 4: Ecosystem **(8 lectures)**

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

Unit 5: Phytogeography **(4 lectures)**

Principle biogeographical zones; Endemism

Unit 6: Introduction to plant taxonomy **(2 lectures)**

Identification, Classification, Nomenclature.

Unit 7: Identification **(4 lectures)**

Functions of Herbarium, important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access

Unit 8: Taxonomic evidences from palynology, cytology, phytochemistry and molecular data. **(6 lectures)**

Unit 9: Taxonomic hierarchy **(2 lectures)**

Ranks, categories and taxonomic groups

Unit 10 Botanical nomenclature **(6 lectures)**

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

Unit 11 Classification **(6 lectures)**

Types of classification-artificial, natural and phylogenetic. Bentham and Hooker (upto series), Engler and Prantl (upto series).

Unit 12 Biometrics, numerical taxonomy and cladistics **(4 lectures)**

Characters; variations; OTUs, character weighting and coding; cluster analysis; phenograms, cladograms (definitions and differences).

Practical

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 -*Solanum nigrum, 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).

Course Code: GECBOT 1
Title of the Course: Natural Resource Management
Semester: 2nd Sem

Title of the Course : Natural resource management
Course Code : GECBOT 1
Nature of the Course : Generic Elective Course-I
Total Credits : 03
Distribution of Marks : 80 (End Sem) + 20 (In-Sem)

COURSE OBJECTIVES: *The objective of this course is to provide knowledge to the students on importance, sustainable utilization, conservation and management of natural resources.*

UNITS	CONTENTS	L	T	P	Total Hours
I 15 MARKS	Natural resources: Definition and types. Natural resources of NE India.	8	01	-	09
II 25 MARKS	Sustainable utilization of land and water resources; Soil degradation and management; water resources and their management. Renewable and non-renewable sources of energy.	12	01	-	13
III 15 MARKS	Forests: Definition, Significance; Types of vegetation in India; NTFC Depletion and Management, JFM.	08	02	-	10
IV 25 MARKS	Contemporary practices in resource management: EIA, GIS, Participatory Resource Appraisal, Ecological Footprint with emphasis on carbon footprint, Resource Accounting; Waste management. National and international efforts in resource management and conservation	10	03	-	13
	Total	**38**	**07**	-	**45**

Where, ***L: Lectures*** ***T: Tutorials*** ***P: Practicals***

MODES OF IN-SEMESTER ASSESSMENT: **(20 Marks)**

- One Internal Examination - **10 Marks**
- Others (Any one) - **10 Marks**
  - Sessional Examinations
  - Assignment

LEARNING OUTCOMES:

1. Know about the natural resources, its types, sustainable utilization and management practices.

SUGGESTED READINGS:

1. Vasudevan, N. (2006). Essentials of Environmental Science. Narosa Publishing House, New Delhi.
2. Singh, J. S., Singh, S.P. and Gupta, S. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications, New Delhi.
3. Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. Prentice Hall of India Private Limited, New Delhi.