



COURSE OUTCOMES

DEPARTMENT OF BOTANY

I B.Sc. Botany

SEMESTER: I

Subject Name: ALGAE AND BRYOPHYTES

Subject Code: U22BYC11

COs	CO Statement
CO1	Provide basic knowledge and expose to the habit of algae
CO2	Know the systematics, morphology and structure of Algae.
CO3	Understand the life cycle pattern and uses of Algae.
CO4	Understand the morphological diversity of Bryophytes.
CO5	Familiarize the economic importance of the Bryophytes

Subject Name: LAB: ALGAE AND BRYOPHYTES

Subject Code: U22BYCP11 /U2BYC1P

COs	CO Statement
CO1	Develop skill in the micro preparations of the thallus of Algae and Bryophytes and make sketches of it
CO2	Understand the the thallus variations among Algae
CO3	Identify the reproductive structures among algae
CO4	Acquires knowledge on the morphological diversity of Bryophytes.
CO5	Compare and contrast the reproductive structures among Bryophytes

Subject Name: LAB: Horticulture

Subject Code: U22BYSP11

COs	CO Statement
CO1	Understand the usefulness of garden tools and implements in various horticultural operations.
CO2	Acquire sufficient knowledge in raising the nursery beds and horticultural operations of seeds raised in pots.
CO3	Expertise in vegetative propagation methods of important horticultural plants.
CO4	Self-reliant in the preparation of Farm yard Manure.
CO5	Development of skills in raising Indoor Garden plants.

Subject Name: Embryology of Angiosperms

Subject Code: U22BYS11

In this course the students will

COs	CO Statement
CO1	Appreciate the Structure and development of microsporangium.
CO2	Understand the differences between monosporic, bisporic and tetrasporic embryo sac development.
CO3	Gain knowledge about double fertilization and endosperm types.



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CO4	Get an insight about the Structure and development of dicot and monocot embryos.
CO5	Acquire basic knowledge about tissue culture and their significance.

Subject Name: **General Chemistry-I**

Subject Code: **U22CHAY11 /U3CHAY1Y**

In this course the students will

CO1:	Understand fundamental ideas about organic chemistry and isomerism
CO2:	Preparation properties of hydrogen isotopes
CO3:	Know the various types of colloids
CO4	Become professionally trained in the area of petrochemicals products and fertilizers
CO5	Understand importance of polymers in our daily life

SEMESTER: II

Subject Name: **HERBAL TECHNOLOGY**

Subject Code: **U22BYC21**

In this course the students will

COs	CO Statement
CO1	Impart knowledge on herbal medicine.
CO2	Develop a scientific attitude towards the study of herbal medicines.
CO3	Expose the students to different pharmaceutical industries and research institutes.
CO4	Develop skill in experiments and usage of equipments in herbal products preparation and their utilization.
CO5	Understand the ethical principles in herbal medicine research.

Subject Name: **LAB: HERBAL TECHNOLOGY**

Subject Code: **U22BYCP21**

In this course the students will

COs	CO Statement
CO1	Acquire knowledge on identification of. crude drug.
CO2	Understands the anatomical traits of the crude drugs.
CO3	Get trained in the preparations of herbal formulations
CO4	Develop skill in experiments and usage of equipments in herbal products preparation and their utilization.
CO5	Gain hands on training in pharmacognostic standardization of herbal drugs.



Subject Name: Plant Ecology and Phytogeography

Subject Code: U22BYS21

In this course the students will

COs	CO Statement
CO1	Know about the biotic and abiotic components of ecosystems.
CO2	Understand the importance of biogeochemical cycles and flow of energy among various trophic levels.
CO3	Learn about the adaptations exhibited by the flora of various geographical areas
CO4	Know about the Ecological succession and its types.
CO5	Understand the phytogeographical regions of India.

Subject Name: TECHNIQUES IN CELL BIOLOGY

Subject Code: U22BYSP21

In this course the students will

COs	CO Statement
CO1	Know about the principles and working of microscopes
CO2	Develop skill to measure the objects and count the cells viewed under microscope.
CO3	Know the various structures present in the plants
CO4	Develop skill to preserve the plant material sections
CO5	Understand the various stages of cell division

Subject Name: General Chemistry –II

Subject Code: U22CHAY21/ U3CHA2Y

In this course the students will

CO1:	Understand various chromatography technique
CO2:	Know about proteins and Vitamins
CO3:	Understand the importance of significant numbers and various methods for expressing
CO4:	Concentration of the solution.
CO4	Comprehend the method of estimation carbon, hydrogen, sulphur and halogens.
CO5	Ability to draw the structure and explain the applications of dyes.

