Dr. Bhimrao Ambedkar University, Agra

A State University of Uttar Pradesh (Paliwal Park, Agra -282004)

www.dbrau.ac.in

A Documentary Support

for

Matric No. – 1.3.1

Institution integrates cross-cutting issues relevant to **Professional Ethics, Gender, Human Values, Environment & Sustainability and other value framework enshrined in Sustainable Development goals and National Education Policy – 2020** into the Curriculum

under the

Criteria – I

(Curriculum Design and Development)

Key Indicator - 1.3

in

Matric No. – 1.3.1

M. Sc. Botany

2020

PROFESSIONAL ETHICS

ENVIRONMENT & SUSTAINABILITY

NATIONAL EDUCATION POLICY – 2020

HUMAN VALUES

GENDER

Registrar
Dr. B.R.A. University, Agra

Signature Not Verified
RAJEEV KUMAR
Digitally Signed By Registrar

Appendix – 2, 3

Choice Based Credit System (CBCS)
Department of Botany,
School of Life Sciences,
Dr.BhimraoAmbedkar University, Agra

Core Courses	Course Title M.Sc. Botany I semester	Marks		Total 100	Credit
		CIE	End Semester Examination		
BOT-C101	PLANT DIVERSITY I	25	75	100	4
BOT-C102	PLANT DIVERSITY -2	25	75	100	4
BOT-C103	PLANT PHYSIOLOGY AND METABOLISM	25	75	100	4
BOT-C104	PLANT MORPHOLOGY AND ANATOMY	25	75	100	4
BOT-C105	PRACTICAL	25	75	100	4
	Industrial training/Survey/Research Project				
	Total			**500**	**20**
Core Courses	**Course Title M.Sc. Botany II semester**	**Marks**		**Total**	**Credit**
		CIE	**End Semester Examination**		
BOT-C201	ANGIOSPERMS, SYSTEMATICS AND ECONOMIC BOTANY	25	75	100	4
BOT-C202	PLANT RESOURCES UTILIZATION AND CONSERVATION	25	75	100	4
BOT-C203	FOUNDAMENTALS OF ECOLOGY	25	75	100	4
BOT-C204	PLANT CELL, TISSUE AND ORGAN CULTURE	25	75	100	4
BOT-C205	PRACTICAL	25	75	100	4
BOT-C206	**Industrial training/Survey/Research Project**		200	**200**	**8**
	Minor	25	75	**100**	**4**
	Total			**800**	**32**
Core Courses	**Course Title M.Sc. Botany III semester**	**Marks**		**Total**	**Credit**
		CIE	**End Semester Examination**		
BOT-C301	BIOLOGY OF PLANT REPRODUCTION	25	75	100	4
BOT-C302	MYCOLOGY AND PLANT PATHOLOGY	25	75	100	4
BOT-C303	MOLECULAR BIOLOGY AND GENETIC ENGINEERING	25	75	100	4
BOT-E304	CYTOGENETICS	25	75	100	4
BOT -E305	PLANT BREEDING				
BOT -E306	PRACTICAL	25	75	100	4
	Industrial training/Survey/Research Project				
	Total			**500**	**20**
Core Courses	**Course Title M.Sc. Botany IV semester**	**Marks**		**Total**	**Credit**
		CIE	**End Semester**		

13/06/2022

			Examination		
BOT -C401	BIOSTATISTICS AND COMPUTER APPLICATION	25	75	100	4
BOT -C402	CELL BIOLOGY AND PLANT BIOCHEMISTRY	25	75	100	4
BOT-E403	*IN VITRO* PLANT PROPAGATION	25	75	100	4
BOT-E404	STRESS PHYSIOLOGY OF PLANTS				
BOT-E405	ENVIRONMENTAL BIOTECHNOLOGY	25	75	100	4
BOT-E406	ETHNOBIOLOGY AND ETHNOPHARMACOLOGY				
BOT-C407	PRCTICAL	25	75	100	4
BOT-C408	**Industrial training/Survey/Research Project**		200	**200**	**8**
	Total			**700**	**28**

Note:

03/06/2022

M.Sc. Botany I semester

Core Course

BOT-C101 Plant Diversity- I

UNIT I

Phycology: Algae in diversified habitats: thallus-organization; cell ultrastructure; reproduction (vegetative, asexual and sexual); classification of algae; pigments, reserve food, flagella; algal blooms, Economic importance of algae(as fertilizers, food feed and industry).

