PO, PSO & CO

Department of Botany

Ss no	Program	Course	Paper	Topic
1	B.Sc I	BOTANY	First	General diversity of Cryptogams
2	B.Sc I	BOTANY	Second	Bryophytes, Pteridophytes, Gymnosperms & Palaeobotany
3	B.Sc II	BOTANY	First	Diversity of seed plants & their systematics
4	B.Sc II	BOTANY	Second	Structure, Development & Reproduction in flowering plants.
5	B.Sc III	BOTANY	First	Plant Physiology, Biochemistry & Biotechnology
6	B.Sc III	BOTANY	Second	Ecology and Utilization of Plants
7	M.Sc I Semester	BOTANY	First	Biology & Diversity of Bacteria, Vruses and Fungi
8	M.Sc I Semester	BOTANY	Second	Biology & Diversity of Algae, Bryophytes & Pteridophytes.
9	M.Sc I Semester	BOTANY	Third	Cell & Molecular Biology of Plants
10	M.Sc I Semester	BOTANY	Fourth	Taxonomy of Angiosperms
11	M.Sc II Semester	BOTANY	First	Cytology ,Genetics & Cytogenetics
12	M.Sc II Semester	BOTANY	Second	Biology & Diversity of Gymnosperms
13	M.Sc II Semester	BOTANY	Third	Plant Physiology
14	M.ScIISemester	BOTANY	Fourth	Plant Biochemistry & Bioergetics
15	M.ScIIISemester	BOTANY	First	Plant Development
16	M.Sc III Semester	BOTANY	Second	Plant Reproduction
17	M.Sc III Semester	BOTANY	Third	Plant Ecology
18	M.Sc III Semester	BOTANY	Fourth	Elective Paper (A)Plant Pathology-I (B)Weed Biology-I
19	M.Sc IV Semester	BOTANY	First	Plant Cell ,Tissue & Organ Culture
20	M.Sc IV Semester	BOTANY	Second	Plant Resource Utilization & Conservation
21	M.Sc IV Semester	BOTANY	Third	Genetic Engineering of Plant & Microbes &

				Biostatistics
22	M.Sc.IV Sem.	BOTANY	Fourth	Elective Paper (A)Plant pathology-II (B)Weed Biology-II

Programme outcomes for B.Sc.

NOTE- For all B.Sc. (Undergraduate) programme the Programme outcomes are exactly as the general higher education programmes because the syllabus is unified. We follow them. These are

PO1-Critical Thinking- Take informed actions after identifying the assumptions and checking our degree to whichthese assumptions are accurate and valid and looking to our ideas and decisions.

PO2- Effective Communication

PO3- Social Interaction

PO4- Effective Citizen ship

PO5- Ethics

PO6- Environment and Sustainability

PO7- Self directed and lifelong learning

PSOs FOR B.Sc. Botany-

PSO1- To know the diversity of the prokaryotes and microbes like Algae & Fungi.

PSO2- To understand the structure and function of early vascular plants and higher tracheophytes like Pteridophytes and Gymnosperms**.**

PSO3- To know the Diversity and Systematics of Angiosperms.

PSO4- To understand the structure and complexity and also the reproduction of flowering plants.

PSO5- The acquaint the students with functional aspects of plant life i.e plant physiology and the basics of Biochemistry.

PSO6- How the ecosystem works and what are the relationships of plants, environment and society? This is the specific outcome of the B.Sc. 3 Year programme. This is included in plant Ecology and Utilisation of plants.

Programme Outcomes for M.Sc.

PO1- M. Sc. Programmes has been designed to acquaint the students about the diversity of lower and higher plants. Also they are well aware about theCellular& Molecular Biology of Plants.

PO2- The systematic arrangement of plants has been taught and students learn about the taxonomy of angiosperms.

PO3- Biochemistry and the physiological aspects are learned by them so that they may explore the plant life physiologically.

PO4– The cellular and molecular organisation and the process of Tissue culture techniques are also taught indetail.

PO5- Plant Ecology and the Utilisation of plants for mankind as well as conservation of plant wealth are the important outcomes of 4^{th} Sem. students.

PO6- Genetic Engineering, Recombinant DNA Technology Artificial gene transfers are some of the topics which are learnt by the students in their last semester.

Programme Specific Outcomes for M.Sc.

PSO 1- Learn about practical technique in lab for detail study of plant structure, reproduction, anatomy, breeding procedures for hybridization

PSO 2- To utilize the knowledge of mycology and plant pathology to satisfy the need of farmers

PSO 3- Procure the knowledge of teaching to them while staying in the department

PSO 4- Prepare the students for many competitive exams like CGPSC, UPSC, NET, SET, GATE etc.

PSO 5- Enable the students to be resourceful in identifying of plants of Field and Lab.

PSO 6- Perform critical evaluation of ideas and arguments by collection of relevant information about plants, so as to recognize the position of plants in broad classification and Phylogenetic level.

PSO 7- Identify problems and independently propose solutions using creative approaches, acquired through interdisciplinary experiences, and acquire knowledge/expertise in the field of Plant Identification.

PSO 8- Accurate interpretation of collected information and use taxonomical information to evaluate and formulate a position of plant in taxonomy.

