

Name of Department : Botany

Department Vision : The continued well being of common man through the study of plant sciences.

Department Mission: Applying conventional as well as non-conventional tools to understand plant process, development of human resource with hands on experience in areas of Plant Sciences and plant biotechnology. Establishment of linkages with National and International Institute for betterment of students of the Department.

Name of Program: M. Sc. Botany

Program Outcomes (POs)

1. Identification and classification of plants
2. Understanding genetic diversity and evolution of plants
3. Understanding the role of plant wealth for mankind
4. Understanding conservation and improvement of plant genetic resources
5. Understanding plant processes and species interaction
6. Understanding the role of tools and techniques in plant resource utilization and conservation

Program Specific Outcomes (PSOs)

1. Plant diversity assessment
2. Bioprospection and sustainable utilization
3. Role of tools and techniques in understanding plant structure and function

COURSE OUTCOMES

M.Sc. Part- I **Paper- I (CC-101)** **Course Outcome**

1. Candidates trained will be able to identify and classify fungal, algal and bryophyte live and preserved specimens.
2. Candidates trained will be able to isolate fungal and algal species from soil, air and water and their hosts.
3. Candidates trained will be able to understand phylogeny of cryptogams.

Paper- II (CC-102) **Course Outcome**

1. Candidates trained will be able to identify and classify Pteridophytes, Gymnosperms and fossils.
2. Candidates trained will be able to know the sustainable utilization of these plants to the society.
3. Understanding evolution of Pteridophytes, gymnosperms and fossils.

Paper- III (CC-103) **Course Outcome**

1. Candidates trained will have understanding of the biomes.
2. Candidates trained will be able to understand various species interactions.
3. Candidates trained will be able to understand ecological succession and evolution.
4. Candidates trained will be able to identify Phytoplankton.
5. Students will get the knowledge of sustainable use of energy resources.

Paper- IV (CC-104) **Course Outcome**

1. Candidates trained will be acquainted with the safety measures of laboratory.
2. Candidates will be trained in instrumentation and their applications.
3. Candidates will be trained to use statistical tools to handle scientific data
4. Candidates will be trained in preservation of specimens using various techniques.

Paper- V (CC-201)

Course Outcome

1. Candidates trained will be able to understand flowering plant diversity and its conservation.
2. Candidates trained will be able to understand importance of herbarium and botanical gardens.
3. Candidates will be trained in plant nomenclature and identification.
4. Candidates will be trained in various advances in plant classification.

Paper- VI (CC-202)

Course Outcome

1. Candidates trained will be able to identify various diseases of crop plants.
2. Candidates will be trained in identification of different life cycle stages of plant pathogens.
3. Candidates will be trained in disease management of crop plants.

Paper- VII (CC-203)

Course Outcome

1. Candidates trained will be able to understand embryology of flowering plants.
2. Candidates trained will be able to understand various branches of palynology.
3. Candidates will be trained in understanding the internal structures of flowering plants.

Paper- VIII (CC-204)

Course Outcome

1. Candidates trained will be able to understand cell structure.
2. Candidates will get the knowledge of cell cycle and DNA replication.
3. Candidates trained will be able to understand cell signaling and cellular communication.

M.Sc. Part- II
(DSE-304) Biotechnology and Genetic
Engineering

Course Outcome

1. Candidates will be trained in study of genome and genome editing.
2. Candidates will be trained in various tools used in genetic diversity and genetic engineering.
3. Candidates will be trained in Intellectual Property Right.

M.Sc. Part- II
Paper- XIII (CC-401)

Course Outcome

1. Candidates will be trained in basic plant processes.
2. Candidates will be able to learn the various aspects of stress physiology.
3. Candidates will be familiar with the use of different PGRs in Agriculture and Horticulture.
4. Candidates will understand nutrient requirements of plants.

M.Sc. Part- II
(DSE-404)

Course Outcome

1. Candidates will be familiar with biodiversity and biodiversity hotspots.
2. Candidates will be trained in various approaches of conservation.
3. Candidates will be trained in sustainable utilization of plant resources.

M.Sc. Part- II
Paper- IX (CC-301)

Course Outcome

1. Candidates trained will be able to understand organization of genetic material and its physical localization.
2. Candidates trained will be able to understand various crop genetic resources and their improvement.
3. Candidates will be trained to understand the various theories of Evolution.