Classification, salient features of Chlorophyta, Xanthophyta, Bacillariphyta, Phaeophyta and Rhodophyta.

UNIT II

Bryophytes: Morphology, structure, reproduction and life history; distribution; Sporophyte evolution of bryophytes; classification; general account of Marchanitales, Jungermaniales, Anthocerotalcs, Funariales, economic and ecological importance.

UNIT III

Pteridophyta: Morphology, anatomy and reproduction; classification, life cycle, evolution of stele; heterospory and origin of seed habit.

General account of fossil pteridophyta, Brief introduction of Psilopsida, Lycopsida, Sphenopsida and Pteropsida

UNIT IV

GYMNOSPERMS

Classification of Gymnosperms. Comparative study vegetative, anatomical and reproductive structures of Cycadophyta, Coniferophyta and Gnetophyta. Evolutionary trends and phytogenetic relationship among various groups of Gymnosperms. Economic importance of Gymnosperms.

03/06/2022

M.Sc. Botany I semester

Core Course

BOT-C102 Plant Diversity- II

UNIT I

Archaebacteria and eubacteria: General account; ultrastructure, nutrition and reproduction biology and economic importance: cyanobasseri-salint feature and biological importance.

UNIT II

Viruses: Characteristics and ultrastructure of virions; isolation and purification of viruses; chemical nature, replication, transmission viruses; economic importance.

Phytoplasma: General characteristics and role in causing plant diseases.

UNIT III

Mycology and Plant Pathology:

Fungi: General characters of fungi: substrate relationship in fungi; cell ultrastructure, unicellular and multicellular organization;

Plant Pathology: Concept of disease in plants; Definition of plant disease; Historical development of Plant Pathology. Methods of studying plant diseases: Collection, preservation, isolation of pathogens and proving Koch postulates. Symptoms caused by Plant Pathogenic fungi, bacteria and viruses. Brief Classification of Plant diseases.

UNIT IV

General account of Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina, Deuteromycotina; fungi in industry, medicine anc as food; fungal diseases in plant humans; Mycorrhizae, fungi as biocontrol agents.

Cell wall composition; nutrition-saprobic, biotrophic, symbiotic; reproduction-vegetative, asexual and sexual; heterothallism; heterokaryosis; parasexuality; recent trends in classification, phylogeny of fungi.

03/06/2022

M.Sc. Botany I semester

Core Course

BOT-C103 PANT PHYSIOLOGY AND METABOLISM

UNIT I

Energy flow : Principles of thermodynamics, free energy and chemical potential redox reaction structure and function of ATP.

Fundamentals of enzymology : General account, isozymes, kinetics of enzymatic catalysis, Michel's Menten equation and its significance.

Membrane transport and translocation of water and solutes: Plant water relations, mechanism of water transport through xylem, phloem; passive and active solute transport, membrane transport problems.

Signal transduction: Overview, receptors and G-proteins, phospholipid signaling, role of cyclic nucleotides, calcium-O clamodulin cascade, diversity in protein kinases and phosphatases, specific signaling mechanism, e.g. two component sensor regulating system in bacteria and plants, sucrose sensing mechanism.

UNIT II

Phytochemistry and photosynthesis: Evolution of photosynthetic apparatus, photosynthetic pigment and light harvesting complexes, photooxidation of water, mechanism of electron and proton transport, carbon assimilation-the calvin cycle, photorespiration, C4 cycle, CAM pathway.

Respiration and Lipid metabolism: Glycolysis, TCA cycle, electron transport and ATP synthesis, pentose phosphate pathway, glyoxylate cycle, alternative oxidases system structure and function of lipids, fatty acid biosynthesis and their catabolism.

