

S.S.J.D.V.S.S.S. Govt. P.G. College,
Ranikhet, Almora



UG/PG

POs/PSOs/COs OF SYLLABUS

Name of Programme- B.Sc. BOTANY

- **The course** work shall be divided in to six semester with three paper in each semester
- **Each paper in a semester will be of 80 marks** out of which 60 marks for theory and 20 marks for internal assessment.
- Total 300 marks in each semester.
- **Practical examination in each semester is of 60marks.**
- Duration of theory examination shall be 3 hours and for practical examination 4 hours.

B.Sc. Botany Course Structure (Semester System)

I Semester	II Semester	III Semester	IV Semester	V Semester	VI Semester
Algae	Bryophyta	Taxonomy of Angiosperm	Genetic and Plant Breeding	Ecology	Economic Botany
Fungi	Pteridophyta	Cytology	Molecular Biology	Plant Physiology	biostatistic
Bacteria, Viruses and	Gymnosperm and Paleobotany	Embryology and Morphogenesis	Plant Anatomy	Biochemistry	Biotechnology

Liches					
--------	--	--	--	--	--

Programme Outcomes/ Programme Specific Outcomes

PROGRAMME OUTCOME

PO1: It is to give in depth knowledge of fundamental botany/ classic botany.

PO2: The knowledge gained in this program will be helpful in daily life.

PO3: Students will become employable in various government and private sector.

PO4: The completion of this programme develops ability to communicate botany by written, computational and graphic means.

PO4: Students will know about plant diversity and its importance that will help to develop strategies for conservation of rare and threaten plant species.

Programme Specific Outcome (PSOs):

After the successful completion of B.Sc. degree in botany the student will be able to:

PSO1: Understanding of the importance of plants in human life.

PSO2: Awareness about environmental conservation and sustainable use of plant.

PSO3: Skills related to laboratory as well as field work.

PSO4: Knowledge about application of plants in various industries and will develop apptitude and creativity require to become successful entrepreneur.

COURSE OUTCOMES (COs):

COs1: Students will get knowledge necessary for identification of plants and microorganism

COS2: Students will be able to explain how organism function at the level of the biomolecules, gene, genome, cell, tissue and various plant system.

COS3: They will be able to explain various physiological and biochemical processes, development, reproduction and behavior of different forms of plant life.

YEAR 2017-18

SEMESTER I

PAPER-I

ALGAE

B.Sc.	Year first	Semester first
Subject-Botany		
Course Title- Algae		
Course Outcomes		
COs1: : Students will get knowledge necessary for identification of Algae.		
COS2: They will be able to explain various Structural, physiological and biochemical processes, development, reproduction and life cycle in algae.		

PAPER-II

FUNGI

B.Sc.	Year first	Semester first
Subject-Botany		
Course Title-Fungi		

Course Outcomes

COS1: To learn about general account of habit, habitat and structure of fungi.

COS2: can understand about heterothallism and para-sexuality and pattern of life cycle of different fungal genera.

COS3: Students will learn about the economic importance of fungal world.

PAPER-III

BACTERIA, VIRUS AND LICHEN

B.Sc.	Year first	Semester first
Subject-Botany		
Course Title- Bacteria, Virus and Lichen		
Course Outcomes		
COS1: To learn about general characteristics and types of bacteria, viruses and Lichens.		
COS2: Their association with other plant groups.		
COS3: Their significance and economic importance.		

(Semester II)

PAPER-IV

BRYOPHYTA

B.Sc.	Year first	Semester second
Subject-Botany		
Course title- BRYOPHYTA		

Course Outcomes
COS1: To learn about general characteristic, systematic position and occurrence of Bryophytes.
COS2: Their morphology, Anatomy and Reproductive structure.
COS3: Their economic importance and evolutionary process

PAPER-V
PTERIDOPHYTA

B.Sc.	Year first	Semester second
Subject-Botany		
Course title- PTERIDOPHYTA		
Course Outcomes		
COS1: To learn about general characteristic, systematic position and occurrence of pteridophytes.		
COS2: Their morphology, Anatomy and Reproductive structure.		
COS3: telome theory, heterospory, stelear system and seed habit.		

PAPER-VI
GYMNOSPERM AND PALEOBOTANY

B.Sc.	Year first	Semester second
Subject-Botany		
Course title- GYMNOSPERM AND PALEOBOTANY		
Course Outcomes		

COS1: To learn about general characteristic, systematic position and occurrence of gymnosperms.
COS2: study of fossil plants and their formation
COS3: Economic importance of Gymnosperms.

SEMESTER III
PAPER-VII
TAXONOMY OF ANGIOSPERM

B.Sc	Year second	Semester third
Subject-Botany		
Course title- TAXONOMY OF ANGIOSPERM		
Course Outcomes		
<p>COS1: To learn about the origin and evolution of Angiosperm. COS2: to know about the classification of Angiosperm. COS3: General accounts of families prescribed in syllabus.</p>		

PAPER-VIII
CYTOLOGY

B.Sc.	Year second	Semester third
Subject-Botany		
Course title- CYTOLOGY		
Course Outcomes		
<p>COS1: Learn about the prokaryotic and eukaryotic cells. COS2: Ultra structure of plant cell and functions of cell organelles COS3: Know about cell division (Mitosis & Meiosis), Chromosomes.</p>		

PAPER-IX

EMBRYOLOGY AND MORPHOGENESIS

B.Sc.	Year second	Semester third
Subject-Botany		
Course title- EMBRYOLOGY AND MORPHOGENESIS		
Course Outcomes		
COS1: To know about flower as modified shoot and embryology of flowering plants.		
COS2: Study of male gametophyte and female gametophyte.		
COS3: Mechanism of pollination, fertilization and seed germination.		
COS 4: Role of plant growth regulators.		

SEMESTER IV

PAPER X

GENETICS AND PLANT BREEDING

B.Sc.	Year second	Semester four
Subject-Botany		
Course title- GENETICS AND PLANT BREEDING		
Course Outcomes		
COS1: To learn about structure and function of nucleic acid and genetic code.		
COS2: To study mendal's law of inheritance.		
COS3: To know aims, objectives and basic techniques of plant breeding.		

PAPER XI

MOLECULAR BIOLOGY

B.Sc.	Year second	Semester four
Subject-Botany		
Course title- MOLECULAR BIOLOGY		
Course Outcomes		
COS1: To learn chemistry of D.N.A. and molecular bases of gene mutation.		
COS2: General idea of molecular markers.		
COS3: Brief idea of PCR and DNA fingerprinting.		

PAPERXII

PLANT ANATOMY

B.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT ANATOMY		
Course Outcomes		
COS1: To learn about plant tissue system.		
COS2: To know about Anatomical characteristics of dicot and monocot Root, Stem and Leaf.		
COS3: A general idea of secondary growth.		

SEMESTER V

PAPER XIII

ECOLOGY

B.Sc.	Year third	Semester five
Subject-Botany		
Course title- ECOLOGY		
Course Outcomes		

COS1: To get basic knowledge of plant and environment.

COS2: To know concept of ecosystem.

COS3: Brief idea of biodiversity and its conservation.

COS4: Preliminary idea of environmental pollution.

PAPER- XIV

PLANT PHYSIOLOGY

B.Sc	Year third	Semester five
Subject-Botany		
Course title- PLANT PHYSIOLOGY		
Course Outcomes		
COS1: To know about plant-water relation.		
COS2: To know about transport of food, water and minerals in plants.		
COS3: To learn about process of respiration and photosynthesis in plant.		

PAPER- XV

BIOCHEMISTRY

B.Sc	Year third	Semester five
Subject-Botany		
Course title- BIOCHEMISTRY		
Course Outcomes		
COS1: To know the role properties and mechanism of enzymes.		
COS2: Elementary idea of amino acids, carbohydrate, fat and lipids in plants.		
COS3: To know the process of biological nitrogen fixation.		