Subject Name: Volumetric Analysis

Subject Code: U22CHAYP21 /U2CHA2YP

Upon completion of this lab, the students will be able

CO1:	Understand the apparatus used in volumetric analysis
CO2:	The precautions to using equipment
CO3:	Acquire the knowledge about the standard solutions
CO4:	Prepare standard solutions
CO4	Acquire the knowledge about strength of the solutions
CO5	Understand the apparatus used in volumetric analysis



COURSE OUTCOME

SEMESTER III

Fungi, Lichens and Plant Pathology

Subject Code: U3BYC3

- To study the morphology and reproduction of major classes of fungi.
- To study the fungal, bacterial and viral diseases and control measures in plants.
- To know about the classification of fungi and lichens.
- To acquire knowledge about the role of fungi.
- To make the students know about the types, structure and reproduction in lichens.

Allied Paper III - General Chemistry-III

Subject Code: U2CHA3Y

- To gain basic knowledge of photochemistry and nuclear chemistry.
- To understand the concept data analysis.
- To acquire basic knowledge in water quality parameters.
- To study the versatility of insecticides

INVERTEBRATA

Subject Code: U3ZYA3X1

- CO 1:** The outcome of the course 'Invertebrata' is to understand the systemic position and classification principles of various groups of animals.
- CO 2:** To impart knowledge about general characteristics of various Phyla belongs to Invertebrata.
- CO 3:** To acquire knowledge about single cell animals and sponges, understand the structure, reproduction and life cycle of Obelia, realize the Coral reef role in the marine environment.
- CO 4:** To build up the familiarity among the students regarding earthworm morphology and anatomical system.
- CO 5:** To Pass on information about Structure of Pila and know about the torsion in Mollusk.

SEMESTER IV

Pteridophytes and Gymnosperms

Subject Code: U2BYC4

- To understand the salient features and the importance of Pteridophytes and Gymnosperms
- To provide knowledge about the structure and reproduction in Pteridophytes and Gymnosperms.
- To know about the types and methods of fossilization.
- To impart knowledge about the fossil ferns and Gymnosperms.

Allied Paper IV - General Chemistry – IV

Subject Code: U2CHA4Y

- To study the mode of action of drugs.
- To learn some chemicals day to day life utility.



- To acquire basic idea about the alkaloids and Terpenoids.
- To gain knowledge about the soil chemistry.
- To study the role of catalyst in chemical reactions.

LAB: Organic Qualitative Analysis

Subject Code: U2CHA4YP

- To gain the fundamental knowledge about organic analysis

CHORDATA

Subject Code: U3ZYA4X2

- CO 1:** To understand the basis of chordates and their evolutionary importance.
- CO 2:** To gain knowledge about the reproductive and respiratory mechanisms and their regulations.
- CO 3:** To discuss the importance of identification of poisonous and nonpoisonous snakes and their classification system.
- CO 4:** To explain the mechanisms of adaptation of flight of birds and their taxonomic importance.
- CO 5:** To highlight the mechanism of reproduction in mammals and adaptation of aquatic mammals.



COURSE OUTCOME

SEMESTER V

BIOCHEMISTRY AND BIOTECHNIQUES

Subject code: U3BYC51

- Gain knowledge on fundamental biochemical principles such as bonding structure and function of biomolecules.
- Get insight about biomolecules.
- Acquaintance with basics of enzymes, classification and mechanism of enzyme action.
- Gain proficiency in handling basic instruments and laboratory techniques.

GENETICS AND PLANT BREEDING

Subject code: U3BYC52

- Understand the natural hereditary mechanisms in living organism
- Impart knowledge in basic concepts at molecular level of organism
- Learn the principles and practices in plant breeding techniques.

TAXONOMY OF ANGIOSPERMS

Subject Code: U3BYC53

- Get interest in admiring the variations in the vegetative and floral morphology of Angiosperms.
- Understand the importance of herbarium and BSI.
- Understand the floral arrangement to identify the plant species.
- Gain knowledge on the economic importance of Angiospermic plants.

BIOCHEMISTRY and BIOTECHNIQUES, GENETICS and PLANT BREEDING & TAXONOMY OF ANGIOSPERMS

Subject code: U3BYC5P

- Gain proficiency in handling basic instruments and laboratory techniques.
- Understand the natural hereditary mechanisms in living organisms.
- Learn the principles and practices in plant breeding techniques.
- Understand the floral variations among plant species



**CELLBIOLOGY, DEVELOPMENTAL BIOLOGY, PHYSIOLOGY,
IMMUNOLOGY AND EVOLUTION**

Subject Code: U3ZYA5X3

- To understand various structure and functions cell and organelles
- To Study about the development and function of various organs in animal body
- To find out ancestral development in earth

SBE- EMPLOYABILITY SKILLS

Subject Code: U1PS51

- Enrich the Employability Skills by imparting Reasoning skills, Aptitude skills and General Knowledge.