UNIT III

Nitrogen fixation, Nitrogen and sulphur metabolism: Overview, biological nitrogen fixation, nodule formation and nod factors, mechanism of nitrate uptake and reduction, ammonia assimilation

Sensory photobiology: Phytochromes and their photochemical and biochemical properties, photoperiodism and its significance, vernalization

UNIT IV

Plant growth regulators and elicitors: Physiological effect and mechanism of action of auxin, gibberellins, cytokinins, ethylene, abscisic acid, brassinosteroids and polyamines

03/06/2022

M.Sc. Botany I semester

Core Course

BOT-C104 PLANT MORPHOLOGY AND ANATOMY

UNIT I

Introduction : Unique features of plant development. Differentiates specialization and morphologenesis.

UNIT II

Seed Germination and seedling growth: Metabolism of nucleic acids, proteins and mobilization of food reserves; tropisms hormonal control of seedling growth; gene expression

UNIT III

Shoot development: Organization of the shoot apical meristem (SAM); Cytological and molecular analysis of SAM; control of cell division and cell to cell communication; anomalous secondary growth; tissue differentiation- xylem and phloem; secretary ducts and laticifers; wood development in relation to environmental factors; nodal anatomy.

UNIT IV

Leaf growth and differentiation: Determination; phyllotaxy; control of leaf form; differentiation of epidermis (with special reference to stomata and trichomesl and mesophyll.

Root Development: Organization of root apical meristam (RAM); cell fates and lineages; vascular tissue differentiation; lateral roots, root hairs; root-microbe interactions, Rood nodules.

03/6/2022

M.Sc. Botany II semester

Core Course

BOT-C201 ANGISOPERMS, SYSTEMATICS AND ECONOMIC BOTANY

UNIT I

Origin of intrapopulation variation. and the environment : ecades and ecotype : Exxxx hotspots plant diversity.

The species concept: Taxonomic hierarchy, species, genus, family and other categories; Modern trends in plant taxonomy: Anatomy in relation to taxonomy, embryology in relation to taxonomy; salient features of the ICBN

UNIT II

Taxonomic tools: Herbarium, numerical taxonomy, cytotaxonomy, chaemotaxonomy, serological and molecular taxonomy

UNIT III

Systems of angiospermic classification: Phenetic verses phylogenetic system: Benthom & Hooker, Engler and Prantell & Hutchinson's system; relative merits and demerits of major systems

UNIT IV

Description of the families:

(a) **Dicotyledons:** Ranunculaceae, Rutacoe, Meliaceae, Euphorbiaceae. Malvaceae, Apiaceae, Apocynaceae, Asciemadacoae, Cnvolvuiaceae, Lamiaceae, Solanaceae, Rubiaceae, Cucurbitaceae, Asteraceae, Verbinaceae

(b) **Monocotyledons:** Poaceae, Cyperaceae, Palmae, Zingiberaceae, Orchidaceae

03/06/2022

M.Sc. Botany II semester

Core Course

BOT-C202 PLANT RESOURCES UTILIZATION AND CONSERVATION

UNIT I

Strategies for conservation- *In situ* conservation: International efforts and Indian initiatives; protected areas in India-Sanctuaries, National Parks, biosphere reserves, wetlands, mangroves and coral reefs for conservation of wild biodiversity.

Strategies for conservation: ex situ conservation : Principles and practices; botanical gardens, field gene banks, *in vitro* repositories, cryobanks.

UNIT II

Origin, evolution, botany, cultivation and uses of food, forage and fodder, fibre, medicinal and aromatic plants, and vegetable oil yielding crops.

UNIT III

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

UNIT IV

Green revolution: Benefits and adverse consequences.

Innovations for meeting world food demand.

Plants used as avenue trees for shade, pollution control and aesthetics.

Principles of conservation; extinction's environmental status of plant based on International union for conservation of Nature.

General account of the activities of Botanical Survey of India (BSI); National Bureau of Plant Genetic Resources (NBPGR), Indian Council of Agricultural Research (ICAR), Council of Scientific & Industrial Research (CSIR), and the Department of Biotechnology (DBT) for conservation, non-formal conservation efforts.