**SEMESTER VI
PAPER-XVI
ECONOMIC BOTANY**

B.Sc	Year third	Semester six
Subject-Botany		
Course title- ECONOMIC BOTANY		
Course Outcomes		
<p>COS1: A brief knowledge of botany and commercial utilization of plants.</p> <p>COS2: To know about the general accounts of medicinal plants.</p> <p>COS3: A brief idea of spices and condiments.</p>		

**PAPER-XVII
BIOSTATISTIC**

B.Sc	Year third	Semester six
Subject-Botany		
Course title- BIOSTATISTIC		
Course Outcomes		
<p>COS1: General idea of scope and importance of statistics.</p> <p>COS2: To learn how to measure central tendencies.</p> <p>COS3: Classification, Tabulation and Graphic presentation of data.</p>		

**PAPER-XVIII
BIOTECHNOLOGY**

B.Sc	Year third	Semester six
Subject-Botany		

Course title- BIOTECHNOLOGY

Course Outcomes

COS1: To know role of biotechnology in modern life.

COS2: To learn about genetic engineering.

COS3 :Basic idea of industrial and agricultural biotechnology.

YEAR 2018-19

Semester-I

PAPER-I

ALGAE

B.Sc.	Year first	Semester first
Subject-Botany		
Course Title- Algae		
Course Outcomes		
COs1: : Students will get knowledge necessary for identification of Algae.		
COS2: They will be able to explain various Structural, physiological and biochemical processes, development, reproduction and life cycle in algae.		

PAPER-II

FUNGI

B.Sc.	Year first	Semester first
Subject-Botany		
Course Title-Fungi		

Course Outcomes

COS1: To learn about general account of habit, habitat and structure of fungi.

COS2: can understand about heterothallism and para-sexuality and pattern of life cycle of different fungal genera.

COS3: Students will learn about the economic importance of fungal world.

PAPER-III

BACTERIA VIRUS AND LICHEN

B.Sc.	Year first	Semester first
Subject-Botany		
Course Title- Bacteria, Virus and Lichen		
Course Outcomes		
COS1: To learn about general characteristics and types of bacteria, viruses and Lichens.		
COS2: Their association with other plant groups.		
COS3: Their significance and economic importance.		

(Semester II)

PAPER-IV

BRYOPHYTA

B.Sc.	Year first	Semester second
Subject-Botany		
Course title- BRYOPHYTA		

Course Outcomes

COS1: To learn about general characteristic, systematic position and occurrence of Bryophytes.

COS2: Their morphology, Anatomy and Reproductive structure.

COS3: Their economic importance and evolutionary process

PAPER-V

PTERIDOPHYTA

B.Sc.	Year first	Semester second
Subject-Botany		
Course title- PTERIDOPHYTA		
Course Outcomes		
COS1: To learn about general characteristic, systematic position and occurrence of pteridophytes.		
COS2: Their morphology, Anatomy and Reproductive structure.		
COS3: telome theory, heterospory, stelear system and seed habit.		

PAPER-VI

GYMNOSPERM AND PALEOBOTANY

B.Sc.	Year first	Semester second
Subject-Botany		
Course title- GYMNOSPERM AND PALEOBOTANY		
Course Outcomes		
COS1: To learn about general characterstic, systematic position		

and occurrence of gymnosperms.

COS2: study of fossil plants and their formation

COS3: Economic importance of Gymnosperms.

SEMESTER III

PAPER-VII

TAXONOMY OF ANGIOSPERM

B.Sc	Year second	Semester third
Subject-Botany		
Course title- TAXONOMY OF ANGIOSPERM		
Course Outcomes		
COS1: To learn about the origin and evolution of Angiosperm.		
COS2: to know about the classification of Angiosperm.		
COS3: General accounts of families prescribed in syllabus.		

PAPER-VIII

CYTOLOGY

B.Sc.	Year second	Semester third
Subject-Botany		
Course title- CYTOLOGY		
Course Outcomes		
COS1: Learn about the prokaryotic and eukaryotic cells.		
COS2: Ultra structure of plant cell and functions of cell organelles		
COS3: Know about cell division (Mitosis & Meiosis), Chromosomes.		

PAPER-IX
EMBRYOLOGY AND MORPHOGENESIS

B.Sc.	Year second	Semester third
Subject-Botany		
Course title- EMBRYOLOGY AND MORPHOGENESIS		
Course Outcomes		
<p>COS1: To know about flower as modified shoot and embryology of flowering plants.</p> <p>COS2: Study of male gametophyte and female gametophyte.</p> <p>COS3: Mechanism of pollination, fertilization and seed germination.</p> <p>COS 4: Role of plant growth regulators.</p>		

SEMESTER IV
PAPER X
GENETICS AND PLANT BREEDING

B.Sc.	Year second	Semester four
Subject-Botany		
Course title- GENETICS AND PLANT BREEDING		
Course Outcomes		
<p>COS1: To learn about structure and function of nucleic acid and genetic code.</p> <p>COS2: To study mendal's law of inheritance.</p> <p>COS3: To know aims, objectives and basic techniques of plant breeding.</p>		

PAPER XI
MOLECULAR BIOLOGY

B.Sc.	Year second	Semester four
Subject-Botany		
Course title- MOLECULAR BIOLOGY		
<p align="center">Course Outcomes</p> <p>COS1: To learn chemistry of D.N.A. and molecular bases of gene mutation.</p> <p>COS2: General idea of molecular markers.</p> <p>COS3: Brief idea of PCR and DNA fingerprinting.</p>		

**PAPERXII
PLANT ANATOMY**

B.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT ANATOMY		
<p align="center">Course Outcomes</p> <p>COS1: To learn about plant tissue system.</p> <p>COS2: To know about Anatomical characteristics of dicot and monocot Root, Stem and Leaf.</p> <p>COS3: A general idea of secondary growth.</p>		

**SEMESTER V
PAPER XIII
ECOLOGY**

B.Sc.	Year third	Semester five
Subject-Botany		
Course title- ECOLOGY		
Course Outcomes		

COS1: To get basic knowledge of plant and environment.

COS2: To know concept of ecosystem.

COS3: Brief idea of biodiversity and its conservation.

COS4: Preliminary idea of environmental pollution.

PAPER- XIV

PLANT PHYSIOLOGY

B.Sc	Year third	Semester five
Subject-Botany		
Course title- PLANT PHYSIOLOGY		
Course Outcomes		
COS1: To know about plant-water relation.		
COS2: To know about transport of food, water and minerals in plants.		
COS3: To learn about process of respiration and photosynthesis in plant.		

PAPER- XV

BIOCHEMISTRY

B.Sc	Year third	Semester five
Subject-Botany		
Course title- BIOCHEMISTRY		
Course Outcomes		
COS1: To know the role properties and mechanism of enzymes.		
COS2: Elementary idea of amino acids, carbohydrate, fat and lipids in plants.		
COS3: To know the process of biological nitrogen fixation.		

**SEMESTER VI
PAPER-XVI
ECONOMIC BOTANY**

B.Sc	Year third	Semester six
Subject-Botany		
Course title- ECONOMIC BOTANY		
Course Outcomes		
<p>COS1: A brief knowledge of botany and commercial utilization of plants.</p> <p>COS2: To know about the general accounts of medicinal plants.</p> <p>COS3: A brief idea of spices and condiments.</p>		

**PAPER-XVII
BIOSTATISTIC**

B.Sc	Year third	Semester six
Subject-Botany		
Course title- BIOSTATISTIC		
Course Outcomes		
<p>COS1: General idea of scope and importance of statistics.</p> <p>COS2: To learn how to measure central tendencies.</p> <p>COS3: Classification, Tabulation and Graphic presentation of data.</p>		

**PAPER-XVIII
BIOTECHNOLOGY**

B.Sc	Year third	Semester six
Subject-Botany		

Course title- BIOTECHNOLOGY

Course Outcomes

COS1: To know role of biotechnology in modern life.

COS2: To learn about genetic engineering.

COS3 :Basic idea of industrial and agricultural biotechnology.

