Semester 5

Paper 6: Theory

Ecology and Conservation Biology

Unit 1

1. Ecological Factors: Climatic (light, temperature, precipitation and fire), Edaphic (soil formation process, soil types, soil texture, soil profile, soil reaction and soil organic matter), Physiographic (slope and aspect of mountain) and Biotic (anthropogenic and non- anthropogenic) factors.
2. Ecological adaptations: hydrophytic, xerophytic, epiphytic and halophytic adaptations.
3. Ecological levels of organization: population, community, ecosystem, landscape, biome and biosphere.

Unit 2

1. Population ecology: Attributes of plant populations, mortality, natality, survivorship curves and population growth.
2. Population interactions: Types of interactions, symbiosis, parasitism, commensalism, proto-cooperation and competition.
3. Community ecology: Community structure – qualitative and quantitative attributes of community; Community dynamics – primary and secondary succession, stages of succession; hydrosere and xerosere.

Unit 3

1. Structural attributes of ecosystem: Abiotic components (Inorganic elements, organic compounds and climatic regimes) and Biotic components (producers, macroconsumers and microconsumers).
2. Functional attributes of ecosystem: Flow of energy: Energy flow model (Box and pipemodel), Ecological pyramids,Primary production (types and distribution),Food chain and food web.
3. Biogeochemical Cycles: Hydrological cycle, Gaseous cycle (carbon) and Sedimentary cycle (phosphorus).

Unit 4

1. Air, water and soil pollution: sources, effects and abatement.
2. Global environmental problems: Causes, consequences and remedial measures of ozone layer depletion, Climate change and global warming (greenhouse effect), Desertification.
3. Plant diversity and conservation: Magnitude of vascular plant diversity in India, Plant conservation measures – *in-situ* (Biosphere Reserve, National Park, Wildlife Sanctuary, World Heritage Site and Community Conserved Area) and *ex-situ* (Botanical Garden, Seed Bank, Gene Bank and Cryopreservation).

Paper 6: Practical

Ecology and Conservation Biology

1. Determination of pH of soil samples of various sites using pH meter.
2. Determination of moisture content of two different soil samples using gravimetric method.
3. Determination of soil organic matter content of different soil samples by Walkley and Black's rapid titration method.
4. Determination of requisite size and requisite number of quadrats for the study of a plant community.
5. Determination of frequency, density, abundance, and basal area by quadrat method and IVI.
6. Study of morphological and anatomical features of xerophytes, hydrophytes and epiphytes.
7. Study of spatial and temporal variations in climatic factors – light, temperature and relative humidity.

Recommended Readings

- Odum, E.P. 1983. Basic Ecology, 5th edition. Thomson Business InternationalWaldisPvt Ltd. Barichad.
- Townsend, C.R.,Begon, M. and Harper, J.L. 2006. Essentials of Ecology. 2ndedition. Blackwell Publishers.
- Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand publishing, Delhi.

Suggested Readings

- Ambasht, R.S. and Ambasht, N.K. 2011. A Text Book of Plant Ecology, 15th edition. CBS Publishers and Distributors, New Delhi.
- Bell, P.R. and Woodcock, C.L.F. 1986. Diversity of Green Plants, 3rd edition, ELBS, Edward Arnold.
- Begon, M. Townsend, C.R. and Harper, J.L. 2006. Ecology from Individuals to ecosystem, 4th edition. Blackwell Publishers.
- Begon, M. and Harper, J.L. 2000. Essentials of Ecology. Blackwell Publishing.
- Crawley, M.J. 1997. Plant Ecology. Blackwell Science.
- Dash, M.C. 2001. Fundamentals of ecology, 2nd edition. McGraw hill Companies.
- Daubenmire, R.F. 1959. Plants and Environment, A Text book of Plant Autecology. Wiley Eastern Publ.
- Hill, M.K. 1997. Understanding Environmental Pollution. CambridgeUniversity Press, Cambridge.
- Kandya, A.K. and Gupta, A. 2007. Advancing Frontiers of Ecological Researches in India.
- Koromondy, E.J. 1996. Concepts of Plant ecology, 4th edition, Publ. Prentice Hall of India, New Delhi
- Krebs, C. 2008. The Ecological World View. CSIRO publishing.
- Misra, K.C. 1988. Manual of Plant Ecology, 3rd edition. Oxford and IBH Publishing Co. New Delhi.
- Mitra, D., Guha, J. and Chaudhury, S.K. 2000. Studies of Botany, Vol II. Moulik Library, Kolkata.
- Mohapatra, A.C., Barik, S.K. and Rao, C.S. 2000. Man and Environment. Star Publ. House, Shillong.
- Molles, M.C. 2005. Ecology – Concepts and Applications. McGraw Hills.
- Odum, E.P. 1971. Fundamentals of Ecology, 3rd edition. W.B. Saunders Co. Philadelphia.
- Prasanthrajan, M. and Mahendran, P.P. 2008. A Text Book on Ecology and Environmental Sciences. Publ. Agrotech, Udaipur.
- Sharma, P.D. 2013. Ecology and Environment, Rastogi Publishers.
- Tiwari, S.C. 2005. Concepts of Modern Ecology.
- Weaver, J.E. and Clements, F.E. 1986. Plant Ecology, 2nd edition. Tata McGraw, New Delhi.