03/06/2022

M.Sc. Botany II semester

Core Course

BOT-C203 FUNDAMENTALS OF ECOLOGY

UNIT I

Climate, soil and vegetation patterns of Life zones : major biomer and major vegetation, Soil types. pedogenesis; physical and chemical characters.

Vegetation Organization: Concepts of community and continuum; analysis of communities (analytical and synthetic characters); inter-and intra specific associations; concept of ecological niche.

UNIT II

Vegetation development: Temporal changes (Cyclic and non-cyclic); mechanism of ecological succession; Ecological life-cycle of plants; autoecology, genecology- gene study in India, synecology.

UNIT III

Ecosystem Organization: Structure and functions; primary production (methods of measurement), energy dynamics (trophic organization, energy flow pathways, ecological efficiencies; global biogeochemical cycles of C, N, P and S.

Biological Diversity: Concepts of levels; role of diversity in ecosystem functions and stability; speciation and extinction; IUCN categories of threat; distribution and global warming, sea level rise, UV radiation.

UNIT IV

Air, water and soil pollution: Kinds; source; quality parameters; effects on plants and ecosystems.

Climate change: Greenhouse gases (CO_2, CH_4, N_2O, CFCs: source, trends and role); ozone layer and ozone hole; consequences of climate change (CO_2 fertilization, global warming, sea level rise, UV radiation).

03/06/2022

M.Sc. Botany II semester

Core Course

BOT-C204 PLANT CELL, TISSUE AND ORGAN CULTURE

UNIT I

General introduction, history scope, concept of cellular differentiation and totipotency; Tissue culture media; preparation and sterilization procedures; Anther culture production of androgenic hapoids, bullbosum method.

UNIT II

Meristem culture and production of disease free plants; Cell culture and production of secondary metabolites / natural products; Embryo culture.

UNIT III

Callus culture, somatic embryogenesis and production of synthetic seeds; Endosperm culture; Somatic hybridization: Protoplast isolation fusion and culture, hybrid selection and regeneration possibilities.

UNIT IV

Somaclonal and gametoclonal variation; Clonal propagation; Cryopreservation, germplasm storage and gene banks. Germplasm conservation and synthetic seed technology, Industrial application. Suspension culture, hairy root culture and bioreactors

03/06/2022

M.Sc. Botany III semester

Core Course

BOT-C301 BIOLOGY OF PLANT REPORDUCTION

UNIT I

Methods of reproduction in flowering plants: Vegetative, asexual, sexual and parasexual mode reproduction. Sexual system in flowering plants. Structure and development of male garnetophyte and female gametophyte.

Pollination: Self and cross pollination, flower structure in relationship to the mono of pollination, contrivances promoting cross pollination, methods of cross pollination, insect pollination, the pollinators and causal factors, attractants and reward of pollination.

UNIT II

Pollen-Pistil interaction: Significance of pollen pistil interaction, structure of stigma and style, post- pollination events, fertilization.

Pollen Physiology: Viability, FCR, Alexander's stain, TLC

UNIT III

Carpel Morphology: Form of carpel, closure of carpel, complex carpel, solid carpel, placentation.

UNIT IV

Seed Biology: Seed and fruit physiology of growth and development, interaction of seed and Twit, involvement of extraovarian parts in fruit development. Physiology of seed germination, seed dormancy and seedling establishment. **Morphological sterility:** Mechanical and physiological factors. **Incompatibility:** Sexual incompatibility, general concepts, mechanism of intraspecific incompatibility Methods employed for overcoming incompatibility.

03/06/2022

M.Sc. Botany III semester

Core Course

BOT-C302 MYCOLOGY AND PLANT PATHOLOGY

Unit I

Introduction. General characteristics; Ecology and Distribution; Thallus organization; EM of haustorium and septum: Wall composition: Nutrition; Growth; Reproduction and spore); Heterokaryosis and parasexuality; Sexual compatibility: Life cycle patterns of Myxomycota. Oomycota, Zygomycota, Ascomycota, Basidiomycota, Deuteromycota.