Year 2019-20

B.Sc. Botany

Course Structure (Semester System)

2 paper system start

I Semester	II Semester	III Semester	IV Semester	V Semester	VI Semester
Algae and Bryophyte	Pteridophyte and Gymnosperm	Taxonomy and Angiosperms and Economics Botany	Plant Anatomy	Plant Physiology	Cell and Molecular Biology
Fungi and El. Microbiology	Ecology and Biostatistics	Plant Anatomy	Genetics and Plant breeding	Biochemistry	Biotechnology

Semester-I

PAPER-I
ALGAE AND BRYOPHYTA

B.Sc.	Year first	Semester first
Subject-Botany		
Course Title- Algae and Bryophyte		
Course Outcomes		
<p>COS1: : Students will get knowledge necessary for identification of Algae.</p> <p>COS2: They will be able to explain various Structural, physiological and biochemical processes, development, reproduction and life cycle in algae.</p> <p>COS3: To learn about general characteristic, systematic position and occurrence of Bryophytes.</p> <p>COS4: Their morphology, Anatomy and Reproductive structure.</p> <p>COS5: Their economic importance and evolutionary process</p>		

PAPER-II
FUNGI AND EL. MICROBIOOLOGY

B.Sc.	Year first	Semester first
Subject-Botany		
Course Title-Fungi and El. Microbiology		
Course Outcomes		
<p>COS1: To learn about general account of habit, habitat and structure of fungi.</p> <p>COS2: can understand about heterothallism and para-sexuality</p>		

and pattern of life cycle of different fungal genera.
COS3: Students will learn about the economic importance of fungal world.
COS4: To learn about general characteristics and types of bacteria, viruses and Lichens.
COS5: Their association with other plant groups.
COS6: Their significance and economic importance.

PAPER-III (Semester II)
PTERIDOPHYTA AND GYMNOSPERM

B.Sc.	Year first	Semester second
Subject-Botany		
Course title- PTERIDOPHYTA AND GYMNOSPERM		
Course Outcomes		
<p>COS1: To learn about general characteristic, systematic position and occurrence of pteridophytes.</p> <p>COS2: Their morphology, Anatomy and Reproductive structure.</p> <p>COS3: telome theory, heterospory, stelear system and seed habit.</p> <p>COS4: To learn about general characteristic, systematic position and occurrence of gymnosperms.</p> <p>COS5: study of fossil plants and their formation.</p> <p>COS6: Economic importance of Gymnosperms.</p>		

PAPER-IV(Semester II)
ECOLOGY AND BIOSTATISTICS

B.Sc.	Year third	Semester Second
Subject-Botany		
Course title- ECOLOGY AND BIOSTATICS		
Course Outcomes		
<p>COS1: To get basic knowledge of plant and environment.</p> <p>COS2: To know concept of ecosystem.</p> <p>COS3: Brief idea of biodiversity and its conservation.</p> <p>COS4: Preliminary idea of environmental pollution.</p> <p>COS5: General idea of scope and importance of statistics.</p> <p>COS6: To learn how to measure central tendencies.</p> <p>COS7: Classification, Tabulation and Graphic presentation of data.</p>		

PAPER-VII (Semester III)
TAXONOMY OF ANGIOSPERM

B.Sc	Year second	Semester third
Subject-Botany		
Course title- TAXONOMY OF ANGIOSPERM		
Course Outcomes		
<p>COS1: To learn about the origin and evolution of Angiosperm.</p> <p>COS2: to know about the classification of Angiosperm.</p> <p>COS3: General accounts of families prescribed in syllabus.</p>		

PAPER-VIII (Semester III)
CYTOLOGY

B.Sc.	Year second	Semester third
Subject-Botany		
Course title- CYTOLOGY		
Course Outcomes		
<p>COS1: Learn about the prokaryotic and eukaryotic cells.</p> <p>COS2: Ultra structure of plant cell and functions of cell organelles</p> <p>COS3: Know about cell division (Mitosis& Meiosis), Chromosomes.</p>		

PAPER-IX (Semester III)

EMBRYOLOGY AND MORPHOGENESIS

B.Sc.	Year second	Semester third
Subject-Botany		
Course title- EMBRYOLOGY AND MORPHOGENESIS		
Course Outcomes		
<p>COS1: To know about flower as modified shoot and embryology of flowering plants.</p> <p>COS2: Study of male gametophyte and female gametophyte.</p> <p>COS3: Mechanism of pollination, fertilization and seed germination.</p> <p>COS 4: Role of plant growth regulators.</p>		

PAPER X (Semester IV)
GENETICS AND PLANT BREEDING

B.Sc.	Year second	Semester four
Subject-Botany		
Course title- GENETICS AND PLANT BREEDING		
Course Outcomes		
<p>COS1: To learn about structure and function of nucleic acid and genetic code.</p> <p>COS2: To study mendal's law of inheritance.</p> <p>COS3: To know aims, objectives and basic techniques of plant breeding.</p>		

PAPER XI (Semester IV)
MOLECULAR BIOLOGY

B.Sc.	Year second	Semester four
Subject-Botany		
Course title- MOLECULAR BIOLOGY		
Course Outcomes		
<p>COS1: To learn chemistry of D.N.A. and molecular bases of gene mutation.</p> <p>COS2: General idea nof molecular markers.</p> <p>COS3: Brief idea of PCR and DNA fingerprinting.</p>		

PAPERXII (Semester IV)
PLANT ANATOMY

B.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT ANATOMY		

Course Outcomes
COS1: To learn about plant tissue system.
COS2: To know about Anatomical characteristics of dicot and monocot Root, Stem and Leaf.
COS3: A general idea of secondary growth.

PAPER XIII (Semester V)
ECOLOGY

B.Sc.	Year third	Semester five
Subject-Botany		
Course title- ECOLOGY		
Course Outcomes		
COS1: To get basic knowledge of plant and environment.		
COS2: To know concept of ecosystem.		
COS3: Brief idea of biodiversity and its conservation.		
COS4: Preliminary idea of environmental pollution .		

PAPER- XIV (Semester V)
PLANT PHYSIOLOGY

B.Sc	Year third	Semester five
Subject-Botany		
Course title- PLANT PHYSIOLOGY		
Course Outcomes		
COS1: To know about plant-water relation.		
COS2: To know about transport of food, water and minerals in plants.		
COS3: To learn about process of respiration and photosynthesis in		

plant.

PAPER- XV (Semester V)

BIOCHEMISTRY

B.Sc	Year third	Semester five
Subject-Botany		
Course title- BIOCHEMISTRY		
Course Outcomes		
COS1: To know the role properties and mechanism of enzymes.		
COS2: Elementary idea of amino acids, carbohydrate, fat and lipids in plants.		
COS3: To know the process of biological nitrogen fixation.		

PAPER-XVI (Semester VI)

ECONOMIC BOTANY

B.Sc	Year third	Semester six
Subject-Botany		
Course title- ECONOMIC BOTANY		
Course Outcomes		
COS1: Abrief knowledge of botany and commercial utilization of plants.		
COS2: To know about the general accounts of medicinal plants.		
COS3: Abrief idea of spices and condiments.		

PAPER-XVII (Semester VI)

BIOSTATISTIC

B.Sc	Year third	Semester six
Subject-Botany		
Course title- BIOSTATISTIC		
Course Outcomes		
COS1: General idea of scope and importance of statistics.		
COS2: To learn how to measure central tendencies.		
COS3: Classification, Tabulation and Graphic presentation of data.		

PAPER-XVIII (Semester VI)

BIOTECHNOLOGY

B.Sc	Year third	Semester six
Subject-Botany		
Course title- BIOTECHNOLOGY		
Course Outcomes		
COS1: To know role of biotechnology in modern life.		
COS2: To learn about genetic engineering.		
COS3 : Basic idea of industrial and agricultural biotechnology.		