PSO 9- Identify the major groups of organisms with an emphasis on plants and be able to classify them within a phylogenetic framework.

PSO 10- Students will be able to compare and contrast the characteristics of plants, algae, and fungi that differentiate them from each other and from other forms of life.

PSO 11- Access the primary literature, identify relevant works for a particular topic, and evaluate the scientific content of these works.

PSO 12- Explain the ecological interconnectedness of life on earth by tracing energy and nutrient flow through the environment. They will be able to relate the physical features of the environment to the structure of populations, communities, and ecosystems.

PSO 13- Demonstrate proficiency in the experimental techniques and methods of analysis appropriate for their area of specialization within biology.

Course Outcomes B.Sc Part 1

Botany paper1

General diversity of Cryptogams

CO1: Students will get familiar with subject Botany in which they learn about Viruses and Bacteria, their ultra-structure, Reproduction, their Economic importance.

CO2: Students learn about types of algae, their classification where they belongs to their class/groups, what kind of habit, thallus structure, organization, pigmentation, form of reserve food present in them and reproduction and their economic importance in reference to food, Industry, Agriculture and also their harmful aspects.

CO3: They learn about different types of plant pathogen / fungi and lichens, their classification and their economic importance in reference to Industry, Medicines, Food and Agriculture.

CO4: The students came to know the diseases caused by Viruses and Bacteria, which were the host, types of pathogen and what kind of symptoms occurred on plants, and identifying characters with type or name of disease of plants.

CO5: Learn the type of Bryophytes, their classification where they belong to group or classes, their characteristic features, how life cycles occurred and their economic importance.

CO6: To learn about the general classification of pteridophytes, life history pattern and importance.

Paper 2- Cell biology and Genetics-

CO1-To know about the structure of plant cell and detail study of cell organelles likemitochondria, chloroplast and endoplasmic reticulum.Ultra structure of cell organelles like mitochondria chloroplast and others.

CO2-Cell divisions mitosis and meiosisand theirimportance.

CO3- Structure of chromosomes a, special type of chromosomes, lamp brush, salivarygland and B chromosomes. Chromosomal abbreration – Additions, Deletion, Translocation inversions.

CO4-Changes in the chromosome number- poly ploidy, euploidy aneuploidy.

Co5- Mutation

B Sc II [BOTANY]

BOTANY PAPER1-Diversity of seed plant & their systematic-PAPER CODE-0861

CO1 – To know about the characters of seed plant and their diversity.

CO2- To know about the morphology and vegetative parts and life cycles of cycaspinus and Ephedra.

CO3-To learn about the origin and evolution of Angiosperms, Primitive Angiosperms

CO4-To Know about Classification of Angiosperms: Salient features of Bentham& Hooker;Engler and Prantl.

CO5-To know about the modern trends of taxonomy:contribution of cytology, phytochemistry and taximetrix to taxonomy.

CO6 -To Know about General account of family ranunculaceae, apiaceae, brasicaceae, malvaceae, utaceae, fabaceae, acanthaceae, lamiaceae, chenopodiaceae, solanaceae. liliaceaeandpoaceae.

PAPER 2- Structure and reproduction of Flowering Plants- PAPER CODE 0862

CO1- To know about the basic body plan of a flowering plants and modular type of growth.

CO2-To Know about Diversity of plant forms, convergence and evolution of tree habit in Gymnosperms, Monocots and Dicots.

CO3-To know about the Largest and longest lived organisms

CO4- To learn about the theories of shoot apical meristem. Vascularisation of ofpri. Shoot in monocotyledons and dicotyledons.

CO5-To Know about Canopy Architecture and branching pattern.

CO6-To Know about Secondary growth in dicots and wood structure.

CO7-To Know about Orin and development of leaf and its diverse forms; Its role in photo synthesis, Senesence and abscission.

CO8-To Know about Root apical meristem :theories to explain it and modification of roots.Differentiation of primary and secondary tissues and their roles.Root Microbe interactions.

C09-To Know about Flowers as a modified shoot, Embryology of flowering plants. Pollination, Pollen –pistil interaction andself-incompatibility.

C0 10-To Know about Fruit development and maturation; Significance of seed :Suspended Animation, Seed as a unit of genetic recombination and replenishment, Dispersal strategies and Vegetative Reproduction.

B.Sc. – III (Botany)

PAPER - I PHYSIOLOGY, BIOCHEMISTRY AND BIOTECHNOLOGY

Co1 – To Know about the Plant water relations, Physical properties of water diffusion and osmosis,Transport of water and transpiration and physiology of stomata.

Co2 – Students will get to know about phloem transport, factors affecting translocation. Basic of enzymology, Characteristics and basic concepts of holoenzyme, coenzyme and regulation of enzyme activity, Photosynthesis.

Co3 – To Know about Respiration, ATP, aerobic and anaerobic respiration cycle Kerb's cycle Chemi-osmotic theory, pentose phosphate pathway. Nitrogen and lipid metabolism, importance of nitrate reductase and its regulation, structure and functions of lipids fatty acid biosynthesis saturated and unsaturated fatty acids and storage and mobilization of fatty acids.

