SYLLABUS

BOTANY PAPER – 1

1. Archaebacteria, eubacteria and cyanobacteria - ultra-structure and reproduction; L-Form Bacteria, Prions, Viroids,Virusoids; Characteristics and ultrastructure of virions; Mycoplasma, Spiroplasma and Phytoplasma - General characters and role in causing plant diseases; Microbiology of water, air and soil.
2. General account of diseases caused by plant pathogens; molecular basis of host parasite interaction, pathogen attack and defense mechanism; etiology of red rot of sugarcane, rust of wheat, covered smut of wheat, loose smut of wheat, green ear disease of bajra, leaf spot and smut of jowar, ergot and smut of bajra, root knot and rot diseases of vegetables; disease control and the role of information technology in disease management.
3. Algae of diversified habitats (Terrestrial, Fresh water, Marine); Thallus organization, cell structure and reproduction in different classes/groups; Criteria of classification of algae; Economic importance of algae.
4. General characteristics of different classes/groups of fungi, cell ultrastructure, cell wall composition, reproduction, heterothallism, para sexuality, recent trends in classification, economic importance of fungi; General account and economic importance of mycorrhiza and lichens.
5. General characters, structure, reproduction, evolution and inter-relationships of bryophytes, pteridophytes and gymnosperms. Evolution of stele, heterospory and seed habit; Principles of palaeobotany.
6. Taxonomic hierarchy, principles of nomenclature, taxonomic tools, important systems of classification (Bentham and Hooker; Engler and Prantl; Hutchinson and Takhtajan). Role of morphology, anatomy, embryology, palynology, cytology, phytochemistry, genome analysis and nucleic acid hybridization in taxonomy. Taxonomy of some selected families (Leguminosae, Cucurbitaceae, Asteraceae, Asclepiadaceae, Solanaceae, Euphorbiaceae and Poaceae). Phylogeny of angiosperms.
7. General concepts of plant morphology, origin and evolution of flower - Primitive living angiosperms, foliar stamens, open carpels. Plant anatomy – types of tissue; Organization of root and shoot apical meristems; Secondary growth (normal and anomalous) and Anomalous primary structures of root and stem.
8. Development of male and female gametophytes, pollination, pollen pistil interaction, fertilization, endosperm development and embryogenesis; seed development and fruit formation; polyembryony, apomixis, embryo culture; biochemistry and molecular biology of fruit maturation.
9. Basic concepts of ecology, ecological factors affecting the plants. Principle of limiting factors; population characteristics, population interaction, r and K selection, genecology and range extensions, community characteristics, community classification, continuum concept, ecological niche, plant succession in various habitats, concept of climax. Structure and function of ecosystem, energy flow and biogeochemical cycles (N,P,C,S), primary production, plant indicators, major biomes of the world. Phytogeographical regions of India, vegetation of Rajasthan. Ecosystem services.

10. Environmental pollution- air, water, noise and soil; Greenhouse effect, Ozone layer depletion, Acid rain; Concept of biodiversity with special reference to India, Hot spots, Rare, Endangered and Endemic plant species of Rajasthan, strategies for conservation of the flora. Bio-monitoring. Environmental Impact Assessment.
11. Plant civilization, centers of diversity/origin of crop plants, gene diversity Utilization, cultivation and improvement of food plants (rice, wheat, bajra, pulses, green-gram, moth and beans), Oil seeds (mustard, soybean and ground nut), drugs (Rauvolfia, Ephedra, Papaver, Atropa, Cinchona and Withania), fibre (cotton, jute and coir) and plants of industrial value (Tobacco, sugarcane, tea and coffee). Ethnobotany, under-exploited plants of potential medicinal and food value with special reference to Rajasthan.
12. Bright field Microscopy, Electron microscopy (TEM & SEM), Confocal microscopy, phase contrast microscopy; Fixation (of lower and higher plant groups) and staining techniques (for bright field microscopy, cytology and bacterial staining); Chromatography, Electrophoresis, ELISA, Spectrophotometry, centrifugation.