YEAR 2020-21
B.Sc I(Semester-I)

PAPER-I
ALGAE AND BRYOPHYTA

B.Sc.	Year first	Semester first
Subject-Botany		
Course Title- Algae and Bryophyte		
Course Outcomes		
COs1: Students will get knowledge necessary for identification of Algae.		
COS2: They will be able to explain various Structural, physiological and biochemical processes, development, reproduction and life cycle in algae.		
COS3: To learn about general characteristic, systematic position and occurrence of Bryophytes.		
COS4: Their morphology, Anatomy and Reproductive structure.		
COS5: Their economic importance and evolutionary process		

PAPER-II
FUNGI AND EL. MICROBIOOLOGY

B.Sc.	Year first	Semester first
Subject-Botany		
Course Title-Fungi and El. Microbiology		
Course Outcomes		
<p>COS1: To learn about general account of habit, habitat and structure of fungi.</p> <p>COS2: can understand about heterothallism and para-sexuality and pattern of life cycle of different fungal genera.</p> <p>COS3: Students will learn about the economic importance of fungal world.</p> <p>COS4: To learn about general characteristics and types of bacteria, viruses and Lichens.</p> <p>COS5: Their association with other plant groups.</p> <p>COS6: Their significance and economic importance.</p>		

PAPER-III (Semester II)
PTERIDOPHYTA AND GYMNOSPERM

B.Sc.	Year first	Semester second
Subject-Botany		
Course title- PTERIDOPHYTA AND GYMNOSPERM		
Course Outcomes		
<p>COS1: To learn about general characteristic, systematic position</p>		

and occurrence of pteridophytes.

COS2: Their morphology, Anatomy and Reproductive structure.

COS3: telome theory, heterospory, stelear system and seed habit.

COS4: To learn about general characteristic, systematic position and occurrence of gymnosperms.

COS5: study of fossil plants and their formation

COS6: Economic importance of Gymnosperms.

PAPER-IV (Semester II)
ECOLOGY AND BIOSTATISTICS

B.Sc.	Year third	Semester five
Subject-Botany		
Course title- ECOLOGY AND BIOSTATICS		
Course Outcomes		
COS1: To get basic knowledge of plant and environment.		
COS2: To know concept of ecosystem.		
COS3: Brief idea of biodiversity and its conservation.		
COS4: Preliminary idea of environmental pollution.		
COS5: General idea of scope and importance of statistics.		
COS6: To learn how to measure central tendencies.		
COS7: Classification, Tabulation and Graphic presentation of data.		

PAPER V (Semester III)
TAXONOMY OF ANGIOSPERM AND ECONOMIC BOTANY

B.Sc	Year second	Semester third
------	-------------	----------------

Subject-Botany
Course title- TAXONOMY OF ANGIOSPERM AND ECONOMIC BOTANY
<p style="text-align: center;">Course Outcomes</p> <p>COS1: To learn about the origin and evolution of Angiosperm.</p> <p>COS2: to know about the classification of Angiosperm.</p> <p>COS3: General accounts of families prescribed in syllabus.</p> <p>COS4: A brief knowledge of botany and commercial utilization of plants.</p> <p>COS5: To know about the general accounts of medicinal plants.</p> <p>COS6: A brief idea of spices and condiments.</p>

PAPER VI (Semester III)

EMBRYOLOGY AND MORPHOGENESIS

B.Sc.	Year second	Semester third
Subject-Botany		
Course title- EMBRYOLOGY AND MORPHOGENESIS		
<p style="text-align: center;">Course Outcomes</p> <p>COS1: To know about flower as modified shoot and embryology of flowering plants.</p> <p>COS2: Study of male gametophyte and female gametophyte.</p> <p>COS3: Mechanism of pollination, fertilization and seed germination.</p> <p>COS 4: Role of plant growth regulators.</p>		

PAPER-VII (Semester IV)

PLANT ANATOMY

B.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT ANATOMY		
Course Outcomes		
COS1: To learn about plant tissue system.		
COS2: To know about Anatomical characteristics of dicot and monocot Root, Stem and Leaf.		
COS3: A general idea of secondary growth.		

PAPER VIII (Semester IV)

GENETICS AND PLANT BREEDING

B.Sc.	Year second	Semester four
Subject-Botany		
Course title- GENETICS AND PLANT BREEDING		
Course Outcomes		
COS1: To learn about structure and function of nucleic acid and genetic code.		
COS2: To study mendal's law of inheritance.		
COS3: To know aims, objectives and basic techniques of plant breeding.		

PAPER IX (Semester V)

ECOLOGY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- Ecology		

Course Outcomes

COS1: To have a knowledge about climate, soil and vegetational pattern of the world.

COS2: To know about structure and function of different ecosystem

COS3: To learn the concept of biological diversity.

COS4: To gain knowledge about climate change and environmental pollution.

PAPER X (Semester V)

PLANT PHYSIOLOGY

B.Sc	Year third	Semester five
Subject-Botany		
Course title- PLANT PHYSIOLOGY		
Course Outcomes		
COS1: To know about plant-water relation.		
COS2: To know about transport of food, water and minerals in plants.		
COS3: To learn about process of respiration and photosynthesis in plant.		

PAPER- XI(Semester VI)

BIOCHEMISTRY

B.Sc	Year third	Semester five
Subject-Botany		
Course title- BIOCHEMISTRY		
Course Outcomes		

COS1: To know the role properties and mechanism of enzymes.
COS2: Elementary idea of amino acids, carbohydrate, fat and lipids in plants.
COS3: To know the process of biological nitrogen fixation.

PAPER-XII(Semester VI)

ECONOMIC BOTANY

B.Sc	Year third	Semester six
Subject-Botany		
Course title- ECONOMIC BOTANY		
Course Outcomes		
<p>COS1: A brief knowledge of botany and commercial utilization of plants.</p> <p>COS2: To know about the general accounts of medicinal plants.</p> <p>COS3: A brief idea of spices and condiments.</p>		

PAPER-XVII (Semester VI)

BIOSTATISTIC

B.Sc	Year third	Semester six
Subject-Botany		
Course title- BIOSTATISTIC		
Course Outcomes		
<p>COS1: General idea of scope and importance of statistics.</p> <p>COS2: To learn how to measure central tendencies.</p> <p>COS3: Classification, Tabulation and Graphic presentation of data</p>		

PAPER-XVIII (Semester VI)

BIOTECHNOLOGY

B.Sc	Year third	Semester six
Subject-Botany		
Course title- BIOTECHNOLOGY		
Course Outcomes		
COS1: To know role of biotechnology in modern life.		
COS2: To learn about genetic engineering.		
COS3 : Basic idea of industrial and agricultural biotechnology.		

YEAR 2021-22

PAPER-I (Semester I)

ALGAE AND BRYOPHYTA

B.Sc.	Year first	Semester first
Subject-Botany		
Course Title- Algae and Bryophyte		
Course Outcomes		
COs1: : Students will get knowledge necessary for identification of Algae.		
COS2: They will be able to explain various Structural, physiological and biochemical processes, development, reproduction and life cycle in algae.		
COS3: To learn about general characteristic, systematic position and occurrence of Bryophytes.		

COS4: Their morphology, Anatomy and Reproductive structure.
COS5: Their economic importance and evolutionary process

PAPER-II (Semester I)
FUNGI AND EL. MICROBIOOOGY

B.Sc.	Year first	Semester first
Subject-Botany		
Course Title-Fungi and El. Microbiology		
Course Outcomes		
<p>COS1: To learn about general account of habit, habitat and structure of fungi.</p> <p>COS2: can understand about heterothallism and parasexuality and pattern of life cycle of different fungal genera.</p> <p>COS3: Students will learn about the economic importance of fungal world.</p> <p>COS4: To learn about general characteristics and types of bacteria, viruses and Lichens.</p> <p>COS5: Their association with other plant groups.</p> <p>COS6: Their significance and economic importance.</p>		

PAPER-III (Semester II)
PTERIDOPHYTA AND GYMNOSPERM

B.Sc.	Year first	Semester second
Subject-Botany		
Course title- PTERIDOPHYTA AND GYMNOSPERM		
Course Outcomes		

COS1: To learn about general characteristic, systematic position and occurrence of pteridophytes.

COS2: Their morphology, Anatomy and Reproductive structure.

COS3: telome theory, heterospory, stelear system and seed habit.