Co4 – To learn about the Growth and development, Various phases of growth and development, seed dormancy, germination and factors of regulation. Plants movements, Concept of Photoperiodism, florigen concept, physiology of flowering. Biologicals Clocks, fruit ripening, Plants harmones like auxin, cytokinins, gibberellins their history of discovery

biosynthesis and mechanism of action. Phytochromes and Cryptochromes their discovery, physiological and mechanism of action.

Co5 - To learn about Genetic engineering, techniques of DNA recombinant technology, cloning vectors, transposable elements, techniques of gene mapping and chromosome mapping. Biotechnology functions basic of plant tissue culture .Cellular totipotency, differentiation and morphogenesis, vectors for gene delivery and marker genes and achievements in crop biotechnology.

PAPER – II ECOLOGY AND UTILIZATION OF PLANTS

CO1 – To learn about plants and environment, atmosphere, Water, light, temperature, Soil and Biota. Morphological, anatomical response of water, temperature, light and Salinity.

CO2 - To know about Community ecology, characteristics, frequency, cover biological spectrum and ecological succession, ecosystem, biogeochemical cycles.

CO3 - To know about population ecology, biogeographical and Vegetation types of India.

Co4 - To know about utilization of plants, food plants, fibres, Vegetable oils and general account of sources of firewood and bamboos.

CO5 - To know about general account, medicinal plants**,** beverges and rubber.

COURSE OUTCOME M.Sc. BOTANY

Id	Program	CourseCode	CourseName	COCode	CO
8892	M.Sc. Botany Ist SEM	BOT107	BIOLOGY & DIVERSITY VIRUS BACTERIA & FUNGI	CO1	To Know about Identify the characteristics of Structure OF Baceria, and Vruses
8892	M.Sc. Botany Ist SEM	BOT107	BIOLOGY & DIVERSITY VIRUS BACTERIA & FUNGI-II	CO1	To know about the ultra structure and identification characters of bacteria and viruses
8892	M.Sc. Botany Ist SEM	BOT107	BIOLOGY & DIVERSITY VIRUS BACTERIA & FUNGI-II	CO2	To know the nutition of viruses and their classification
8892	M.Sc. Botany Ist SEM	BOT107	BIOLOGY & DIVERSITY VIRUS BACTERIA & FUNGI-II	CO3	TO KNOW THE GENERAL CHARACTERS OF FUNGI AND THEIR REPRODUCTION METHODS
8892	M.Sc. Botany Ist SEM	BOT107	BIOLOGY & DIVERSITY VIRUS BACTERIA & FUNGI-II	CO4	To learn about the history of classification and classification given by different mycologists from time to time
8892	M.Sc. Botany Ist SEM	BOT107	BIOLOGY & DIVERSITY VIRUS BACTERIA & FUNGI-II	CO5	TO KNOW ABOUT THE GENERAL CHARACTERISTICS ,MODE OF REPRODUCTION AND LIFE HISTORY PATTERNS IN MAJOR CLASSES OF FUNGI
8892	M.Sc. Botany	BOT108	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES		TO KNOW THE DIVERSE STRUCTURE AND ECONOMIC IMPORTANCE OF ALGAE
8892	M.Sc. Botany	BOT108	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES	CO2	To Understand the characteristics of DIVERSITY OF ALGAE
8892	M.Sc. Botany Ist SEM	BOT108	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES	CO3	To Identify in depth ALGAE
8892	M.Sc. Botany Ist SEM	BOT108	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES	CO4	To Understand the characteristics of INTRODUCTION TO ALGAEALGAE
8892	M.Sc. Botany Ist SEM	BOT103	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES-III	CO1	To Learn about diversity of algae , bryophyta and pteridophyres is learnt by the students
8892	M.Sc. Botany Ist SEM	BOT108	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES	CO5	To Identify in details with examples BRYPHYTA

8892	M.Sc. Botany Ist SEM	BOT108	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES-III	CO2	To Understand the characteristics of DIVERSITY OF ALGAE
8892	M.Sc. Botany Ist SEM	BOT108	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES-III	CO3	To CLASSIFICATION and detail study of the mojor classes of algae
8892	M.Sc. Botany Ist SEM	BOT108	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES-III	CO4	TO LEARN THE GENERAL INTRODUCTION AND BROAD CLASSIFICATION OF BRYPHYTA THE
8892	M.Sc. Botany Ist SEM	BOT108	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES-III	CO5	TO LEARN ABOUT BROAD CLASSIFICATION OF BRYOPHYTA AND ITS ORIGIN
8892	M.Sc. Botany Ist SEM	BOT108	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES-III	CO6	TO LEARN ABOUT GENERAL CHARACTERISTICS REPRODUCTION AND LIFE HISTORY PATTERNS IN BROPHYTA
8892	M.Sc. Botany Ist SEM	BOT108	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES-III	CO7	TO LEARN GENERAL INTRODUCTION , CLASSIFICATION AND ORIGIN OF PTERIDOPHYTA
8892	M.Sc. Botany Ist SEM	BOT108	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES-III	CO8	TO KNOW ABOUT CHARACTERS AND LIFE CYCLE PATTERNS IN MAJOR CLASSES OF PTERIDOPHYTA
8892	M.Sc. Botany Ist SEM	BOT108	BIOLOGY & DIVERSITY OF ALGAE, BRYOPHYTES AND PTERIDOPHYTES-III	CO9	TO LEARN ABOUT FOSSIL MEMBERS OF PTERIDOPHYTES
8892	M.Sc. Botany Ist SEM	BOT109	CELL AND MOLECULAR BIOLOGY OF PLANTS-I	CO1	TO KNOW INTRODUCTION TO PLANT CELL ,ULTRASTRUCTURE AND DIFFERENT CELL TYPES,CELL WALL
8892	M.Sc. Botany Ist SEM	BOT109	CELL AND MOLECULAR BIOLOGY OF PLANTS-I	CO2	To learn about Cell Wall: Structure and function, biogenesis and:growth.plasma Membrane : Structure ,Models ofplaSma,membfane ';function ,site of ATP aces,site of ATP aces,i.on caarier ,channels and pumps .
8892	M.Sc. Botany Ist SEM	BOT109	CELL AND MOLECULAR BIOLOGY OF PLANTS-I	CO3	To Know about Plasma membrane Structure and models, and functions