Unit II

Applied Mycology Role of fungi in biotechnology Application of fungi in food industry of flavour & texture. Fermentation. Baking, Organic acids, Enzymes, Mycoproteins); Secondary metabolites Pharmaceutical preparations); Agriculture (Biofertilizers): Mycotoxins; Biological Control (Mycofungicides, Mycoherbicides, Mycoinsecticides, Myconematicides); Medical mycology.

Unit III

Plant Pathology Introduction: Definition: Importance; Terms and Concepts, Classification; Causes, Symptoms Host Pathogen relationships

Unit IV

Geographical distribution of diseases; etiology, symptomology, disease cycle and environmental relation; prevention and control of plant diseases, and role of quarantine

03/06/2022

M.Sc. Botany III semester

Core Course

BOT-C303 MOLECULAR BIOLOGY AND GENETIC ENGINEERING

UNIT I

Basic concepts, principle and scope of molecular biology and genetic engineering.

Recombinant DNA technology: Gene cloning principles and techniques, construction of genomic/c DNA libraries, choice of vectors, DNA synthesis and sequencing, polymerase chain rejection, DNA fingerprinting.

UNIT II

Genetic Engineering of plants: Aims, strategies for development of transgenics (with suitable examples), Agrobacterium- the natural genetic engineer, T-DNA and transposon mediated gene tagging, chioroplast transformation and its utility, intellectual property rights.

UNIT III

Microbial Genetic Manipulation: Bacterial transformation, selection of recombinants and transformants, genetic improvement of industrial microbes and nitrogen fixers, fermentation technology.

UNIT IV

Genomics and Proteomics: Genetic and physical mapping of genes, molecular markers for introgression of useful traits, artificial chromosome, high throughout sequencing, genome projects, bioinformatics, microarrays.

03/06/2022

M.Sc. Botany III semester

Elective

BOT-E304 CYTOGENETICS

UNIT I

Chromatin Organization : Chromosome structure and packaging of DNA, molecular organization of centromere and telomere; nucleolus and ribosomal RNA genes; euchromatin and heterochromatin; chromosomes-polythene, ampbrush, B-chromosome and sex chromosome, molecular basis of chromosome pairing.

UNIT II

Structural and numerical alterations in chromosomes: Origin, meiosis and breeding behavior of duplication, deficiency, inversion and translocation heterozygotes; origin, occurrence, production and meiosis of hapioids, aneuploids and euploids; origin and production of autoployploids; chromosomes and chrmatid segregation; allopolyploids, types, genome constitution and analysis; evolution of wheat and paddy crop induction and characterization of trisomics and monosormics.

UNIT III

Genetics of Prokaryotes and eukaryotic organelles: Mapping the bacteriophage genome; phage phenotypes; genetics recombination phage; genetics transformation, conjugation and transduction in bacteria; cytoplasmic male sterility.

Gene Structure and Expression: Genetics fine structure; cis-trans test; fine structure analysis of eukaryotes; introns and their significance; regulation of gene expression in prokaryotes and eukaryotes.

UNIT IV

Mutations: Spontaneous induced mutations; physical and chemical mutagens; molecular basis of gene mutations; transposable elements in prokaryotes and eukarotes; mutations induced by transposons; site- directed mutagenesis; DNA damage and repair mechanisms.

03/06/2022

M.Sc. Botany III semester

Elective

BOT-E305 Plant Breeding

UNIT I

Cytogenetics of anuploids and structure heterozygote : Effect of an on phen.... transmission of monosomics and trisomics; breeding behaviour and genetics of structure heterozygotes; translocation tester sets; Robertsonian translocation; B-B translocation.

UNIT II

Alien gene transfer, chromosome manipulation: transfer of whole genome, example from wheat, Arachis and Brassica; transfer of individual chromosomes and chromosome segments; method of detecting alien chromatin; production characterization and utility of alien addition and substitution lines; genetic basis of inbreeding and heterosis; exploitation of hybrid vigour.