COS4: To learn about general characteristic, systematic position and occurrence of gymnosperms.

COS5: study of fossil plants and their formation

COS6: Economic importance of Gymnosperms.

PAPER-IV (Semester II)
ECOLOGY AND BIOSTATISTICS

B.Sc.	Year first	Semester second
Subject-Botany		
Course title- ECOLOGY AND BIOSTATISTICS		
Course Outcomes		
<p>COS1: To get basic knowledge of plant and environment.</p> <p>COS2: To know concept of ecosystem.</p> <p>COS3: Brief idea of biodiversity and its conservation.</p> <p>COS4: Preliminary idea of environmental pollution .</p> <p>COS5: General idea of scope and importance of statistics.</p> <p>COS6: To learn how to measure central tendencies.</p> <p>COS7: Classification, Tabulation and Graphic presentation of data.</p>		

PAPER V (Semester III)
TAXONOMY OF ANGIOSPERM AND ECONOMIC BOTANY

B.Sc	Year second	Semester third
Subject-Botany		

**Course title- TAXONOMY OF ANGIOSPERM AND
ECONOMIC BOTANY**

Course Outcomes

COS1: To learn about the origin and evolution of Angiosperm.

COS2: to know about the classification of Angiosperm.

COS3: General accounts of families prescribed in syllabus.

COS4: A brief knowledge of botany and commercial utilization of plants.

COS5: To know about the general accounts of medicinal plants.

COS6: A brief idea of spices and condiments.

**PAPER VI (Semester III)
EMBRYOLOGY AND MORPHOGENESIS**

B.Sc.	Year second	Semester third
Subject-Botany		
Course title- EMBRYOLOGY AND MORPHOGENESIS		
Course Outcomes		
COS1: To know about flower as modified shoot and embryology of flowering plants.		
COS2: Study of male gametophyte and female gametophyte.		
COS3: Mechanism of pollination, fertilization and seed germination.		
COS 4: Role of plant growth regulators.		

**PAPER-VII (Semester IV)
PLANT ANATOMY**

B.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT ANATOMY		
<p style="text-align: center;">Course Outcomes</p> <p>COS1: To learn about plant tissue system.</p> <p>COS2: To know about Anatomical characteristics of dicot and monocot Root, Stem and Leaf.</p> <p>COS3: A general idea of secondary growth.</p>		

PAPER VIII (Semester IV)
GENETICS AND PLANT BREEDING

B.Sc.	Year second	Semester four
Subject-Botany		
Course title- GENETICS AND PLANT BREEDING		
<p style="text-align: center;">Course Outcomes</p> <p>COS1: To learn about structure and function of nucleic acid and genetic code.</p> <p>COS2: To study Mendel's law of inheritance.</p> <p>COS3: To know aims, objectives and basic techniques of plant breeding.</p>		

PAPER IX (Semester V)

PLANT PHYSIOLOGY

B.Sc	Year third	Semester five
-------------	-------------------	----------------------

Subject-Botany
Course title- PLANT PHYSIOLOGY
Course Outcomes
COS1: To know about plant-water relation.
COS2: To know about transport of food, water and minerals in plants.
COS3: To learn about process of respiration and photosynthesis in plant.

PAPER X (Semester V)
BIOCHEMISTRY

B.Sc	Year third	Semester five
Subject-Botany		
Course title- BIOCHEMISTRY		
Course Outcomes		
COS1: To know the role properties and mechanism of enzymes.		
COS2: Elementary idea of amino acids, carbohydrate, fat and lipids in plants.		
COS3: To know the process of biological nitrogen fixation.		

PAPER-XI (Semester VI)
CELL AND MOLECULAR BIOLOGY

B.Sc.	Year third	Semester six
Subject-Botany		
Course title- Cell and Molecular Biology		

Course Outcomes

- COS1:** Learn about the prokaryotic and eukaryotic cells.
- COS2:** Ultra structure of plant cell and functions of cell organelles
- COS3:** Know about cell division (Mitosis& Meiosis), Chromosomes.

- COS4:** To learn chemistry of d.n.a. and molecular bases of gene mutation.
- COS5:** General idea of molecular markers.
- COS6:** Brief idea of PCR and DNA fingerprinting.

PAPER-XII (Semester VI)

BIOTECHNOLOGY

B.Sc	Year third	Semester six
Subject-Botany		
Course title- BIOTECHNOLOGY		
Course Outcomes		
COS1: To know role of biotechnology in modern life.		
COS2: To learn about genetic engineering.		
COS3 : Basic idea of industrial and agricultural biotechnology.		

M.Sc. BOTANY

SESSION 2017-18

SEMESTER- I

PAPER-I

MICROBIOLOGY(BACTERIA, VIRUS, LICHENS)

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- MICROBIOLOGY(BACTERIA, VIRUS, LICHENS)		
Course Outcomes		
COS1: To know about characteristics features and ultra structure of bacteria, viruses.		
COS2: To know the role of microorganism in daily life.		
COS3: Brief idea of morphology, anatomy, reproduction and importance of lichens.		

PAPER- II

PHYCOLOGY

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- PHYCOLOGY		
Course Outcomes		
COS1: To know about the general characteristics, diverse structure of algae.		
COS2: Classification and type study of different groups of algae.		

COS3: To learn the useful and harmful aspects of algae.

**PAPER- III
MYCOLOGY**

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- MYCOLOGY		
Course Outcomes		
COS1: To know about the general characteristics of fungi and their reproduction methods.		
COS2: Classification and phylogeny of fungi.		
COS3: To learn about the life history patterns in major classes in fungi.		

**PAPER- IV
BRYOLOGY AND PTERIDOLOGY**

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- BRYOLOGY AND PTERIDOLOGY		
Course Outcomes		
COS1: To know the origin, relationship and evolutionary trends in bryophytes.		
COS2: Classification , ecological characteristics and economic importance of bryophytes		
COS3: A brief idea of origin and classification of pteridophyte.		
COS4: To know about heterospory, seed habit, evolution of stelea		

system and sorus.

SEMESTER-II
PAPER- V
GYMNOSPERM AND PALEOBOTANY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- GYMNOSPERM AND PALEOBOTANY		
Course Outcomes		
COS1: To know the history, classification, distribution and evolution of Gymnosperm.		
COS2: Study about specific fossil and living genera.		
COS3: Basic idea of paleobotany, types of fossils and mode of formation of fossil.		

PAPER- VI
DIVERSITY AND TAXONOMY OF ANGIOSPERM

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- DIVERSITY AND TAXONOMY OF ANGIOSPERM		
Course Outcomes		
COS1: To know important system of classification of angiosperm.		
COS2: Brief idea of international code of botanical nomenclature.		
COS3: Basic idea of taxonomic tools.		

COS4: Basic knowledge of prescribed families.

PAPER- VII

PLANT MORPHOLOGY, ANATOMY AND EMBRYOLOGY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- PLANT MORPHOLOGY, ANATOMY AND EMBRYOLOGY		
Course Outcomes		
COS1: To learn the morphological adaptation in flowering plants.		
COS2: To know th process of root, shoot and leaf development.		
COS3: To understand the process of pollination and fertilization		
COS4: General account oftissue nsystem and root shoot anatomy.		

PAPER- VIII

CELL AND MOLECULAR BIOLOGY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- CELL AND MOLECULAR BIOLOGY		
Course Outcomes		
COS1: To learn about cell wall and plasma membrane.		
COS2: To know the structure genome organization of different plant cell organllaes.		
COS3: To learn about cell cycle and different technique in cell biology.		

**SENESTER-III
PAPER-IX
PLANT ECOLOGY**

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT ECOLOGY		
Course Outcomes		
COS1: To have a knowledge about climate, soil and vegetational pattern of the world.		
COS2: To know about structure and function of different ecosystem		
COS3: To learn the concept of biological diversity.		
COS4: To gain knowledge about climate change and environmental pollution.		

