

MASTER OF SCIENCE (BOTANY) – THIRD SEMESTER

Third Semester			
S. No.	Name of Subject	Credits	Total Marks
1	Environmental Management and Biodiversity Conservation	5	100
2	Introductory Plant Pathology and Plant Protection	5	100
3	Introductory Plant Cell and Tissue Culture	4	100
4	Microbial Biogeochemistry	4	100
5	Practical	4	100
Total		22	

Subject Name: ENVIRONMENTAL MANAGEMENT AND BIODIVERSITY CONSERVATION

UNIT-I

Introduction and scope of environmental management, Environmental impact assessment (EIA), Scheme of labelling of environment friendly product, ISO Certification, Environmental audit: energy audit, cost benefit analysis, Basic concepts of sustainable development, International summits and treaties related with ecology and environment.

UNIT-II

Environmental legislations: Status in India, Introduction of some Indian Environmental laws; The Biological Diversity Act 2002, The Wildlife (Protection) Act; The Forest (Conservation) Act, The Environmental (Protection) Act, 1986; IUCN categories of threat, Red Data book.

UNIT-III

Biological diversity: Basic concept, significance and magnitude; levels of biodiversity, uses of biodiversity: source of food medicine, raw materials, aesthetic, and ecosystem services; threats to biodiversity, species extinction, protected area network, Strategies for biodiversity conservation: Principles of biodiversity conservation, in-situ and ex-situ conservation strategies, Convention on Biological Diversity. Traditional approach to biodiversity conservation, TKDL.

UNIT –IV

Climate change, Global warming and effects and Greenhouse effect, Earth's natural greenhouse effect, Ozone depletion, Effects of rise in earth's temperature on forests, effects on agroecosystems; Mitigation and adaptation: carbon sink and carbon source.

Subject Name: INTRODUCTORY PLANT PATHOLOGY AND PLANT PROTECTION

UNIT -1

Historical and developmental aspects of plant pathology; Mode of infection and role of enzymes and toxins in plant disease;

Defense mechanisms of plants against infection: Pre-existing structural and chemical defense, induced structural and chemical defense, hypersensitive reaction, role of phytoalexins and other phenolic compounds.

Management of plant diseases: Cultural, chemical, biological, biopesticides, breeding for resistant varieties, plant quarantine, integrated pest management.

Post-harvest pathology: Fungal deterioration of food commodities, mycotoxins and health hazards, control measures

UNIT –II

Molecular plant pathology: Molecular aspects of host pathogen interactions - PR proteins, degradation of phytoalexins, systemic resistance mechanism; application of molecular biology to plant disease control - transgenic approach for crop protection, engineering chemicals that elicit defense response to plants.

UNIT –III

Major diseases in plants

(a) Cereals: Rice - blast disease, bacterial blight

(b) Vegetables: Chilly - leaf spot; Ladies finger - vein clearing disease.

(c) Fruits: Citrus - bacterial canker;

(d) Spices: Ginger - rhizome rot; Pepper - quick wilt

(e) Oil seeds: Coconut - grey leaf spot, bud rot disease.

(f) Rubber yielding: *Heveabraziliensis* - abnormal leaf fall, powdery mildew.

(g) Sugar yielding: Sugarcane - red rot

(h) Cash crops: Arecanut - nut fall disease.

Subject Name: INTRODUCTORY PLANT CELL AND TISSUE CULTURE

UNIT -1

Introduction; History of Plant Tissue Culture and Biotechnology; Scope and Importance of Biotechnology.

Principles of plant tissue culture: Organization of laboratory media composition and preparation, aseptic manipulation

UNIT –II

Cellular totipotency: Process and mechanism; Somatic embryogenesis and synthetic seeds: Induction and controlling factors; Organogenesis: Process and controlling factors; Haploids: Androgenic and gynogenic; obtention and promises; Somatic hybridization: Isolation, culture and fusion of protoplasts, regeneration of hybrids and cybrids.

UNIT –II

Somatic hybridization: Isolation, culture and fusion of protoplasts, regeneration of hybrids and cybrids; Clonal propagation: Micropropagation; Somaclonal and gametoclonal variation and

their selection; Transgenic plants: Method of transformation, selection, identification and applications; Germplasm conservation.
Industrial application of tissue culture.

Subject Name: MICROBIAL BIOGEOCHEMISTRY

UNIT -1

The tools of microbial genetics: Escherichia coli, Bacillus subtilis, bacteriophages (T4, lambda, Mu)

Mutation: Spontaneous and induced mutation, mutagens and mechanism of mutation, selection of auxotrophic and drug resistant mutants, suppressor mutations.

Insertion sequences: plasmids, mechanism of insertion, effects of insertion sequences and its importance.

Transposons: heritable properties conferred by transposons, physical organization of drug resistant transposons, genetic organization of TnA and its role in transposition.

UNIT –II

Gene expression and regulation: Regulation of virulent genes in pathogenic bacteria, heat shock regulon and signal transduction and Cps regulon

Microbial toxins: Microbial toxin types, biochemical and molecular basis of toxin production.

UNIT –III

Gene manipulation and production of novel commercial products, biopolymers, biosensors, biocatalysts

Bio fertilizers and its application: Algalization, rhizobia, Azolla-Anabaena system.

Subject Name: PRACTICAL