

11. Schaad, N. W. (1980). Laboratory guide for identification of plant pathogenic bacteria (edt.). Bacteriology Committee of American Phytopathological Society, St. Paul, Minnesota.
12. Schaad, N. W. (1988). Laboratory guide for identification of plant pathogenic bacteria (2nd eds.). APS Press (The American Phytopathological Society), St. Paul, Minnesota.
13. Singh, D. and Mathur, S. B. (2004). Histopathology of seed-borne infections. CRC Press, Boca Raton, London, New York, Washington DC.
14. Singh, K.G. and Manalo, P.L. 1986. Plant Quarantine and Phytosanitary Barriers in the Asean. Asean Plant Quarantine Centre and Training Institute, Malaysia.

BOT 404 (C): ENVIRONMENTAL BIOLOGY & ARID ZONE ECOLOGY-II

Desert: Definition, classification (hot and cold), physiography, desert features, flora, fauna and water, formation, topography, distribution and characteristics of world deserts

Hot deserts: Hot deserts of the world, Global distribution of hot deserts, Formation and topography, climatic conditions, characteristic features of each desert, flora and fauna.

Cold deserts: Cold deserts of the world, global distribution of cold deserts, formation and topography, climatic conditions, characteristic features of each desert, flora and fauna.

24hours

Indian Arid Zones: State wise description of arid regions of India, Hot arid zones- West Rajasthan, Punjab-Haryana, Gujarat, Andhra Pradesh, Karnataka, Maharashtra. Cold arid zones-Jammu and Kashmir state, Aridity index in different arid zones of India.

Desert Ecosystem (Thar desert): Climatic conditions, temperature and rainfall, high speed wind, cyclones, sand dunes, thunder storms, characteristic features of desert soil, topography, organic matter and nutrients, food chain and food web in desert

ecosystems, Vegetation types (Rajasthan desert) and plant communities, plant life forms, plant processes (seed viability, dormancy, phenology, and rhizology of desert plants), biological production in deserts, conservation of flora and fauna, agroforestry, wild life, Succession in vegetation of western Rajasthan and coastal sand dunes, economic importance of desert plants (general economic plants, medicinal, famine food plants and crops) **24 hours**

Saline Arid zones: Saline tracts of Rajasthan and plants of saline arid zones (Halophytes), Economic and social considerations in the management of salt affected soils, afforestation in salt affected soils, Importance of halophytes.

Mangrove vegetation: Definition, Distribution of mangrove vegetation in India, habitat of mangrove plants, biological and ecological characteristic features of mangrove plants. Role of mangroves plants in conservation and ecological significance.

Sand dunes: Definition, processes for transportation of dune sands, types of sand dunes, origin and morphology of sand dunes **21 hours.**

Stabilization of sand dunes; Principles of sand dune stabilization, Techniques for stabilization of inland and coastal dunes, management of sand dunes, wind breaks and shelter belts, afforestation and desert control measures.

Water crises in desert: Water problems in Rajasthan particularly underground water resources and its change, rain water harvesting, Orans, dry land farming, arid lands and horticultural crops, Indira Gandhi Canal and its ecological implication, water logging & salinity problems- The management alternatives **21hours.**

BOT 404 (D) - ADVANCED PLANT PHYSIOLOGY-II

Plant growth regulators : Natural and synthetic, biochemistry and physiological effects of brassinosteroids, jasmonic acid; salicylic acid, polyamines, morphactins and cyanogenic compounds. 10.

Signal transduction in plants : Receptors and G-proteins, phospholipid signaling, role of cyclic nucleotides, calcium-calmodulin cascade, diversity of protein kinases and phosphatases, signal transduction mechanisms with special reference to : actin-cytoskeleton signal transduction, sugar induced signal transduction, Gibberellin induced signal transduction, auxin induced signal transduction and cytokinin induced signal transduction. 13

Stress physiology : Plant responses to biotic and abiotic stresses, mechanism of biotic and abiotic stress resistance, plant defense mechanisms against water stress, salinity stress, metal toxicity, freezing and heat stress and oxidative stress. Role of Sec. metabolites in defence mechanism, 22

Photobiology - Photoreceptors, Phytochrome : history, discovery, physiological properties, interaction between hormones, and phytochrome, role of different phytochromes in plant development and flowering, mechanism of phytochrome signal transduction. Cryptochromes and phototropins. Physiology of flowering: Photoperiodism and Vernalization. 13.

Circadian rhythms in plants - nature of oscillator, rhythmic outputs, entrainments (inputs) and adaptive significance 10.

Tools and Techniques : Principles and application of spectrophotometry, Principles of chromatography, partition chromatography, thin layer chromatography, ion-exchange chromatography, gas-liquid chromatography, high performance liquid chromatography, gel filtration, electrophoresis, isoelectric focusing, immobilized pH gradient, ultra centrifugation(velocity and density gradient), ELISA and RIA 22.

BOT 404 (E): ADVANCED MORPHOLOGY & MORPHOGENESIS-II

Development and morphogenesis - shoot apex, the apical cell, meristem, the subcellular and biochemical structure of the meristem. the mechanism of primordium initiation, transition to flowering, growth and formation of organs, experimental work on apical meristem, meristem culture and virus free plant, histochemical studies on apical meristems. 20

The phenomenon of morphogenesis - correlation, polarity, symmetry, differentiation, regeneration. 15

Morphogenetic factors - Physical, mechanical, chemical and genetic factors. molecular basis of morphogenesis in plants with special reference to work done in *Arabidopsis*. 15

Somatic embryogenesis - survey of somatic embryogenesis in angiosperms, direct somatic embryogenesis and embryogenesis from callus and protoplasts, cytology, physiology and genesis of somatic embryogenesis nutritional factors, hormonal factors and embryo rescue in wide hybridization. Endosperm and embryo culture.

Micropropagation advances and synthetic seeds. Cell plating technique and isolation of mutant cell lines, auxotrophic mutants. Mechanism involved in cell culture mutants. Suspension culture and growth studies. 22

Microtechniques. Fixation (FAA and gluteraldehyde), dehydration, clearing, embedding in paraffin and GMA, microtomy ,equipment and histological staining \procedures, histochemistry. Transmission and scanning electron microscopy for internal structure and morphologica development of plant organs and tissues. 18

BOT 404 (F): BIOSYSTEMECS OF ANGIOSPERMS-II

Experimental taxonomy - Scope and significance, Synthetic theory of evolution, study of major families belonging to monocotyledons and dicotyledons. (20 hrs)

Concept of species- speciation, species classification, Concept of characters- analytic versus synthetic character, qualitative versus quantitative characters, good and bad characters. (10 hrs)

Concept of population- its significance, pattern of phenetic variability, Geographical Variability. (10 hrs)

Variation - causes of variation in population, Range of tolerance and phenotypic plasticity. (14 hrs)

Ecotypes - origin and differentiation, Taxonomic significance of ecotypes, vicarians. (12 hrs)

Experimental taxonomy and hybridization, Role of hybridization in evolution, amphidiploidy. Breeding barriers, epistasis pleiotropy. (10 hrs)

Biochemical systematics – method and principles. Systematic markers, PCR analysis, chemotaxonomy, seed proteins, techniques of protein electrophoresis, chemical protein analysis procedures—Lowry and Bradford methods.genome analysis and nucleic acid hybridization. (14 hrs)

Practical work will be based on theory syllabus.