	M.Sc. Botany Ist SEM	BOT109	CELL AND MOLECULAR BIOLOGY OF PLANTS-I	CO4	To Know about Chloroplast: Structure, genome organization, geneexpression, nucleo-chloroplasticinteraction.Mitochondria : Structure, geRomeorganization, biogenesis&function.Other cell organelles: Structure and function of micro bodies,Golgiapparatus,
	M.Sc. Botany Ist SEM	BOT109	CELL AND MOLECULAR BIOLOGY OF PLANTS-I	CO5	To Learn about Ribosomes: structure site of protein synthesis,plant vacuoles tonoplastmembrane Arpase, transporter, runction as storase organelle.
	M.Sc. Botany Ist SEM	BOT109	CELL AND MOLECULAR BIOLOGY OF PLANTS-I	CO6	To Know about Nucleus: Structure ,nuclear pore, nucleosome ,organization , DNA Structure,Forms of DNA ,DNA replication ,damage & repair,trariseription ,splicing of Mrna.,mRNA transport , nucleolus ,r RNA biosynthesis .
	M.Sc. Botany Ist SEM	BOT109	CELL AND MOLECULAR BIOLOGY OF PLANTS-I	CO7	To learn about Gell shape and Motility: The cytoskeleton, organization and role of microtubules andmicrofilament, motormovement, implications of flagellar and other movements
	M.Sc. Botany Ist SEM	BOT109	CELL AND MOLECULAR BIOLOGY OF PLANTS-I	co8	To Know about Cell cycle and Apoptosis: Karyokinesis - mitosis and Meiosis, role of cyclins and cyclin dependent kinases, cytokinesis is and cell plate formation,, mechanism of programmed cell death.
	M.Sc. Botany Ist SEM	BOT 110	Taxonomy of Angiosperms	CO1	To acquire knowledge about Origin of lntra-Population Variation: Population & the environment, ecads & ecotypes, evblution & differentiation of species - various models.
	M.Sc. Botany Ist SEM	BOT 110	Taxonomy of Angiosperms	CO2	To Know about The Species Concept: Taxonomic hierarchy, Delimitation of taxa.
	M.Sc. Botany Ist SEM	BOT 110	Taxonomy of Angiosperms	CO3	To learn about Salient features of the intemational code of botani€t nomenclature and salieht features ofMelbourne Code.

	M.Sc. Botany Ist SEM	BOT 110	Taxonomy of Angiosperms	CO4	To Know about Taxonomic Evidences : Morphology, anatomy, embryology, cytology, photochemistry, genome analysis & nucleic acid hybridization.
	M.Sc. Botany Ist SEM	BOT 110	Taxonomy of Angiosperms	CO5	To learn about Taxonomy Tools: Herbarium, floras, histological photochemical cytology serological biochemical & molecular techniques, computers & GlS.
	M.Sc. Botany Ist SEM	BOT 110	Taxonomy of Angiosperms	CO6	To learn about System of Classifications : Phonetic and phylogerietic systems; Cladistics.relevance of taxonomy to consevation, sustainable utilization of:bio resource & ecosystem,research.
	M.Sc. Botany Ist SEM	BOT 110	Taxonomy of Angiosperms	CO7	To know Concept of Phytogeography: Endemism, hot spots and hottest hot spots, plant exploration, invasion &:introduction, Iocal plant diversity and its socio-economic importance.
	M.Sc. Botany IIst SEM	BOT 111	Cytology and Genetics	CO1	To Learn about Chromosome 'structure and,"packing of."DNA, . molecularorganization of centromere andtelomere, nucleolus and ribosomal RNA gene, euchromatin,Karyptype analysis and karyotype evolution,
	M.Sc. Botany IIst SEM	BOT 111	Cytology and Genetics	CO2	To know about Specialized type of chromosome -polytene,Lampbrush and sex chromosomes lampbrush, B- chromosomes and sex chromosome.
	M.Sc. Botany IIst SEM	BOT 111	Cytology and Genetics	CO3	To learn about Structure and Numerical Alterations in chromosomes ,: Deletion ,duplication,translocation and inversiontheirorigin ,occurrence and breed.ing bphqviout , aneuploids-origin and production of aneuploid,allopolyploidstypesgenomeconstitution and analysis ,evolution of major crop plants.