**PAPER-X
CYTOGENETICS AND PLANT BREEDING**

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- CYTOGENETICS AND PLANT BREEDING		
Course Outcomes		
COS1: To learn about chromosomal organization and structural and numerical alteration in chromosome.		
COS2: Structure of gene and its expression.		

COS3: To know the technique of genetic recombination and gene mapping and process of mutation.

PAPER –XI

PLANT BIOTECHNOLOGY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT BIOTECHNOLOGY		
Course Outcomes		
COS1: Principle and scope of biotechnology.		
COS2: To know about tissue culture and recombinant D.N.A. technology.		
COS3: Genetic engineering of plants.		

PAPER-XII

PLANT PHYSIOLOGY AND BIOCHEMISTRY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT PHYSIOLOGY AND BIOCHEMISTRY		
Course Outcomes		
COS1: To know about membrane transport.		
COS2: Translocation of water and solute		
COS3: General aspect of enzymology and plant growth regulators.		
COS4: Structure and classification of carbohydrate, lipid and alkaloids.		
COS5: Concept of different physiological process like respiration, photosynthesis etc.		

--

PAPER-XII

PLANT RESOURCE, UTILIZATION AND CONSERVATION

M.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT RESOURCE, UTILIZATION AND CONSERVATION		
Course Outcomes		
<p>COS1: To know about origin and domestication in plant.</p> <p>COS2: To learn about economical importance plants and their parts.</p> <p>COS3: Knowledge of principle and strategies for conservation of plant biodiversity.</p> <p>COS4: To learn about green revolution and sustainable development.</p>		

PAPER- XIV

PLANT PATHOLOGY (ELECTIVE SUBJECT)

M.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT PATHOLOGY (ELECTIVE SUBJECT)		
Course Outcomes		
<p>COS1: To know about historical aspect of pathology, inoculum, dissemination of pathogen and plant-microbe interaction.</p> <p>COS2: To learn about genetic of host parasite interaction, enzymes and toxin, seed pathology and physiology of disease host.</p>		

COS3: Study disease control methods and disease cycle of some specific disease.

YEAR 2018-19

PAPER-I

MICROBIOLOGY(BACTERIA, VIRUS, LICHENS)

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- MICROBIOLOGY(BACTERIA, VIRUS, LICHENS)		
Course Outcomes		
COS1: To know about characteristics features and ultra structure of bacteria, viruses.		
COS2: To know the role of microorganism in daily life.		
COS3: Brief idea of morphology, anatomy, reproduction and importance of lichens.		

PAPER- II

PHYCOLOGY

M.Sc.	Year first	Semester first
--------------	-------------------	-----------------------

Subject-Botany
Course title- PHYCOLOGY
Course Outcomes
COS1: To know about the general characteristics, diverse structure of algae.
COS2: Classification and type study of different groups of algae.
COS3: To learn the useful and harmful aspects of algae.

PAPER- III
MYCOLOGY

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- MYCOLOGY		
Course Outcomes		
COS1: To know about the general characteristics of fungi and their reproduction methods.		
COS2: Classification and phylogeny of fungi.		
COS3: To learn about the life history patterns in major classes in fungi.		

PAPER- IV
BRYOLOGY AND PTERIDOLOGY

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- BRYOLOGY AND PTERIDOLOGY		

Course Outcomes

COS1: To know the origin, relationship and evolutionary trends in bryophytes.

COS2: Classification , ecological characteristics and economic importance of bryophytes

COS3: A brief idea of origin and classification of pteridophyte.

COS4: To know about heterospory, seed habit, evolution of stelea system and sorus.

SEMESTER-II

PAPER- V

GYMNOSPERM AND PALEOBOTANY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- GYMNOSPERM AND PALEOBOTANY		
Course Outcomes		
COS1: To know the history, classification, distribution and evolution of Gymnosperm.		
COS2: Study about specific fossil and living genera.		
COS3: Basic idea of paleobotany, types of fossils and mode of formation of fossil.		

PAPER- VI

DIVERSITY AND TAXONOMY OF ANGIOSPERM

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- DIVERSITY AND TAXONOMY OF ANGIOSPERM		
Course Outcomes		
<p>COS1: To know important system of classification of angiosperm. COS2: Brief idea of international code of botanical nomenclature. COS3: Basic idea of taxonomic tools. COS4: Basic knowledge of prescribed families.</p>		

PAPER- VII

PLANT MORPHOLOGY, ANATOMY AND EMBRYOLOGY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- PLANT MORPHOLOGY, ANATOMY AND EMBRYOLOGY		
Course Outcomes		
<p>COS1: To learn the morphological adaptation in flowering plants. COS2: To know th process of root, shoot and leaf development. COS3: To understand the process of pollination and fertilization COS4: General account oftissue nsystem and root shoot anatomy.</p>		

PAPER- VIII

CELL AND MOLECULAR BIOLOGY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- CELL AND MOLECULAR BIOLOGY		
Course Outcomes		
<p>COS1: To learn about cell wall and plasma membrane.</p> <p>COS2: To know the structure genome organization of different plant cell organllaes.</p> <p>COS3: To learn about cell cycle and different technique in cell biology.</p>		

SEMESTER-III
PAPER-IX
PLANT ECOLOGY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT ECOLOGY		
Course Outcomes		
<p>COS1: To have a knowledge about climate, soil and vegetational pattern of the world.</p> <p>COS2: To know about structure and function of different ecosystem</p> <p>COS3: To learn the concept of biological diversity.</p> <p>COS4: To gain knowledge about climate change and environmental pollution.</p>		

PAPER-X
CYTOGENETICS AND PLANT BREEDING

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- CYTOGENETICS AND PLANT BREEDING		
Course Outcomes		
COS1: To learn about chromosomal organization and structural and numerical alteration in chromosome.		
COS2: Structure of gene and its expression.		
COS3: To know the technique of genetic recombination and gene mapping and process of mutation.		

PAPER- XI
PLANT BIOTECHNOLOGY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT BIOTECHNOLOGY		
Course Outcomes		
COS1: Principle and scope of biotechnology.		
COS2: To know about tissue culture and recombinant D.N.A. technology.		
COS3: Genetic engineering of plants.		

PAPER XII- PLANT PHYSIOLOGY AND BIOCHEMISTRY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT PHYSIOLOGY AND BIOCHEMISTRY		
Course Outcomes COS1: To know about membrane transport. COS2: Translocation of water and solute COS3: General aspect of enzymology and plant growth regulators. COS4: Structure and classification of carbohydrate, lipid and alkaloids. COS5: Concept of different physiological process like respiration, photosynthesis etc.		

PAPER-XII

PLANT RESOURCE, UTILIZATION AND CONSERVATION

M.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT RESOURCE, UTILIZATION AND CONSERVATION		
Course Outcomes COS1: To know about origin and domestication in plant. COS2: To learn about economical importance plants and their parts. COS3: Knowledge of principle and strategies for conservation of plant biodiversity. COS4: To learn about green revolution and sustainable development.		

PAPER- XIV
PLANT PATHOLOGY (ELECTIVE SUBJECT)

M.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT PATHOLOGY (ELECTIVE SUBJECT)		
Course Outcomes		
<p>COS1: To know about historical aspect of pathology, inoculum, dissemination of pathogen and plant-microbe interaction.</p> <p>COS2: To learn about genetic of host parasite interaction, enzymes and toxin, seed pathology and physiology of disease host.</p> <p>COS3: Study disease control methods and disease cycle of some specific disease.</p>		

2019-20

SEMESTER- I

PAPER-I

MICROBIOLOGY(BACTERIA, VIRUS, LICHENS)

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- MICROBIOLOGY(BACTERIA, VIRUS, LICHENS)		
Course Outcomes		
<p>COS1: To know about characteristics features and ultra structure of bacteria, viruses.</p> <p>COS2: To know the role of microorganism in daily life.</p>		

COS3: Brief idea of morphology, anatomy, reproduction and importance of lichens.

**PAPER- II
PHYCOLOGY**

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- PHYCOLOGY		
Course Outcomes		
COS1: To know about the general characteristics, diverse structure of algae.		
COS2: Classification and type study of different groups of algae.		
COS3: To learn the useful and harmful aspects of algae.		

