

DEPARTMENT OF BOTANY

PROGRAMME: M. SC.

Statements of Programme Specific Outcomes (PSOs)

By the end of this course, the students will be able to:

1. learn about practical technique in lab for detail study of plant structure, reproduction, anatomy, breeding procedures for hybridization
2. to utilize the knowledge of mycology and plant pathology to satisfy the need of farmers
3. procure the knowledge of teaching to them while staying in the department
4. prepare the students for many competitive exams like MPSC, UPSC NET SET GATE
5. Enable the students to be resourceful in identifying of plants and lab.

Statements of Course Outcomes (COs)

MSc I Course: SEM-1 paper 1

By the end of this course, the students will be able to:

1. Understand the structure, function of viruses and bacteria
2. Describe the life cycle, structure and functions of algae
3. Describe the life, cycle, structure and function of fungi
4. Comparative study of different fungi with special reference to evolutionary plants
5. Identify algae and fungi in their natural habitat on the basis of characters
6. Develop the cultures of algae and fungi

MSc I Course: SEM-1 paper 2

By the end of this course, the students will be able to:

1. Understand the structure and life cycle of different bryophytes
2. Identify the members of Hepatocopsida and Bryopsida
3. Study of evolutionary trends of Sphenopsida and filicopsida
4. Study of distribution and classification of rhyniopsida, psilopsida and Lycopsida
5. Identify bryophyte and pteridophyte material for specimens

MSc I Course: SEM-1 paper 3

By the end of this course, the students will be able to:

1. Study the different types of fossils of extinct plants/ flora
2. Study the origin of gymnosperm by living fossil genre
3. Study the evolutionary affinity between cordiattes, caytonicles and pentoxylate
4. Study of living gymnosperm and fossil forms
5. Identify fossil and living form of gymanosperm

MSc I Course: SEM-1 paper 4

By the end of this course, the students will be able to:

1. Study Mendelian law including incomplete dominance, penetrance, expressivity in *Drosophila*
2. Explain the study of chromatin organization, karyotype analysis
3. Discuss the breeding behaviour of duplicator, deficiency, inversion and translocator
4. Detail study of spontaneous and induced mutation of chromosomes on the basis of karyotype

5. Gain knowledge about actual mutations happens in plants.

MSc I Course: SEM-1 Practical-1

By the end of this course, the students will be able to:

1. Identify cyan bacteria and algae
2. Prepare and identify the fungal culture
3. Identify bryophytes and plant disease
4. Identify fungi and bryophytes

MSc I Course: SEM-1 Practical-2

By the end of this course, the students will be able to:

1. Identify pteridophyte and gymnosperm material
2. Study the anatomical preparation of Pteridophyte and gymnosperm
3. Describe the fossil specimens
4. Perform the experiments on cytology and genetics
5. Prepare the botanical excursion report.

MSc I Course: SEM-2 paper 1

By the end of this course, the students will be able to:

1. Study the mechanism of photosynthesis and photorespiration
2. Explain the mechanism of growth hormones, auxin, gibberellins
3. Classify enzymes and regulation of their activity
4. Compare the structure and function of carbohydrate lipid and protein metabolism

MSc I Course: SEM-2 paper 2

By the end of this course, the students will be able to:

1. Understand photo morphogenesis and seedling development
2. Evaluate the root developments, flower development in plants
3. Study the reproduction in plants with the help of male female gametophyte
4. Study of microspogesis and megasprogenesis.
5. Understand pollen-pistil interacting and seed development.

MSc I Course: SEM-2 paper 3

By the end of this course, the students will be able to:

1. Describe cell wall, plasma membrane and plasmodesmata
2. Understand cell organelles Golgi complex, lysosomes, peroxisomes etc
3. Study the nucleus-ultra structure and function
4. Study the stress biology, biotic and abiotic stress
5. Correlate the theoretical description of cell components with microscopic ultrastructures

MSc I Course: SEM-2 paper 4

By the end of this course, the students will be able to:

1. Study of floral symmetry of dicot and monocot flowers
2. Discuss about the principles of taxonomy and major system of plant classification
3. Understand anatomy, embryology, palynology and photochemistry
4. Discuss the principles of biosystematics numerical taxonomy.
5. Collect the ethno botanical museum specimens.