	M.Sc. Botany IIst SEM	BOT 111	Cytology and Genetics	CO4	To Know about Genelics of Prokaryotes & Eukaryotic Organelles: Mapping the bacteriophage genome ;
	M.Sc. Botany IIst SEM	BOT 111	Cytology and Genetics	CO5	To learn about Gqne Structure &Expression: Genetic fine structure, cis-trans test, introns & theirsignificanee, RNA splicing, regulation of gene expression in prokaryotes & eukaryotes
	M.Sc. Botany IIst SEM	BOT 111	Cytology and Genetics	CO6	To Know about Genetic Recombination & Genetic Mapping:Recombination, independent assortment & crossing over, role of rec A & Rec BCD enzyme in recombination,
	M.Sc. Botany IIst SEM	BOT 111	Cytology and Genetics	CO7	To Know about Mutation: Spontaneous & induced mutation ,molecular basis of gene rnutations;Transposable elements in Prokaryotes & eukaryotes, mutation induced by Transposons ,site directed mutagenesis, DNA damage & repair mechanism ,inherited human disease &defects in DNA repair ,initiation of cancer at cellular level , Proto- oncogene& oncogenes.
	M.Sc. Botany IIst SEM	BOT 111	Cytology and Genetics	CO8	To Know about Cytogenetic of Aneuploidy & Heterozygotes : Effect of aneuploidy on phenotype inplant transmission of monosomics & trisomics & their use in chromosome mapping ofdiploid & polyploidy species
	M.Sc. Botany IIst SEM	BOT 111	Cytology and Genetics	CO9	To Know about Nuclear DNA content ,C-value paradox ,Cot curve & itss_ignificance , restriction mapping ,in situ hybridization
	M.Sc. Botany IIst SEM	BOT 111	Cytology and Genetics	CO10	To Know about Alien Gene Transfer Through Chromosome Manipulation: Transfer of whole genome,example from triticum, Arachis & Brassica. Hybrid Vigour.
	M.Sc. Botany IIst SEM	BOT 112	Biology & Diversity Of Gymnosperms	CO1	To Know about Introduction :Gymnosperms the vessel less & fr:uitless seed ptants.
	M.Sc. Botany IIst SEM	BOT 112	Biology & Diversity Of Gymnosperms	co2	To Know about Classification of Gymnosperms & their distribution in India.

	M.Sc. Botany IIst SEM	BOT 112	Biology & Diversity Of Gymnosperms	CO3	To Know about Brief account of the families of Fteridosperm4lqs:l.(LJginppteridaceae ,Medullosaceae , Cytoniaceae & Glossopteridaceae)
	M.Sc. Botany IIst SEM	BOT 112	Biology & Diversity Of Gymnosperms	CO4	To Know about General account and comparative Structure and Reproduction in Cycadeodales and Cordaitales.
	M.Sc. Botany IIst SEM	BOT 112	Biology & Diversity Of Gymnosperms	CO5	To Know about General account and comparative Structure and Reproduction in Cycadales & ,Ginkgqales
	M.Sc. Botany IIst SEM	BOT 112	Biology & Diversity Of Gymnosperms	CO6	To Know about General accountand comparative structure and Reproduction in Cycadales & CONIFERALES.
	M.Sc. Botany IIst SEM	BOT 112	Biology & Diversity Of Gymnosperms	co7	To Know about General accountand comparative structure and Reproduction in Ephedrdles,Welwithschiales and Gnetales .
	M.Sc. Botany IIst SEM	BOT 113	Plant Physiology	CO1	To Know about Membrane Transport and Translocation of Water and Solutes : Plant - Water relations ,mechanism of water transport through xylem ,root microbe interaction.
	M.Sc. Botany IIst SEM	BOT 113	Plant Physiology	CO2	To Know about Nitrogen Fixation:: Overview biologidal nitrogenflxation, root nodules formation and nod mechanism of nitrate uptake and reduction
	M.Sc. Botany IIst SEM	BOT 113	Plant Physiology	CO3	To Know about Signal Transduction : Overview ,receptors and G-protein ,phospholipids signalling ,role of cyclin nucleotides calcium calmodulin cascade .
	M.Sc. Botany IIst SEM	BOT 113	Plant Physiology	CO4	To Know aboutDiversity in protein kinesis andphosphatases , specific signalling mechanism ,example two component senor-regulator system in bacteria and plant,source sensing mechanism
	M.Sc. Botany IIst SEM	BOT 113	Plant Physiology	CO5	To Know about General concept and historical background,evolution of photopynthesis apparatus ,photosynthetic pigment and light harvesting complexes .