**PAPER- III
MYCOLOGY**

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- MYCOLOGY		
Course Outcomes		
COS1: To know about the general characteristics of fungi and their reproduction methods.		
COS2: Classification and phylogeny of fungi.		
COS3: To learn about the life history patterns in major classes in fungi.		

PAPER- IV
BRYOLOGY AND PTERIDOLOGY

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- BRYOLOGY AND PTERIDOLOGY		
Course Outcomes		
<p>COS1: To know the origin, relationship and evolutionary trends in bryophytes.</p> <p>COS2: Classification , ecological characteristics and economic importance of bryophytes</p> <p>COS3: A brief idea of origin and classification of pteridophyte.</p> <p>COS4: To know about heterospory, seed habit, evolution of stelea system and sorus.</p>		

SEMESTER-II
PAPER- V
GYMNOSPERM AND PALEOBOTANY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- GYMNOSPERM AND PALEOBOTANY		
Course Outcomes		
<p>COS1: To know the history, classification, distribution and evolution of Gymnosperm.</p> <p>COS2: Study about specific fossil and living genera.</p> <p>COS3: Basic idea of paleobotany, types of fossils and mode of formation of fossil.</p>		

PAPER- VI
DIVERSITY AND TAXONOMY OF ANGIOSPERM

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- DIVERSITY AND TAXONOMY OF ANGIOSPERM		
Course Outcomes		
<p>COS1: To know important system of classification of angiosperm. COS2: Brief idea of international code of botanical nomenclature. COS3: Basic idea of taxonomic tools. COS4: Basic knowledge of prescribed families.</p>		

PAPER- VII

PLANT MORPHOLOGY, ANATOMY AND EMBRYOLOGY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- PLANT MORPHOLOGY, ANATOMY AND EMBRYOLOGY		
Course Outcomes		
<p>COS1: To learn the morphological adaptation in flowering plants. COS2: To know th process of root, shoot and leaf development. COS3: To understand the process of pollination and fertilization COS4: General account oftissue nsystem and root shoot anatomy.</p>		

PAPER- VIII

CELL AND MOLECULAR BIOLOGY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- CELL AND MOLECULAR BIOLOGY		
Course Outcomes		
<p>COS1: To learn about cell wall and plasma membrane.</p> <p>COS2: To know the structure genome organization of different plant cell organllaes.</p> <p>COS3: To learn about cell cycle and different technique in cell biology.</p>		

SEMESTER-III
PAPER-IX
PLANT ECOLOGY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT ECOLOGY		
Course Outcomes		
<p>COS1: To have a knowledge about climate, soil and vegetational pattern of the world.</p> <p>COS2: To know about structure and function of different ecosystem</p> <p>COS3: To learn the concept of biological diversity.</p> <p>COS4: To gain knowledge about climate change and environmental pollution.</p>		

PAPER-X
CYTOGENETICS AND PLANT BREEDING

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- CYTOGENETICS AND PLANT BREEDING		
Course Outcomes		
<p>COS1: To learn about chromosomal organization and structural and numerical alteration in chromosome.</p> <p>COS2: Structure of gene and its expression.</p> <p>COS3: To know the technique of genetic recombination and gene mapping and process of mutation.</p>		

PAPER-XI

PLANT BIOTECHNOLOGY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT BIOTECHNOLOGY		
Course Outcomes		
<p>COS1: Principle and scope of biotechnology.</p> <p>COS2: To know about tissue culture and recombinant D.N.A. technology.</p> <p>COS3: Genetic engineering of plants.</p>		

PAPER-XII

PLANT PHYSIOLOGY AND BIOCHEMISTRY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT PHYSIOLOGY AND BIOCHEMISTRY		
Course Outcomes		
COS1: To know about membrane transport.		
COS2: Translocation of water and solute		
COS3: General aspect of enzymology and plant growth regulators.		
COS4: Structure and classification of carbohydrate, lipid and alkaloids.		
COS5: Concept of different physiological process like respiration, photosynthesis etc.		

PAPER -XIII

PLANT RESOURCE, UTILIZATION AND CONSERVATION

M.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT RESOURCE, UTILIZATION AND CONSERVATION		
Course Outcomes		
COS1: To know about origin and domestication in plant.		
COS2: To learn about economical importance plants and their parts.		
COS3: Knowledge of principle and strategies for conservation of plant biodiversity.		
COS4: To learn about green revolution and sustainable development.		

PAPER- XIV

PLANT PATHOLOGY (ELECTIVE SUBJECT)

M.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT PATHOLOGY (ELECTIVE SUBJECT)		
COS1: To know about historical aspect of pathology, inoculum, dissemination of pathogen and plant-microbe interaction.		
COS2: To learn about genetic of host parasite interaction, enzymes and toxin, seed pathology and physiology of disease host.		
COS3: Study disease control methods and disease cycle of some specific disease.		

YEAR 2020-21

SEMESTER- I

PAPER-I

MICROBIOLOGY(BACTERIA, VIRUS, LICHENS)

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- MICROBIOLOGY(BACTERIA, VIRUS, LICHENS)		
Course Outcomes		
COS1: To know about characteristics features and ultra structure of bacteria, viruses.		
COS2: To know the role of microorganism in daily life.		
COS3: Brief idea of morphology, anatomy, reproduction and		

importance of lichens.

PAPER- II
PHYCOLOGY

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- PHYCOLOGY		
Course Outcomes		
COS1: To know about the general characteristics, diverse structure of algae.		
COS2: Classification and type study of different groups of algae.		
COS3: To learn the useful and harmful aspects of algae.		

PAPER- III
MYCOLOGY

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- MYCOLOGY		
Course Outcomes		
COS1: To know about the general characteristics of fungi and their reproduction methods.		
COS2: Classification and phylogeny of fungi.		
COS3: To learn about the life history patterns in major classes in fungi.		

PAPER- IV

BRYOLOGY AND PTERIDOLOGY

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- BRYOLOGY AND PTERIDOLOGY		
Course Outcomes COS1: To know the origin, relationship and evolutionary trends in bryophytes. COS2: Classification , ecological characteristics and economic importance of bryophytes COS3: A brief idea of origin and classification of pteridophyte. COS4: To know about heterospory, seed habit, evolution of stelea system and sorus.		

SEMESTER-II

PAPER- V

GYMNOSPERM AND PALEOBOTANY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- GYMNOSPERM AND PALEOBOTANY		
Course Outcomes COS1: To know the history, classification, distribution and evolution of Gymnosperm. COS2: Study about specific fossil and living genera. COS3: Basic idea of paleobotany, types of fossils and mode of formation of fossil.		

PAPER- VI
DIVERSITY AND TAXONOMY OF ANGIOSPERM

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- DIVERSITY AND TAXONOMY OF ANGIOSPERM		
Course Outcomes		
<p>COS1: To know important system of classification of angiosperm.</p> <p>COS2: Brief idea of international code of botanical nomenclature.</p> <p>COS3: Basic idea of taxonomic tools.</p> <p>COS4: Basic knowledge of prescribed families.</p>		

PAPER- VII

PLANT MORPHOLOGY, ANATOMY AND EMBRYOLOGY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- PLANT MORPHOLOGY, ANATOMY AND EMBRYOLOGY		
Course Outcomes		
<p>COS1: To learn the morphological adaptation in flowering plants.</p> <p>COS2: To know the process of root, shoot and leaf development.</p> <p>COS3: To understand the process of pollination and fertilization</p> <p>COS4: General account of tissue system and root shoot anatomy.</p>		

PAPER- VIII

CELL AND MOLECULAR BIOLOGY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- CELL AND MOLECULAR BIOLOGY		
Course Outcomes		
<p>COS1: To learn about cell wall and plasma membrane.</p> <p>COS2: To know the structure genome organization of different plant cell organllaes.</p> <p>COS3: To learn about cell cycle and different technique in cell biology.</p>		

SEMESTER III
PAPER-IX
PLANT ECOLOGY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT ECOLOGY		
Course Outcomes		
<p>COS1: To have a knowledge about climate, soil and vegetational pattern of the world.</p> <p>COS2: To know about structure and function of different ecosystem</p> <p>COS3: To learn the concept of biological diversity.</p> <p>COS4: To gain knowledge about climate change and environmental pollution.</p>		

PAPER-X
CYTOGENETICS AND PLANT BREEDING

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- CYTOGENETICS AND PLANT BREEDING		
Course Outcomes		
COS1: To learn about chromosomal organization and structural and numerical alteration in chromosome.		
COS2: Structure of gene and its expression.		
COS3: To know the technique of genetic recombination and gene mapping and process of mutation.		