MSc I Course: SEM-2 Practical- 1

By the end of this course, the students will be able to:

1. Perform the experiments on photosynthesis, respiration and growth of plants
2. Identify chemical metabolic-protein fat, carbohydrate, from plants
3. Classify different kind of cytohistological zonaton of shoot and root meristem
4. Undretsbnd the process of micro and megasporogenesis
5. Understand physiological effects of temperature, humidity, co2 level on plants.

MSc I Course: SEM-2 Practical-2

By the end of this course, the students will be able to:

1. Study the salivary gland chromosome of chromonomas larva
2. Isolate DNA and prepare cot curve
3. Study the different families of dicot
4. Prepare cardiogram of different species of Ficus
5. Collect the different types of inflorescence and fruits
6. Collect the museum specimens of morphology of plants

MSc II Course: SEM-3 paper 1

By the end of this course, the students will be able to:

1. Understand the concept of community and vegetable development and succession
2. Organize the ecosystem and mechanism of biogeochemical cycle
3. Discuss the concept of ecosystem stability
4. Know about IUCN, red data book, sanctuaries, national park
5. Study of topography of an area
6. Study of composition of wetlands and mangroves

MSc II Course: SEM-3 paper 2

By the end of this course, the students will be able to:

1. Study of taxonomic classification- croquets (1968)
2. Study of systematic position of Alismitadae, commeliadae, Astetraceac and Lemnaceac
3. Explain the fossil angiosperm and global Biodiversity
4. Study of socio-economic importance of diversity of plants
5. Collect the herbarium specimens
6. Collect the morphological specimens- cones, flowers, fruits and seeds etc.

MSc II Course: SEM-3 paper 3

By the end of this course, the students will be able to:

1. Understand various divisions of fungi, bacteria and virus
2. Study the life cycle development of mycorrhizal fungus
3. Study of the production of metabolites-antibiotics enzymes and organic acids
4. Discuss the role of fungi in food processing and welfare to human being
5. Identify various culture of fungi
6. Collect the museum specimens of fungi.

MSc II Course: SEM 3 paper 4

By the end of this course, the students will be able to:

1. Introduce to Aesthetic botany in syllabus to study phytogeography and forest types in India

2. Understand the technique of grafting, budding, industrial gardening, terrace gardening etc.
3. Develop nurseries and other management for cultivation of flowers
4. Design landscape in commercial, residential bungalows
5. Develop the technique to set up playhouses and ornamental succulents.

MSc II Course: SEM-3 Practical-1

By the end of this course, the students will be able to:

1. Study of frequency, abundance and density by quadrat method
2. Study of statistical problems based on biometry
3. Identify morphological and floral characters of different plants
4. Use of generic key and species key for plant
5. Collect the herbarium specimens for herbarium record in the department for UG and PG students.

MSc II Course: SEM-3 Practical-2

By the end of this course, the students will be able to:

1. Identify the characters of fungi from the culture
2. Identify the infected material and study their symptoms
3. Perform the experiments on germination on pollen or conidia
4. Develop the skills for drawing camera Lucida diagrams of fungus

MSc II Course: SEM-4 Mycology and Plant Pathology

By the end of this course, the students will be able to:

1. Study epidemiology of plant diseases and epidemic plant diseases
2. Study pathogen city, defense mechanism of host plants and pathogen.
3. Study of blight, smut, rot, downy mildew, green ear etc diseases of crops and veg
4. Undertake the study of bacterial, viral and mycoplasma disease of plants
5. Study and collect the specimens of plant pathology

MSc II Course: SEM-4 paper 4 Centric Plant Resources.

Course Outcomes: By the end of this course, the students will be able to:

1. Study Fiber, gum, resin, timber, spice and condiments plants.
2. Study of medicinal plants anatomy and evaluation of herbal drugs
3. Study of structure of alkaloids, terpenoids, steroids, glycoside etc.
4. Study of preparation of dyes, paper, tea, coffee and coca etc.
5. Study of rubber industry and its product
6. Identify the medicinal plants and collect them during the botanical tour.