	M.Sc. Botany IIst SEM	BOT 113	Plant Physiology	CO6	To Know about photo -oxidation of water mechanism of electron and proton transport carbonassimilation the Calvin cycle ,Photorespiration and its signification the C4 cycle CAM pathway.
	M.Sc. Botany IIst SEM	BOT 113	Plant Physiology	CO7	To Know about Biosynthesis of starch and sucrose ,physiological and ecological consideration .
	M.Sc. Botany IIst SEM	BOT 113	Plant Physiology	CO8	To Know about Plant response to biotic and abiotic stress mechanism m ,of biotic and abiotic stress tolerance ,HR and SAR water deficit and drought resistance salinity stress,
	M.Sc. Botany IIst SEM	BOT 113	Plant Physiology	CO9	To Know about Metal toxicity ,freezing heat stress ,oxidative stress .
	M.Sc. Botany IIst SEM	BOT 114	Plant Biochemistry and Bioenergetics	CO1	To Know about Prineiples of therrnodynamies', fre,erenergy,and .chemical'potential.
	M.Sc. Botany IIst SEM	BOT 114	Plant Biochemistry and Bioenergetics	CO2	To Know about Overview of plant respiration ,glycolysis ,the TCA Cycle, electron transport and ATP synthesi synlhg9is.of mernbrane lipids ,structure lipid and Storage lipids and theil catabolism .
	M.Sc. Botany IIst SEM	BOT 114	Plant Biochemistry and Bioenergetics	CO3	To Know about Pentose Phosphate pathway ,glyoxylate cycle , alternative oxidase system
	M.Sc. Botany IIst SEM	BOT 114	Plant Biochemistry and Bioenergetics	co4	To Know about Structure and function of lipids ,fatty acid biosynthesis
	M.Sc. Botany IIst SEM	BOT 114	Plant Biochemistry and Bioenergetics	CO5	To Know about Fundamentals of Enzymology: General aspect, allosteric, mechanism, regulatory and active sites isoenzymes, kinetic of enzymatic catalysis Michaelis- Manton equation and its signiflcance.
	M.Sc. Botany IIst SEM	BOT 114	Plant Biochemistry and Bioenergetics	CO6	To Know about molecular mechanism of action of photo-morphogenic receptorssignalling andGene Expression.
	M.Sc. Botany IIst SEM	BOT 114	Plant Biochemistry and Bioenergetics	co7	To Know about Plant Growth Regulators and Elicitors: Physiological effects and mechanism ofAuxins,Gibberllins ,Ethylene ,Abscisic acid

	M.Sc. Botany IIst SEM	BOT 114	Plant Biochemistry and Bioenergetics	CO8	To Know about Brassinosteroids , polyarnines ,Jasmonic acidand salicylic acid ,hormone receptors , signal transduction and gene expression.
	M.Sc. Botany IIst SEM	BOT 114	Plant Biochemistry and Bioenergetics	CO9	To Know about The Flowering Process: Photoperiodism and its significance, endogenous clock and its regulation, photochrome, floral induction and development genetic and molecular analysis,Role of vernalization.
	M.Sc. Botany IIIrd SEM	BOT 115	PLANT DEVELOPMENT	CO1	To Know about Unique features of plant development, diffurences bethrben",plant and animal development.
	M.Sc. Botany IIIrd SEM	BOT 115	PLANT DEVELOPMENT	CO2	To Know about Metabolism of nucleic acid, protein and mobilization of food reserve, tropism, hormonal control of seedling growth, gene expression use of mutants in understanding seedling development.
	M.Sc. Botany IIIrd SEM	BOT 115	PLANT DEVELOPMENT	CO3	To Know about Shoot development : Organization of shoot apical meristem (SAM), cytological and molecular analysis of SAM, control of cell division and cell communication, control of tissue .
	M.Sc. Botany IIIrd SEM	BOT 115	PLANT DEVELOPMENT	CO4	To Know about Differentiation especially xylem and phloem, secretary ducts and lactifers, wood development in relation to environmental factors.
	M.Sc. Botany IIIrd SEM	BOT 115	PLANT DEVELOPMENT	CO5	To Know about Organization of rootapical meristem (RAM), cell fate's and lineages, vascular tissue differentiation, lateral tissue, hairs, root- microbe interaction.
	M.Sc. Botany IIIrd SEM	BOT 115	PLANT DEVELOPMENT	CO6	To Know about Leaf Growth and differentiation determination, , differentiation of epidermis (with reference to stomata and trichomes), mesophyll.