PAPER- PLANT BIOTECHNOLOGY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT BIOTECHNOLOGY		
Course Outcomes		
COS1: Principle and scope of biotechnology.		
COS2: To know about tissue culture and recombinant D.N.A. technology.		
COS3: Genetic engineering of plants.		

PAPER-XI
PLANT PHYSIOLOGY AND BIOCHEMISTRY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT PHYSIOLOGY AND BIOCHEMISTRY		
Course Outcomes		
<p>COS1: To know about membrane transport.</p> <p>COS2: Translocation of water and solute</p> <p>COS3: General aspect of enzymology and plant growth regulators.</p> <p>COS4: Structure and classification of carbohydrate, lipid and alkaloids.</p> <p>COS5: Concept of different physiological process like respiration, photosynthesis etc.</p>		

PAPERXII

PLANT RESOURCE, UTILIZATION AND CONSERVATION

M.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT RESOURCE, UTILIZATION AND CONSERVATION		
Course Outcomes		
<p>COS1: To know about origin and domestication in plant.</p> <p>COS2: To learn about economical importance plants and their parts.</p> <p>COS3: Knowledge of principle and strategies for conservation of plant biodiversity.</p> <p>COS4: To learn about green revolution and sustainable development.</p>		

PAPER- XIV

PLANT PATHOLOGY (ELECTIVE SUBJECT)

M.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT PATHOLOGY (ELECTIVE SUBJECT)		
Course Outcomes		
<p>COS1: To know about historical aspect of pathology, inoculum, dissemination of pathogen and plant-microbe interaction.</p> <p>COS2: To learn about genetic of host parasite interaction, enzymes and toxin, seed pathology and physiology of disease host.</p> <p>COS3: Study disease control methods and disease cycle of some specific disease.</p>		

YEAR 2021-22

SEMESTER- I

PAPER-I

MICROBIOLOGY(BACTERIA, VIRUS, LICHENS)

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- MICROBIOLOGY(BACTERIA, VIRUS, LICHENS)		
Course Outcomes		

COS1: To know about characteristics features and ultra structure of bacteria, viruses.

COS2: To know the role of microorganism in daily life.

COS3: Brief idea of morphology, anatomy, reproduction and importance of lichens.

PAPER- II
PHYCOLOGY

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- PHYCOLOGY		
Course Outcomes		
COS1: To know about the general characteristics, diverse structure of algae.		
COS2: Classification and type study of different groups of algae.		
COS3: To learn the useful and harmful aspects of algae.		

PAPER- III
MYCOLOGY

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- MYCOLOGY		
Course Outcomes		
COS1: To know about the general characteristics of fungi and their reproduction methods.		
COS2: Classification and phylogeny of fungi.		
COS3: To learn about the life history patterns in major classes in		

fungi.

PAPER- IV
BRYOLOGY AND PTERIDOLOGY

M.Sc.	Year first	Semester first
Subject-Botany		
Course title- BRYOLOGY AND PTERIDOLOGY		
Course Outcomes		
COS1: To know the origin, relationship and evolutionary trends in bryophytes.		
COS2: Classification , ecological characteristics and economic importance of bryophytes		
COS3: A brief idea of origin and classification of pteridophyte.		
COS4: To know about heterospory, seed habit, evolution of stelea system and sorus.		

SEMESTER-II
PAPER- V
GYMNOSPERM AND PALEOBOTANY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- GYMNOSPERM AND PALEOBOTANY		
Course Outcomes		
COS1: To know the history, classification, distribution and evolution of Gymnosperm.		
COS2: Study about specific fossil and living genera.		

COS3: Basic idea of paleobotany, types of fossil and mode of formation of fossil.

PAPER- VI
DIVERSITY AND TAXONOMY OF ANGIOSPERM

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- DIVERSITY AND TAXONOMY OF ANGIOSPERM		
Course Outcomes		
COS1: To know important system of classification of angiosperm.		
COS2: Brief idea of international code of botanical nomenclature.		
COS3: Basic idea of taxonomic tools.		
COS4: Basic knowledge of prescribed families.		

PAPER- VII
PLANT MORPHOLOGY, ANATOMY AND EMBRYOLOGY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- PLANT MORPHOLOGY, ANATOMY AND EMBRYOLOGY		
Course Outcomes		
COS1: To learn the morphological adaptation in flowering plants.		
COS2: To know the process of root, shoot and leaf development.		
COS3: To understand the process of pollination and fertilization		
COS4: General account of tissue system and root shoot anatomy.		

PAPER- VIII
CELL AND MOLECULAR BIOLOGY

M.Sc.	Year first	Semester second
Subject-Botany		
Course title- CELL AND MOLECULAR BIOLOGY		
Course Outcomes		
<p>COS1: To learn about cell wall and plasma membrane.</p> <p>COS2: To know the structure genome organization of different plant cell organllaes.</p> <p>COS3: To learn about cell cycle and different technique in cell biology.</p>		

SEMESTER III
PAPER-IX
PLANT ECOLOGY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT ECOLOGY		
Course Outcomes		
<p>COS1: To have a knowledge about climate, soil and vegetational pattern of the world.</p> <p>COS2: To know about structure and function of different ecosystem</p> <p>COS3: To learn the concept of biological diversity.</p> <p>COS4: To gain knowledge about climate change and</p>		

environmental pollution.

PAPER-X
CYTOGENETICS AND PLANT BREEDING

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- CYTOGENETICS AND PLANT BREEDING		
Course Outcomes		
COS1: To learn about chromosomal organization and structural and numerical alteration in chromosome.		
COS2: Structure of gene and its expression.		
COS3: To know the technique of genetic recombination and gene mapping and process of mutation.		

PAPER- PLANT BIOTECHNOLOGY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT BIOTECHNOLOGY		
Course Outcomes		
COS1: Principle and scope of biotechnology.		
COS2: To know about tissue culture and recombinant D.N.A. technology.		
COS3: Genetic engineering of plants.		

PAPER-XI

PLANT PHYSIOLOGY AND BIOCHEMISTRY

M.Sc.	Year second	Semester third
Subject-Botany		
Course title- PLANT PHYSIOLOGY AND BIOCHEMISTRY		
Course Outcomes		
COS1: To know about membrane transport.		
COS2: Translocation of water and solute		
COS3: General aspect of enzymology and plant growth regulators.		
COS4: Structure and classification of carbohydrate, lipid and alkaloids.		
COS5: Concept of different physiological process like respiration, photosynthesis etc.		

PAPERXII

PLANT RESOURCE, UTILIZATION AND CONSERVATION

M.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT RESOURCE, UTILIZATION AND CONSERVATION		
Course Outcomes		
COS1: To know about origin and domestication in plant.		
COS2: To learn about economical importance plants and their parts.		
COS3: Knowledge of principle and strategies for conservation of plant biodiversity.		
COS4: To learn about green revolution and sustainable development.		

PAPER- XIV

PLANT PATHOLOGY (ELECTIVE SUBJECT)

M.Sc.	Year second	Semester four
Subject-Botany		
Course title- PLANT PATHOLOGY (ELECTIVE SUBJECT)		
Course Outcomes		
COS1: To know about historical aspect of pathology, inoculum, dissemination of pathogen and plant-microbe interaction.		
COS2: To learn about genetic of host parasite interaction, enzymes and toxin, seed pathology and physiology of disease host.		
COS3: Study disease control methods and disease cycle of some specific disease.		