MSc II Course: SEM-4 paper 1

Course Outcomes: By the end of this course, the students will be able to:

1. Study of process of transcription and protean synthesis in prokaryote and eukaryote
2. Describe lac-operan model and its epigenetic regulation
3. Understand the mechanism of gene mapping and genetic recombination.
4. Describe cell cycle-mitosis and meiosis.
5. Understand signal transduction, sensor, regulator system in bacteria and plants.

MSc II Course: SEM-4 paper 2

Course Outcomes: By the end of this course, the students will be able to:

1. Understand the application of DNA recombination technology in genetic engineering
2. Discuss about polymerase chain reaction and DNA fingerprinting
3. Describe detail of tissue culture technique and its application
4. Study bioinformatics, data base sequences DNA nomenclature and taxonomy database
5. Study methods of plant breeding technique
6. Study the technique of hybridization.

MSc I Course: SEM-4 Practical-1

Course Outcomes: By the end of this course, the students will be able to:

1. Study the presence of specific antigen by ELISA
2. Perform the experiment on restriction digestion of DNA
3. Study of media for plants tissue culture
4. Study of oil, rubber, medicinal plants, dyes etc.
5. Identify medicinal and economical plants

MSc I Course: SEM-4 Practical-2 Project

Course Outcomes: By the end of this course, the students will be able to:

1. Staff members are in different areas viz, cytology, and genetics, taxonomy and ethno botany, mycology, paleobotany
2. Select their topic as per teacher's supervision
3. Learn various techniques
4. Examiners are appointed from other universities.

DEPARTMENT: BOTANY

PROGRAMME: B SC

Statements of Programme Specific Outcomes (PSOs)

By the end of this course, the students will be able to:

1. Understand the basic concepts of lower group plants and morphology of higher groups.
2. Understand the evolution , classification, anatomical details of higher group plants
3. Analyze the cell organelles and application of genetics, molecular biology in plant breeding
4. Identify the bacteria, viruses and plant pathogen
5. Analyze metabolic activities of plants
6. Understand the application of genetic engineering for the improvements of plants
7. Understand the basic concepts of ecology
8. Perform the procedure of laboratory technique in biochemistry, biotechnology and utilization of plants

Statements of Course Outcomes (COs)

B Sc. Course: SEM-I Paper-1

Course Outcomes: By the end of this course, the students will be able to:

1. Understand the basic concept of bacteria, viruses and mycoplasma
2. Describe the classification general characteristics of Algae
3. Analyze economic importance of bacteria, virus and algae
4. Discuss the life-cycle of micro organism and algae

B Sc. Course: SEM-I Paper-2

Course Outcomes: By the end of this course, the students will be able to:

1. Compare lower group of plants with higher lower group
2. Identify the different plant diseases
3. Understand the economic importance of fungi, lichens and bryophytes.
4. Discuss the classification of fungi and bryophytes

B Sc. Course: SEM-I LAB

Course Outcomes: By the end of this course, the students will be able to:

1. Understand the basic techniques in lab
2. Identify bacterial, cyanobacterial, algal, fungal, lichens and Bryophyte plants
3. Comparative study of lower groups and lower higher group
4. Understand and identify the algal bryophyte, fungal, plant pathology and lichens under natural habitat.

B Sc. Course: SEM-II Paper-1

Course Outcomes: By the end of this course, the students will be able to:

1. Explain the classification of pteridophyta and gymnosperm
2. Describe the economic importance of pteridophyta and gymnosperm
3. Discuss the alternation of generation pteridophyta and gymnosperm
4. Criticize the concept of hysteroscopy seed habit
5. Discuss morphology and anatomy of cycadeoidea

B Sc. Course: SEM-II Paper-2

Course Outcomes: By the end of this course, the students will be able to:

1. Understand the paleobotany and geological time scale
2. Identify the different types of fossils
3. Explain the morphology and modification of plants
4. Compare the types of inflorescence and fruits
5. Describe the parts of flower

B Sc. Course: SEM-II LAB

Course Outcomes: By the end of this course, the students will be able to:

1. Describe the various parts of flower
2. Identify the anatomy of plants material by making temporary mount
3. Identify the different types of fossils
4. Identify the various plant specimens
5. Understand and identify the morphological characters of plants in natural environment.