	M.Sc. Botany IIIrd SEM	BOT 115	PLANT DEVELOPMENT	CO7	To Know about Plant Tissues: Meristem and permanent tissues, parenchyma, cholenchyma, scierenchyma sclerids and fibres, xylem and phloem, structure, origin and differentiation
	M.Sc. Botany IIIrd SEM	BOT 115	PLANT DEVELOPMENT	CO8	To Know about Secondary growth in dicot stem and root, abnormal secondary growth in monocot and dicot stem in various plants
	M.Sc. Botany IIIrd SEM	BOT 116	PLANT REPRODUCTION	CO1	TO PROVIDE THE KNOWLEDGE OF Reproduction IN higher plants Vegetative and sexual reproduction ; flower structure and development,
	M.Sc. Botany IIIrd SEM	BOT 116	PLANT REPRODUCTION	CO2	To Know about Genetics of floral organ differentiation and sex determination in plants.
	M.Sc. Botany IIIrd SEM	BOT 116	PLANT REPRODUCTION	CO3	To understand the Microsporogenesis , Male sterity , pollen germination , pollen embryoes, pollen allergy.
	M.Sc. Botany IIIrd SEM	BOT 116	PLANT REPRODUCTION	CO4	To Know about Ovule development, mega-sporogenesis, organization of the embryosac
	M.Sc. Botany IIIrd SEM	BOT 116	PLANT REPRODUCTION	CO5	To Know aboutPollination ,Pollen-pistil lnteraction and Fertilization ,commercial consideration Sporophytic And gametophytic self incompatibility (cytological biochemical and molecular aspect)
	M.Sc. Botany IIIrd SEM	BOT 116	PLANT REPRODUCTION	CO6	TO LEARN ABOUT Double'fertilizationAND in vitro fertilization .
	M.Sc. Botany IIIrd SEM	BOT 116	PLANT REPRODUCTION	CO7	To Know about Seed Development and fruit Growth :Endosperm development during . Embryogenesis,Structure of endosperm and embryo ; Embryo culture ,polyembryo ,apomixes dynamics of fruit groth.
	M.Sc. Botany IIIrd SEM	BOT 116	PLANT REPRODUCTION	CO8	To understand the Basic Concept of Senesense and Apoptosis ,metabolic change associated with senescence and its regulation ,influence of hormone and environmental factors an senescence .

	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO1	To have a knowledge about Climatic -light ,temperature , air and water topographic ,edaphic ,soilformation ,soiltextrue ,type of soil profile ,classification ,physio-chemical properties , soil organic matter , biotic factor , interrelationships ,major soil type of the world .
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO2	To Know about Structure and functlon of Ecosystem. ,pathway processes budgets in terrestrial and aquatic ecosystems.
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO3	To Know about primary production methods of measurements ,global pattern, controlling factor
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO4	To Know about energy dynamics ,tropic organization ,energy flow pathways ecological efficiencies
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO5	To Know about litter fall and decomposition - mechanism , substrate quality and effect ofclimatic factors.
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO6	To Know about global biogeochernical cycle of C,N,P,S minerals cycle pathway processes
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO7	To know about the nutrient budgets in terrestrial and aquatic ecosystems.
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO8	To Know about Vegetation Organization: life zone major biomes and vegetation of the world concept .
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO9	To know the concept of community and continuum.
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO10	to learn about analytical and synthetic anatylsis of communities ;community coefficients, inte- specific association & ordination
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO11	TO EXPLAIN THE concept of ecological niche.

	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO12	To Know about Vegetation Development: Temporal change (C11clic and non -cyclic), mechanism of ecological succession (relay floriStic and initial floristic Composition, facilitation, tolerance and inhibition modal), changes in ecosystern properties during succession. '
	M.Sc. Botany IIIrd SEM		Plant Ecology	CO13	To Know about Air Water and Soil Pollution: Kinds, source, quality parameters, effect on p
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO14	To Know about Green house gases :sources ,trend and role OF ozone layer. ozone hole ,consequences of climate changes
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO15	To understand the concept of Ecological Stability, ecological perturbations and their impact on plants and ecosystem
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO16	To Know about Ecology of plant invasion environmental impact assessment, ecosystem restoration
	M.Sc. Botany IIIrd SEM	BOT 117	Plant Ecology	CO17	To Know about Ecological management: Concepts, Sustainable. Development, Sustainability inDICATORS
	M.Sc. Botany IIIrd SEM	BOT 118	WEED BIOLOGY-1	CO1	To Know about lntroduction to Weed :Wortdwide distribution and importance of weeds ldeal characters of weed .
	M.Sc. Botany IIIrd SEM	BOT 118	WEED BIOLOGY-1	CO2	To Know about Classification of weed. W6ed menace-in agriculture and aquatic ecosystem.
	M.Sc. Botany IIIrd SEM	BOT 118	WEED BIOLOGY-1	CO3	To Know about Relationship and interactions among weeds and crops .
	M.Sc. Botany IIIrd SEM	BOT 118	WEED BIOLOGY-1	CO4	To Know about Patterns of evolutionary Development : concept of r and K selection.

	M.Sc. Botany IIIrd SEM	BOT 118	WEED BIOLOGY-1	CO5	To Know about Weeds as strategists - competitive, Ruderals-and stress tolerants .
	M.Sc. Botany IIIrd SEM	BOT 118	WEED BIOLOGY-1	CO6	To Know about Morphology, Reproduction, propagation, Dispersal and survival of weeds.
	M.Sc. Botany IIIrd SEM	BOT 118	WEED BIOLOGY-1	CO7	To Know about The diversity of weeds of differenl habitates -
	M.Sc. Botany IIIrd SEM	BOT 118	WEED BIOLOGY-1	CO8	To Know about Weed Competition -Nature of Competition ,Method to study , Critical period for competition, Allelopathy, Weed and crop density effect.
	M.Sc. Botany IV SEM	BOT 119	Plant Cell ,Tissue,AND Organ Culture	CO1	To know about Biotechnology,Plant cell And Tissue Culture.
	M.Sc. Botany IV SEM	BOT 119	Plant Cell ,Tissue,AND Organ Culture	CO2	To know about Organogenesis and Adventive Embryogenesis, Somatic Hybridization.
	M.Sc. Botany IV SEM	BOT 119	Plant Cell ,Tissue,AND Organ Culture	CO3	To Know about Applications of Plant Tissue Culture, Clonal propagation artificial seed, production of hybrids and Production of secondary metabolites,natural products,cryopreseryation and germ plasma storage.
	M.Sc. Botany IV SEM	BOT 119	Plant Cell ,Tissue,AND Organ Culture	CO4	To Know about Biostatistics: Definition and importance of Biostatistics scope and Measurement of central tendencies.
	M.Sc. Botany IV SEM	BOT 120	PLANT RESOURCE UTILIZATION AND CONSERVATION	CO1	To Know about Biological and Plant Diversity.
	M.Sc. Botany IV SEM	BOT 120	PLANT RESOURCE UTILIZATION AND CONSERVATION	CO2	To Know about World Centers of'Primary Diversity of Domesticated Plants and Origin Evolution, Botany Cuttivation and Uses.