Paper- XI (CCS-302.2)
Course Specific Outcome

1. Candidates trained will be able to understand various systems of classification of fungi.
2. Candidates trained will be able to perform practical based on techniques used in microtomy.
3. Candidates trained will be able to prepare culture media used in culture of fungi, identify and classify.

Paper- XII (CCS-303.2)
Course Specific Outcome

1. Candidates trained will be able to classify plant diseases, deficiency of micronutrients and their symptoms.
2. Candidates trained will be able to understand physiology and biochemistry of infected host plant , genetics of host pathogen interaction.
3. Candidates trained will be able to detect aflatoxins from infected crop seeds.

Paper- XV (CCS-402.2)
Course Specific Outcome

1. Candidates trained will understand the scope and utility of industrial mycology , process of selection ,improvement, development and maintenance of various fungal strains.
2. Candidates trained will be able to understand the process of industrial production of ethyl alcohol, various organic acids, enzymes, vitamins and plant growth regulators, antibiotics, ergot alkaloids and economics of fermentation.
3. Candidates trained will be able to cultivate mushrooms (Agaricus bisporus, Pleurotus spp and Volvorella volvacea) manage diseases of mushrooms.

Paper- XVI (CCS-403.2)
Course Specific Outcome

1. Candidates trained will be able to diagnose crop diseases by following plant pathological practices.
2. Candidates trained will be able to manage crop diseases by following IDM practice.
3. Candidates trained will be able to understand Biological, chemical methods used in management of crop diseases.

Course out come
(CCS- 302.4): Energy, Ecology and Environment
(SPECIAL PAPER I) ENVIRONMENT AND ITS ASPECTS

1. The students will understand the basic concepts of general ecology, soil process and phytogeography.
2. The students will learn about the basic principles of land use classification and their integrated planning and management.
3. Candidate will understand the importance of ecology and conservation

(CCS- 303.4): Energy, Ecology and Environment
(SPECIAL PAPER II) POPULATION AND COMMUNITY ECOLOGY

1. The students will be trained in various aspects of population and gene ecology
2. Candidates will understand in community ecology and its aspect.
3. The students will learn about the statistical thinking and forest ecology.

(CCS402.4): Energy, Ecology and Environment
(SPECIAL PAPER III) EXPERIMENTAL ECOLOGY AND ENERGY STUDIES

1. The students will understand the basic concept of ecological methods and remote sensing techniques and application.
2. Candidates will learn energy sources and their sustainable use.
3. The students will be trained in utilization of energy from waste and bio village concept.

(CCS403.4): Energy, Ecology and Environment
(SPECIAL PAPER IV) ENVIRONMENTAL ISSUES, ASSESSMENT AND RESTORATION

1. The students will be trained in environmental issues and their impact assessment on environment.
2. Candidates will learn causes and consequences of air and water pollution

3 The students will have the ability to understand the importance of ecotourism and conserving natural resources.

M. Sc. PART- II (SEMESTER III)

(CCS- 302.5): Angiosperm Taxonomy

(SPECIAL PAPER-I) THE EVOLUTION AND CLASSIFICATION OF ANGIOSPERMS

Course outcomes

1. Students will get to know about the basics taxonomy and history of plant classification.
2. Students will understand the evolution of angiosperms
3. Students will know plant morphology
4. Students will learn to identify the plant families by using morphological characters.

M. Sc. PART-II (SEMESTER III)

(CCS- 303.5): Angiosperm Taxonomy

(SPECIAL PAPER II) MODERN TRENDS IN ANGIOSPERM TAXONOMY

1. Students will know the importance of information from diverse fields in taxonomic works
2. Students will be trained to use the information from plant chromosomes in taxonomic studies
3. Role of SEM, TEM and importance of ecology and geography of plants in taxonomic studies will be known to students
4. Students will learn to identify the plant families by using morphological characters

M. Sc. PART II (SEMESTER IV)

(CCS402.5): Angiosperm Taxonomy

(SPECIAL PAPER III) ANGIOSPERM TAXONOMY FLORISTICS AND BIOSYSTEMATICS

1. Students will know about the taxonomic literature and the importance of floristic/taxonomic work.
2. Students will know the history of botany in India
3. Students will understand the utility of data from various disciplines of botany in taxonomic studies
4. Students will know to utilize the information from geography and its role in identification.