NME - PLANT RESOURCES AND UTILIZATION

Subject code: U3BYN51

- Develop their understanding on Plants morphology and Uses.
- Increase the awareness and appreciation of plants & plant products encountered in everyday life.
- Develop a basic knowledge of taxonomic diversity of plants and its economic importance.
- Understand core concepts of Economic importance of Plants and their value added processing plants in human use.

SEMESTER VI

PLANT PHYSIOLOGY

Subject code: U3BYC61

- Impact an insight into the various plant water relations.
- Understand the mechanism of various metabolic processes in plants.
- Acquire basic knowledge about growth and development in plants.
- Equip students with skills and techniques related to plant physiology so that they can design their own experiments.
- Take students to higher levels of learning about the mineral nutrition in plants.

MICROBIOLOGY AND BIOTECHNOLOGY

Subject code: U3BYC62

- Develop their knowledge about microbes.
- Create awareness on sewage water treatment, preservation of food products and antibiotics
- Build up the knowledge on tissue culture and its applications.
- Understand the multidisciplinary approaches in the field of biotechnology.



ORGANIC FARMING

Subject code: U3BYC63

- Know the values of organic waste and their utilization by adopting different technologies.
- Assess the nutritive value of organic products.
- Get awareness on organic agriculture.

LAB: PLANT PHYSIOLOGY, MICROBIOLOGY AND BIOTECHNOLOGY & ORGANIC FARMING

Subject code: U3BYC6P

- Understand the mechanism of various metabolic processes in plants.
- Acquire basic knowledge about growth and development in plants.
- Create awareness on sewage water treatment, preservation of food products and antibiotics
- Build up the knowledge on tissue culture and its applications.
- Impart Knowledge on organic waste and their utilization by adapting different technologies.
- Assess the nutritive value of organic products.
- Know the importance of organic agriculture.

COMMERCIAL ZOOLOGY

(VERMICULTURE, APICULTURE, AQUACULTURE AND POULTRY SCIENCE AND DAIRY FARMING)

Subject Code: U3ZYA6X4

- To understand the concepts of maintain animals like earthworms, honey bees, fishes, chicks and cattle.
- To develop the students as entrepreneur of the zoology

PROJECT

Subject Code: U1BY6PR

- To train the student in various spears of learning skills like critical thinking, creativity, synthesis of knowledge, analyzing capacity, instrument basics and handling and scientific report writing.
- To introduce the frontiers areas of research in botany among students
- To understand the scope of research programme in Botany
- The project work (field/ lab work) is to inculcate students to learn adequate knowledge on research methodology in the subject and prepare them for pursuing research in experimental areas of the subject.



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MUSHROOM CULTIVATION

Subject Code: U3BYN61

- Explore mushroom cultivation and its economic importance.
- Understand about mushroom spawn preparation for mushroom cultivation and mushroom marketing



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COURSE OUTCOME

SELF LEARNING

Food science and Nutrition

Subject Code: U1BYSL51

1. To have a broad outline of the methodology of food science
2. To enable students to apply scientific methods independently
3. To understand the nature of unit operations in the food industry.



COURSE OUTCOMES

DEPARTMENT OF BOTANY

**I M.Sc. Botany
SEMESTER I**

Subject Name: Gymnosperms and Taxonomy of Angiosperms Subject Code: P22BYC11

In this course the students will

CO1:	Gain knowledge on classification, morphology anatomy, reproductive structures and economic importance of gymnosperms.
CO2:	Develop basic understanding on paleobotany.
CO3:	Attain sufficient knowledge in plant classification, ICN and understand the relationship of plant taxonomy with other fields of plant science.
CO4:	Understand the morphology, identification and evolutionary trend of Polypetalae.
CO5:	Understand the morphology, identification and evolutionary trend of Gamopetalae, Monochlamydeae and Monocotyledons.

Subject Name: Cell Biology and Internal Morphology

Subject Code: P22BYC12

In this course the students will

COs	CO Statement
CO1	Distinguish the structure and functions of various cell organelles.
CO2	Compare and contrast the events of cell cycle and its regulation.
CO3	Explain the communications of cells with other cells and to the environment.
CO4	Distinguish the various processes involved in plant development.
CO5	Understand the internal anatomy and enables to identify fragmentary plant materials, wood, forensic investigation, and applied aspects of meristem cultures.

