M.Sc. (PREVIOUS) BOTANY

PAPER-III
PLANT ECOLOGY, RESOURCE UTILIZATION, CONSERVATION & BIOSTATISTICS

UNIT-I

1. Definition, scope and history of plant ecology.
2. Ecological factors: Edaphic, Biotic and Climatic (Light, Temperature, Precipitation, Wind, Topography); Interaction of factors.
3. Population ecology : Definition, dispersion, fluctuation, age classes, sex, ratios; growth measurement; factors affecting population growth; r- and k- strategies; growth curves; population, density and frequency; over population and under population; population turnover.
4. Vegetation Organization : Structure, characteristics and classification of plant communities; methods of studying vegetation; gradient analysis, continuum concept; Life form and biological spectrum; Community coefficients, concept of ecological niche.

UNIT-II

5. Ecosystem concept : Structure and function, flow of energy, biogeochemical cycles; Production and decomposition in nature; Ecological efficiencies, Methods of measuring primary productivity; turnover; Homeostasis.
6. Vegetation development : Causes and types of succession; Mechanism of ecological succession; Changes in ecosystem properties during succession.
7. Principles of limiting factor.
8. Plant indicators.

UNIT-III

9. Major biomes of the world with special reference to desert and grassland.
10. Environmental pollution – A general account of air, water, soil and noise pollution; effects on plants and ecosystems.
11. Brief account of the following : afforestation, social forestry, agroforestry, windbreaks, environmental impact assessment, International Biological Programme; Man and Biosphere Programme (MAB), IUCN.

UNIT-IV

12. Plant Biodiversity : Concept, status in India, utilization and concerns.
13. World centres of primary diversity of domesticated plants : The Indo-Burmese Centre; plant introductions and secondary centres.
14. Origin, evolution, Botany,cultivation and uses of (i) Food, forage and fodder crops, (ii) Fibre crops,

(iii) medicinal and aromatic plants and vegetable and oil-yielding crops.

15. Important fire-wood and timber yielding plants and non-wood forest products (NWFPs) such as bamboos, rattans, raw materials for paper making, gums, tannins, dyes, resins and fruits.

16. Ethnobotany : Introduction, History and development of ethnobotanical study; scope and potential applications; methods in ethnobotanical study.

17. Traditional Botanical knowledge and subsistence: Wild plant resources as (i) food (ii) fodder (iii) fibre and (iv) medicine with special reference to tribals of Rajasthan.

18. Applied Ethnobotany : Commercialization and conservation; applied ethnobotany in sustainable development; traditional botanical knowledge and intellectual property rights.

UNIT-V

19. Strategies for conservation – *In situ* conservation: International and Indian initiatives; protected areas in India – sanctuaries, national parks, biosphere reserves, sacred groves.

20. Strategies for conservation – *Ex situ* conservation: Principles and practices, Principles and practices, botanical gardens, field gene bank, seed banks *in vitro* repositories, cryobanks, general account of the activities of Botanical Survey of India (BSI), National Bureau of Plant Genetic Resources (NBPGR), ICAR, CSIR and DBT for conservation.

21. Biometry : Aims and objects of statistics and applied to biological sciences – measures of central tendency, Mean, Median and Mode.

22. Measures of Dispersion : Range, mean deviation, standard deviation, standard error and student 't' test. Chi-square test and, goodness of fit. Simple Linear Regression; Analysis of variance.