Generic Elective: GE-1 (For B.Sc. I (Hons) Zoology Students)
Plant Ecology and Taxonomy
(Credits: Theory-4)
THEORY
Lectures: 48

Unit 1: Introduction, Ecological factors and Plant communities
History and introduction and Ecology 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. Characteristic feature plant communities, Ecotone and edge effect; Succession; Processes and types.

Unit 2: Ecosystem, Biogeochemical cycle and Phytogeography
Structure; energy flow trophic organisation; Food chains and food webs, Ecological pyramids production and productivity; Biogeochemical cycling; Cycling of carbon, nitrogen and Phosphorous, Principle biogeographical zones; Endemism

U nit 3: Introduction to plant taxonomy, Herbarium and taxonomic evidences
Identification, Classification, Nomenclature. Functions of Herbarium, technique of preparation of Herbarium important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access. Taxonomy in relation to cytology, Phytochemistry and Palynology.

Unit 4 : Botanical nomenclature and Typification
Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations.

Unit 5: Types of Classification
Types of classification-artificial, natural and phylogenetic. Bentham and Hooker, Engler and Prantl and Hutchinson (upto series)..

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. 8th 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. 68

Generic Elective GE-2 (For B.Sc. II (Hons) Zoology Students)
Biodiversity (Microbes, Algae, Fungi and Archegoniate)

(Credits: Theory-4)

THEORY

Lectures: 48

Unit 1: Microbes- History and their types

Viruses – Discovery, general structure, replication (general account), DNA virus (T-phage); Lytic and glycogenic cycle, RNA virus (TMV); Economic importance; Bacteria – Discovery, General characteristics and cell structure; Reproduction – vegetative, asexual and recombination (conjugation, transformation and transduction); Economic importance.

Unit 2: Algae

General characteristics; Ecology and distribution; Range of thallus organization and reproduction; Classification of algae; Morphology and life-cycles of the following: *Volvox*, *Chlamydomonas, Oedogonium*, *Vaucheria* and *Polysiphonia*. Economic importance of algae.

Unit 3: Fungi

Introduction- General characteristics, ecology and significance, range of thallus organization, cell wall composition, nutrition, reproduction and classification; True Fungi- General characteristics, ecology and significance, life cycle of *Rhizopus* (Zygomycota) *Penicillium,Alternaria* (Ascomycota), *Puccinia, Agaricus* (Basidiomycota); Symbiotic Associations-Lichens: General account, reproduction and significance; Mycorrhiza: ectomycorrhiza and endomycorrhiza and their significance

Unit 4: Introduction to Archegoniate and Bryophytes

Unifying features of archegoniates, Transition to land habit, Alternation of generations. General characteristics of Bryophytes adaptations to land habit, Classification, Range of thallus organization.Classification (up to family), morphology, anatomy and reproduction of *Marchantia* (Developmental details not to be included).Ecology and economic importance of bryophytes

U nit 5: Pteridophytes and Gymnosperms

General characteristics, classification of Pteridophytes and Gymnosperms Early land plants (*Rhynia*). Classification (up to family), morphology, anatomy and reproduction of *Selaginella* and *Equisetum*.(Developmental details not to be included).Heterospory and seed habit, stelar evolution.Ecological and economical importance of Pteridophytes. Morphology, anatomy and reproduction of *Cycas* and *Pinus* (Developmental details not to be included). Ecological and economical importance.

Suggested Readings

1. Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West. Press Pvt. Ltd. Delhi. 2nd edition.
2. Tortora, G.J., Funke, B.R., Case, C.L. (2010). Microbiology: An Introduction, Pearson Benjamin Cummings, U.S.A. 10th edition.
3. Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi & Their Allies, MacMillan Publishers Pvt. Ltd., Delhi.
4. Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, John Wiley and Sons (Asia), Singapore. 4th edition.
5. Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R., (2005). Biology. Tata McGraw Hill, Delhi, India.
6. Vashishta, P.C., Sinha, A.K., Kumar, A., (2010). Pteridophyta, S. Chand. Delhi, India.
7. Bhatnagar, S.P. and Moitra, A. (1996). Gymnosperms. New Age International (P) Ltd Publishers, New Delhi, India.
8. Parihar, N.S. (1991). An introduction to Embryophyta. Vol. I. Bryophyta. Central Book Depot, Allahabad.