Subject Name: ENTREPRENEUR BOTANY

Subject Code: P22BYC13

COs	CO Statement
CO1	Exploration of knowledge in establishment of garden, organic farming and various horticultural practices.
CO2	Enrichment with commercialization of dry and fresh flowers.
CO3	Adapting the methods of preservation of vegetables and fruits.
CO4	Training on skill development and employability abilities in plant based products.
CO5	Marketing credibility through marketing and entrepreneurship development.



Subject Name: Gymnosperms and Taxonomy of Angiosperms Subject Code: P22BYP11

COs	CO Statement
CO1	Develop skill in the micro preparations of wood, leaves of cones of Gymnosperms species
CO2	Develop skills microscopic observation
CO3	Understand the rules of botanical nomenclature and taxonomical hierarchy
CO4	Develop skill plant identification using flora and punch cards and o describe plant species using technical terms
CO5	Become expertise in making sketches of the sections observed under dissection microscope and compound microscope

Subject Name: LAB II : CELL BIOLOGY AND INTERNAL MORPHOLOGY AND ENTREPRENEUR BOTANY

Subject Code: P22BYP12

COs	CO Statement
CO1	Understand the structure of basic organelles of plant cells.
CO2	Identify living and non-living cell inclusions in the plant cells.
CO3	Gain knowledge in comparing the anatomy of wood.
CO4	Develop skill in establishing various type of garden and raising nursery plants.
CO5	Gets trained in the preparation of plant based products.
CO6	Understand the importance of organic manures and develop skill in the preparation of vermicompost.

Subject Name: PHARMACOGNOSY

Subject Code: P22BYE11

COs	CO Statement
CO1	Understand the history of Pharmacognosy, general cultivation and Processing of medicinal plants, classification of crude drugs and Basic principles and concepts of Alternative system of medicine.
CO2	Attain sufficient knowledge on evaluation of crude drugs, extraction and isolation of crude drugs and quality control of herbal drugs.
CO3	Understand pharmacological action of plant drugs on nervous system and other organs.
CO4	Competent enough to perform phytochemical tests in order to find plant secondary metabolites.
CO5	Wisdom on drugs obtained from various plant parts and its medicinal values.



SEMESTER: II

Subject Name: ALGAE, LICHENS, BRYOPHYTES AND PTERIDOPHYTES

Subject Code: P22BYC21

In this course the students will

CO1:	Understand the diversity, distribution and classification of Algae.
CO2:	Develop knowledge about the thallus organisation, reproduction, life cycle and cultivation of Algae.
CO3:	Familiarize with Lichen morphology and reproduction.
CO4:	Understand the evolutionary relationships among Bryophytes and their fossils.
CO5:	Gain knowledge about the structural variations among Pteridophytes.

Subject Name: Genetics and Molecular Biology

Subject Code: P22BYC22

In this course the students will

COs	CO Statement
CO1	Enlighten the basis of Mendelian genetics concepts and gene interaction
CO2	Attain the knowledge in population genetics
CO3	Gain the basic knowledge of Central dogma of molecular biology
CO4	Know the concept of gene regulation
CO5	Understand the causes of gene mutation, implications and repair mechanism

Subject Name: Environmental Biology

Subject Code: P22BYC23

In this course the students will

CO1:	Understand the history and scope of ecology on climatic factors and vegetation
CO2:	Gain knowledge on different types of ecological communities
CO3:	Identifies environmental problem vs population and sustainable development in urban areas
CO4:	Develop skills in identifying methods of environmental impact assessment, ecological, economic and biodiversity.
CO5:	Analyse social issues such as natural calamities, nuclear disaster, resettlement and rehabilitation



Subject Name: LAB III: ALGAE, LICHENS, BRYOPHYTES & PTERIDOPHYTES

Subject Code: P22BYP21

In this course the students will

CO1:	Differentiate the vegetative and reproductive structures of Algae, Lichens, Bryophytes and Pteridophytes.
CO2:	Acquires skill in sea weeds and ferns collection.
CO3:	Get trained in the preparation of Herbaria for algae and ferns.
CO4:	Acquires skill in the micro preparations of Rachis and sporophyll of ferns/ Bryophytes and Lichens.
CO5:	Identify the variation in steles among Peridophytes.