UNIT III

Perspectives of plant breeding, methods of reproduction in crop plants and breeding methods in crops:

a. Aims and achievements of plant breeding

b. Breeding methods for self pollinated crops, pure line breeding and mass selection, pedigree method

c. Selection in cross pollinated crops, Recurrent selection, Clonal selection

d. Hybrid and synthetic varieties

e Heterosis and in breeding depression

UNIT IV

Polyploidy mutation and biotechnology in crop improvement, seed production practices:

a. Autoploidy, Allopolyploidy and aneuploidy, seed production practices

b. Mutation breeding: procedure, achievements and pitfalls of mutation breeding

c. Haploid production Embryo culture, somatic cell hybridization, genetic engineering

d. Seed production practices: Improved varieties, role of seed certification, National seed corporation, seed labeling and seed testing

03/06/2022

M.Sc. Botany IV semester

Core Course

BOT-C401 Biostatistics and Computer Application

UNIT I

1. Concepts of statistics and biometry
2. Continuous and discontinuous variables
3. Brief description and tabulation of data in its graphical representation.

UNIT II

1. Measures of central tendency and dispersion, mean, median mode, range, standard deviation, variance
2. Elementary probability: addition and multiplication laws.

UNIT III

1. Simple linear regression and correlation
2. Idea of two types of errors and level of significances, test of significance (F & t test); chi-square tests.

UNIT IV

1. Introduction of digital computers: organization; low level and high level language; binary number system.
2. Flow charts and programming techniques.
3. Introduction to programming techniques.
4. Introduction to programming techniques.
5. Introduction to data structure and database concepts, introduction to internet and its application.
6. Introduction to MS-Office software, covering Word Processing, Spreadsheets and Presentation software- introduction to Corel Draw.

03/06/2022

M.Sc. Botany IV semester

Core Course

BOT-C402 CELL BIOLOGY AND PLANT BIOCHEMISTRY

Unit-I

Cell components:

Structural and functional aspects of cytoskeleton system, role in cell organization and movement, organization of microtubules, microfilaments and plasmodesmata. Ultrastucture and function of microbodies, golgi apparatus, lysosomes, peroxisomes, endoplasmic reticulum, vacuole, ribosomes, nucleus and nucleolus. Structural organization and functions of: Cell wall and Plasma membrane Membrane transport: Structure and functions of ion carriers, channel proteins.

Unit-II

Classification, structure and functions of: Carbohydrates- Monosaccharides, oligosaccharides, polysaccharides (storage and structural) Amino acids- protein, non- protein, essential and non-essential. Proteins- simple and conjugated Lipids- Fatty acids, simple and compound lipids. Nitrogen and sulfur metabolism: Biological nitrogen fixation, nitrogenase enzyme complex, nodule formation and nod factors. Mechanism of nitrate reduction-nitrate and nitrite reductase. Ammonia assimilation. Assimilation of sulfur.

Unit-III

Plant growth hormones:

Biosynthesis, function and mechanisms of action of Auxins. Gibberellins. Cytokinins. Abscisic acid, Ethylene. Brasssinosteroids, Polyamines, Jasmonic acid and Salicyclic acid.

Unit-IV

Enzymes:

General aspects, characteristics and classification. Factors affecting enzyme activity Active sites and mode of action. Regulation of enzyme activity and allosteric mechanism Enzyme inhibition - reversible and irreversible, competitive and non-competitive. Enzyme kinetics and Michaelis-Menton equation.

03/06/2022

M.Sc. Botany IV semester

Elective

BOT-E403 *In Vitro* Plant Propagation

Unit I

Basic concepts, principles and scope of Plant cell and tissue culture: General introduction, history, concept of cellular differentiation, totipotency.

Unit II

Organogenesis and adventives embryogenesis: Fundamental aspects of morphogenesis somatic embryogenesis and androgenesis. Mechanism techniques and utility. Somatic hybridization: Protoplast isolation, fusion and culture, hybrid selection and regeneration. Possibilities, achievements and limitation of protoplast research.