M. Sc. PART-II (SEMESTER IV)
(CCS403.5): Angiosperm Taxonomy
(SPECIAL PAPER IV) PHYLOGENY AND FLORAL BIOLOGY OF
ANGIOSPERMS

1. Students will know the concepts related to flowering plant evolution and fossilization
2. Students will be trained in floral biology.
3. Students will learn to identify the plant families by using morphological characters.

CCS 302.7 Plant Tissue Culture

1. The candidates will be trained in fundamentals of plant tissue culture .
2. The candidates will be trained in learning basics of plant nutrition and media preparation.
3. The candidates will be trained in different techniques of PTC

CCS 303.7 Molecular Biotechnology and Genetic Engineering

1. The candidates will be trained in knowing the fundamentals of Biotechnology
2. The candidates will be trained in Molecular Biotechnology
3. The candidates will be trained in plant genetic engineering related to gene transfer.
4. The candidates will be trained in proteomics, genomics, enzymology and immunology.

CCS 402.7 Applications and Prospects of PTC

1. The candidates will be trained in actual applications of Biotechnology
2. The candidates will be trained in extraction of secondary metabolites and biotransformation.
3. The candidates will be trained in crop improvement for production of genetically engineered transgenic plants.

CCS 403.7 Application, Regulation and Patenting Biotechnology.

1. The candidates will be trained in efficient use of biotechnological techniques in agriculture.
2. The candidates will get knowledge of global scenario of GMOs.
3. The candidates will be trained in IPR system of India.

M.Sc. PART- II (SEMESTER III)
(CCS- 302.3): Cytogenetics and Plant Breeding
(SPECIAL PAPER- I) CYTOGENETICS

1. Candidates will be trained in different techniques used in cytogenetic study.
2. Candidates will be trained in cell cycle and meiosis and its control
3. Candidates will be trained in genome analysis of crop plants

M. Sc. PART- II (SEMESTER III)
Paper-XII (CCS- 303.3): Cytogenetics and Plant Breeding
(SPECIAL PAPER II) PLANT BREEDING

1. Students will be trained in sources of plant genetic resources and their utilization in plant breeding.
2. Students will be trained in causes and estimation of plant genetic diversity.
3. Students will be trained in different methods of Plant breeding.

M.Sc. PART-II SEMESTER IV
(CCS402.3): Cytogenetics and Plant Breeding
(SPECIAL PAPER- III) MOLECULAR GENETICS

1. Students will be trained in tools in molecular genetic studies.
2. Students will be trained in different techniques used in molecular genetic studies.
3. Students will be trained in use of different tools and techniques used in Bioinformatics, Genomics and Proteomic studies

M.Sc. PART-II SEMESTER IV
(CCS403.3): Cytogenetics and Plant Breeding
**(SPECIAL PAPER IV) SPECIAL APPROACHES IN GENETIC IMPROVEMENT OF
CROP PLANTS**

1. Students will be trained in functional genomics studies of crop plants.
2. Students will be trained in plant tissue culture aspects.
3. Students will be trained in different tools and techniques used in development of transgenic plants.

Plant Physiology

Course code CCS- 302.1	Course title Advanced Plant Physiology and Plant Biochemistry	<ol style="list-style-type: none"> 1. Students will be able to understand the process of plant processes and their regulation. 2. Candidates will learn tole of secondary metabolites in defence mechanism 3. Students will understand the role of mineral nutrients in plant growth and development. 4. Candidate will implement the knowledge of various processes and factors involved in plant metabolism.
Course code CCS- 303.1	Course title Plant Growth and Development	<ol style="list-style-type: none"> 1. Students will learn the process of seed development. 2. Candidates will understand the role of plant growth regulators and their application in horticulture and agriculture. 3. Students will be acquainted with the role of light and photoreceptors. 4. candidates will learn various aspects of post-harvest physiology
Course code CCS 402.1	Course title Stress Physiology of Plants	<ol style="list-style-type: none"> 1. Students will be acquainted with stress responses and crop yield 2. Understanding mechanism of stress tolerance and crop improvement. 3. Plant Interaction and impact on plant growth and development
Course code CCS403.1	Course title Applied Plant Physiology	<ol style="list-style-type: none"> 1. Students will be trained with role of nutrient in plant growth development. 2. Candidates will able to understand role of different growth regulator in plant metabolism and its use in horticulture and agriculture 3. Students will get acquainted role of plant growth regulators in flowering, sex determination and fruit development. 4. Candidates will learn the weeds growing in the agricultural field, impact on plant growth and weed management.