B Sc. Course: SEM-III Paper-1

Course Outcomes: By the end of this course, the students will be able to:

1. Describe general taxonomic rule of plant classification
2. Discuss the principles of botanical nomenclature
3. Criticize the classification of angiosperm
4. Justify the merits and demerits of systems of classification
5. Understand the fossil angiosperm sahanianthus

6. Identify and describe different dicot and monocot families.

B Sc. Course: SEM-III Paper-2

Course Outcomes: By the end of this course, the students will be able to:

1. Describe the structure of plant cell and its organelles
2. Analyze the morphology of chromosome organization
3. Explain the plant cell-division and its significance
4. Evaluate the biostatic formulas
5. Understand the method of plants- breeding

B Sc. Course: SEM-III LAB

Course Outcomes: By the end of this course, the students will be able to:

1. Preparation of herbarium
2. Analyze the floral formula of monocot and dicot families
3. Perform the procedure of cytological techniques
4. Analyze the biostatistics data
5. Understand and identify the plants under natural environment

B Sc. Course: SEM-IV Paper-1

Course Outcomes: By the end of this course, the students will be able to:

1. Classify the meristematic tissue and permanent tissue based on origin and position
2. Compare the different theories of tissue
3. Understand primary, secondary and anomalous, anatomical structure of plant parts
4. Understand the various types of pollination mechanism
5. Explain the types of ovules

B Sc. Course: SEM-IV Paper-2

Course Outcomes: By the end of this course, the students will be able to:

1. Describe the laws of mendelism
2. Summarize the theories of linkage
3. Design and construct the variation in chromosome structure and number
4. Understand the concept of gene
5. Discuss the types of mutations and its application in crop-improvement

B Sc. Course: SEM-IV LAB

Course Outcomes: By the end of this course, the students will be able to:

1. Perform double –stained permanent slide mounting
2. Calculate the percent germination of pollen-grains
3. Solve the mendel's law of inheritance through color beads
4. Solve interaction of genes from the given data.

B Sc. Course: SEM-V Paper-1

Course Outcomes: By the end of this course, the students will be able to:

1. Classify and describe about bimolecular
2. Describe about the basic of Enzymes
3. Understand plant water relation

4. Write about mineral nutrients
5. Summarize the cycle of respiration and photosynthesis.

B Sc. Course: SEM-V Paper-2

Course Outcomes: By the end of this course, the students will be able to:

1. Define and explain about ecology branches and its significance
2. Summarize the environmental factors
3. Understand and explain the nitrogen cycle
4. Compare the various phytogeographic regions of India.
5. Describe the types of ecosystem

B Sc. Course: SEM-V LAB

Course Outcomes: By the end of this course, the students will be able to:

1. Perform major and minor physiology
2. Perform micro-chemical and bio-chemical test
3. Understand ecological adaptations of plants
4. Compare different types of soil

B Sc. Course: SEM-VI Paper-1

Course Outcomes: By the end of this course, the students will be able to:

1. Describe the plant growth and its growth regulators
2. Describe the seed-dormancy and methods to break-dormancy
3. Describe the plant-defense and role of secondary metabolites
4. Discuss plant tissue culture technique and its application
5. Discuss the advantages and disadvantages of genetic-engineering.

B Sc. Course: SEM-VI Paper-2

Course Outcomes: By the end of this course, the students will be able to:

1. Compare the various ecological successions
2. Explain different types of environmental pollution and its management.
3. Understand about the renewable and non-renewable natural sources
4. Analyze the principle , types, and application of instruments
5. Explain morphology utilization and chemical-constituents of different plants.

B Sc, Course: SEM-VI LAB

Course Outcomes: By the end of this course, the students will be able to:

1. Perform principles and working of instruments
2. Study and identify the types and characteristic of soil.
3. Study the physical and chemical properties of water
4. Study the plants of ethanobotanical importance
5. Understand and identify ethno-botanical plants under natural habitat.