Unit III

Micropropagation- Factors affecting morphogenesis and proliferation rate; technical problems in micropropagation. Organogenesis- formation of shoots and roots, production of virus free plants by meristem and shoot-tip culture

Unit-IV

Application of plant tissue culture: Clonal propagation, artificial seed, production of hybrids and somaclones. Production of secondary metabolites/ natural products. Cryopreservation and germplasm storage.

03/06/2022

M.Sc. Botany IV semester

Elective

BOT-E404 Stress Physiology of Plants

Unit-I

Biological stress vs. Physical Stress, Types of stresses and general methods of measurement of stress response (Strain), Stress physiology in crop improvement, Response to UV stress: Injury and resistance mechanism

Unit- II

Response to low temperature stress: Chilling, freezing, frost injury and mechanism of resistance, Adaptations, Response to high temperature stress: Injury and mechanism of resistance, Heat shock proteins, Adaptations

Unit –III

Response to nutrient deficiency stress, Heavy metal stress, injury and mechanism of resistance, adaptations. Salinity stress. Ionic and salt stress injury, mechanism of resistance

Unit-IV

Response to water deficit: Desiccation, Dehydration injury; Mechanism of resistance, Adaptations. Response to water excess: Flooding, hypoxia. Mechanism of resistance, Adaptations. Causative agents for Biotic Stresses. Mechanism of Resistance against Fungal, Bacterial and viral pathogens

03/06/2022

M.Sc. Botany IV semester

Elective

BOT- E405 ENVIRONMENTAL BIOTECHNOLOGY

Unit – I

1. Pollution and Pollutants: Cost of pollution, Kinds of Pollution and Pollutants- Air, Water, and Soil Pollution, Their effects on Plants and Ecosystems;
2. Role of Plants in Pollution Management.

Unit – II

3. Climate Change: Greenhouse Gases (CO_2, CH_4, N_2O, CFCs: sources and roles), Ozone layer and Ozone hole, Consequences of Climate change (acid rain, global warming, sea level rise, UV radiation).

Unit – III

Ecosystem Stability: Concept (resistance and resilience), Ecological Perturbations (natural and anthropogenic) and Their Impacts on Plants and Ecosystems, Ecology of Plant Invasion, Environmental Impact Assessment (EIA), Ecosystem Restoration.
Environment and energy, Energy resources – Renewable and Non-renewable. Natural resources, Loss of Diversity, causes and consequences, Environmental Auditing, Conservation of Biodiversity.

Unit – IV

Ecological Management: Concepts, Sustainable Development, Remote sensing and GIS as Tools for Resources Management.
Phytoremediation: Prevention and Control, Methods of reducing Environmental impacts of Chemicals, Weedicides, Pesticides and Fertilizers. Biotechnological advances in pollution control through GEMs.

03/06/2022

M.Sc. Botany IV semester

Elective

BOT- E406 ETHNOBIOLOGY AND ETHNOPHARMACOLOGY

UNIT- I ETHNOBOTANY

Ethnobotany: concept, history, evolution and scope; Indigenous knowledge and traditional practices of some Himalayan communities; Taxonomic epidermal characters and pharmacognostical studies to check adulteration. Problems and prospects of value addition applicable to plant resources. Scope for development of plant resources.

UNIT II: ETHNOBIOLOGY

Major ethnic group in North East India India, their social institutions, livelihood, cultural and religious practices Shamanism and other belief systems, sacred groove and methods of biological resource conservation. Current status of Ethnobiolgoy; Ethnobiology, biodiversity and traditional knowledge;

UNIT- III ETHNOPHARMACOLOGY

Role of Ethnobotany in drug discovery. Ayurvedic drug preparation and drug adulteration. Chemical composition of few medicinal and aromatic plants, extraction and uses pertaining to typical Indian formulation of drugs. Ethnopharmacological validation of traditional medicine; approaches to drug discovery from ethnobotanical leads.

UNIT- IV NATURAL PRODUCTS FROM PLANTS

Definition, importance and systematics and characterization of Natural products. Phenolic acids, alkaloids, glycosides, terpenoids, flavonoids, steroids, tannins in plants kingdom. Function of secondary metabolite for plant defense and protection.

03/06/2022