	M.Sc. Botany IV SEM	BOT 120	PLANT RESOURCE UTILIZATION AND CONSERVATION	CO3	To learn about important Fire -Wood and rimber Yielding Plant and Nonwood Forest Prroducts such as bamboos ,rattans ,raw materials 'Green Revolution Benefits consequence pollution control and aesthetics.
	M.Sc. Botany IV SEM	BOT 120	PLANT RESOURCE UTILIZATION AND CONSERVATION	CO4	To learn about Principal of Conservation,Strategies for conservation in situ Conservation and Strategies for conservation -Ex situ Conservation.
	M.Sc. Botany IV SEM	BOT 121	GENETIC ENGINEERING OF PLANTS AND MICROBES	CO1	To learn about Reeombinant DNA Technology,construction of genomic /cDNA libraries,choice of vectors,polymerase and chain reaction (PCR), DNA finger printing.
	M.Sc. Botany IV SEM	BOT 121	GENETIC ENGINEERING OF PLANTS AND MICROBES	CO2	To learn about Genetic Engineering of Plants,Aims strategies for development of transgenic,Agro bacterium,T-DNA and transposon mediated gene tagging,ntellectual property right and possible ecological risk and concerns.
	M.Sc. Botany IV SEM	BOT 121	GENETIC ENGINEERING OF PLANTS AND MICROBES	CO3	To learn about Microbial Genetic Manipulation,selection of recombinants and transform ants genetic improvement of industrial microbes and nitrogen fixer's fermentation technology
	M.Sc. Botany IV SEM	BOT 121	GENETIC ENGINEERING OF PLANTS AND MICROBES	CO4	To know about Genomics And Proteomics,molecutar markers for introgression of useful traits,DNA sequencing,functional genomics,protein profiling and its significance.Biostatistics
	M.Sc. Botany IV SEM	BOT 122(A)	EFFECT OF ENVIRONMENT, CONTROL,AND PLANT:DISEASE CYCLE	CO1	To learn about Effect of Environment on Disease Development Predisposition and stressepidemiology and disease forecasting, sources of infection, significance of phyllosphere and rhizosphere studies, recurrence of disease.

	M.Sc. Botany IV SEM	BOT 122(A)	EFFECT OF ENVIRONMENT, CONTROL,AND PLANT:DISEASE CYCLE	CO2	To Know about Principles of plant disease control, 'method of control eg regulatory, chemical, biotogical and breeding for disease resistant varieties of host, plant quarantine.
	M.Sc. Botany IV SEM	BOT 122(A)	EFFECT OF ENVIRONMENT, CONTROL,AND PLANT:DISEASE CYCLE	CO3	To Know about Disease Cycle, Crop loss estimate,control for important ptant disease caused by fungi,bacteria, viruses,mycoplasma and nematodes in crop plants such as Wheat, Rice, Bajra, Mdize Sugarcane etc.
	M.Sc. Botany IV SEM	BOT 122(A)	EFFECT OF ENVIRONMENT, CONTROL,AND PLANT:DISEASE CYCLE	CO4	To Know about Crop loss estimate, controt for important plant disease caused by fungi bacteria viuses, mycoplasma and nematodes in crop plants such as Groundnut, Till, Linseed, Cotton. Chillies, Tomato, Potato, Brinjal, corignder, Tobacco etc.
	M.Sc. Botany IV SEM	BOT 122(B)	WEED.BIOLOGY	CO1	To Know about Light Requirement for germination,seedlongevity AndMortality. pattem of emergence, The safe -Site concept.
	M.Sc. Botany IV SEM	BOT 122(B)	WEED.BIOLOGY	CO2	To Know about Management of weeds,Types of weed control physical, chemical and biological control of weeds.
	M.Sc. Botany IV SEM	BOT 122(B)	WEED.BIOLOGY	CO3	To Know about classification of Herbicides selective and non selective herbicides,Mode of Action of Herbicides,Application rnethod of Herbicides and precautions.
	M.Sc. Botany IV SEM	BOT 122(B)	WEED.BIOLOGY	CO4	To Know about chemistry of some importance herbicides,Critical period for weed control,aquatic weed management plant Enviroment and herbicides interaction.