BSH502PLANTPHYSIOLOGY

52hrs

Course Outcomes:

After successful completion of the course, students will be able to:

CO 1. Understand the role of various nutrients in plant growth
CO 2. Comprehend the various conceptsof water relation in plants and physiologicalprocesses.
CO 3. Gain in-depth knowledge on photosynthesis and regulatory mechanisms.
CO 4. Understand role of various growthregulators in plant growth
CO 5. Gain knowledge on different methods and tools of plant breeding
CO 6. Understand plant pathology

Unit I (13 hours)

Plant nutrition: Trace elements and their role, major and minor elements in soil and plants; Essentiality of elements- Sand culture, Soil culture, Hydroponics, Aeroponics; Mineral deficiencies and their rectification, nitrogen, phosphorus and sulfur metabolism.

Unit II (13 hours)

Water relations in plants: water requirements, Physical forces involved in water absorption, Osmotic system, Water potential, Site and path of water absorption; Ascent of Sap, mechanism of translocation of water and solutes; Factors affecting water absorption; Transpiration- Types of transpiration, structure and functions of stomata, mechanism of stomatal movement, Factors affecting transpiration, Guttation, anti-transpirants.Photosynthesis: Chloroplast and photosynthetic pigments; Concept of photosynthetic unit; Oxygenic and anoxygenic photosynthesis; Concept of pigment system; Stages of photosynthesis- cyclic and non-cyclic photophosphorylation; Hill reaction, Photorespiration; carbon dioxide fixation in C_3 and C_4 plants, CAM plants; Factors affecting photosynthesis.

Unit III (13 hours)

Plant Growth and Growth Regulators- Plant growth, Growth curve, measurement of growth, Phytohormones: Biosynthesis, Mechanism of action and application of auxins, gibberellins, cytokinins, ethylene, abscisic acid; Vernalin, Florigen, Morphactins; Phytochromes. Plant breeding: Objectives – high yield, improved quality, disease and pest resistance, early maturity, photosensitivity, varieties for new seasons, resistant varieties. Breeding in self-pollinated crops. Methods of breeding- Selection, Backcross method, Hybridization-objectives, types, procedure. Mutagenesis.

Unit IV (13 hours)

Plant pathology- Plant pathology in relation to important diseases of crop plants. Important plant diseases: Plant diseases caused by viruses, mycoplasma, bacteria, fungi, protozoa, nematodes, parasitic angiosperms - symptoms, etiology, life cycle, transmission etc.
Seed borne diseases and transmission: Pollination, fertilization, embryogenesis, morphology and physiology in relation to seed infection. Seed-borne pathogens and their importance - viruses, bacteria, fungi and nematodes; seed infection and contamination.

References:

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13. Sharma, J. R. (1994). Principles and practice of Plant Breeding. Tata McGraw Hill Publishing Co. Ltd. New Delhi. pp 599.
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