Subject Name: LAB IV: GENETICS, MOLECULAR BIOLOGY AND ENVIRONMENTAL BIOLOGY

Subject Code: P22BYP22

In this course the students will

CO1:	Understand the Mendelian genetics concepts and gene interactions
CO2:	Attain knowledge in population genetics and Central dogma of molecular biology
CO3:	Gain knowledge to solve the problems on chromosome mapping
CO4:	Explore the chemical components present in various water and soil samples
CO5:	Acquire knowledge to survey the plant diversity in the campus
CO6:	Develop skill in the study of anatomical and adaptive structure present in the hydrophytes, mesophytes and xerophytes through micro preparation

Subject Name: HERBAL BOTANY

Subject Code: P22BYN21

In this course the students will

CO1:	Know about history and relevance of herbal drugs in Indian system of medicine
CO2:	Learn the macroscopic characters, therapeutically and pharmaceutical uses of medicinal plants
CO3:	Understand the techniques for medicinal gardening, Cultivation practices and utilization of selected medicinal plants.
CO4:	Know the technique of herbal formulation to cure various ailments
CO5:	Learn about value added herbal products



COURSE OUTCOME

SEMESTER III

MICROBIOLOGY, FUNGI AND PLANT PATHOLOGY

Subject Code: P19BYC31

- To know the contributions of microbiologists.
- To learn about the structure and growth of bacterial and bacterial culture techniques.
- To understand Bergey's manual of bacterial classification.
- To understand the factors affecting microbial growth.
- To acquire knowledge on the characteristics of viruses.
- To study the morphology and reproduction of major classes of fungi.
- To know the etiology of selected fungal, bacterial and viral diseases and its control measures.

BIOTECHNOLOGY

Subject Code: P19BYC32

- To provide students with a solid foundation in the rapidly expanding field of biotechnology
- To enhance the knowledge about the applications of modern biotechnology for the industrial production with waste minimization and reduced energy consumption.

BIOCHEMISTRY

Subject Code: P19BYC33

- It is an interdisciplinary program that focuses on the chemistry of living systems
- It analyzes the chemical combinations and reactions which take place in biological processes like the process of growth, metabolism, reproduction and heredity
- It also delves deep into the structures and functions of enzymes, proteins, carbohydrates, fats and other numerous processes related to metabolism of the mankind

BIODIVERSITY AND CONSERVATION

Subject Code: P19BYE31

- To provide quick snapshot of biodiversity
- To provide comprehensive methods for inventorying the biodiversity and its assessment
- To give an overview about the various threats to biodiversity and international agencies in conservation
- To give an idea about the biodiversity conservation strategies
- To give an overview about Biodiversity act, various issues and rights related to biodiversity



SEMESTER IV

PLANT PHYSIOLOGY

Subject Code: P19BYC41

- Understand how plant structure relates to function
- Understand how and why water and ions are transported through plants
- Understand plant strategies in the capture of light
- recognize different methods plants use to sequester nutrients
- understand different plant strategies in the utilization of nutrients
- understand and give examples of plant adaptations to different environments and disturbances like climate change scenarios and their impacts on plant physiology

BIOINFORMATICS AND BIOSTATISTICS

Subject Code: P19BYC42

- Provide expertise in study design, including endpoint definition, sample size estimation and power calculation, randomization procedures, data collection from design, plans for report generation, interim reviews, and final analysis.
- Provide analyses and informatics support for all biological research projects using contemporary statistical and computing methodologies by softwares.
- The main aim of this core is to incorporate aspects of high-throughput and high-performance computing with knowledge discovery approaches through the application of neural- networks, probability and statistics to support and enhance each of the participating projects and the Molecular Analysis.

DEVELOPMENTAL BOTANY

Subject Code: P19BYC43

- To acquire knowledge the about structure and development of anthers and its functions
- To study concepts of female reproductive organs of angiosperms
- To gain the knowledge of various fertilization process
- To acquire understanding of development of a diversity of embryo development.
- To analyze the morphogenetic potentials pertaining to its development of various organs



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COURSE OUTCOME

SELF LEARNING

Forestry

Subject Code:P19BYSL31

1. Forestry in India is a significant rural industry and a major environmental resource.
2. Indian forests are more than trees and an economic resource.
3. They are home to some of earth's unique flora and fauna.



COURSE OUTCOMES

UNDERGRADUATE

III - Year

V - Semester

Employability Skills

Subject Code: U1PS51

In this course, the students will

CO1:	Enrich them with the employability skills like reasoning skills and aptitude skills.
CO2:	Get adequate exposure to various types of competitive examinations.
CO3:	Get enough training in OMR based answer sheet.



COURSE OUTCOMES

UNDERGRADUATE

I - Semester

Value Education

Subject Code: U1VE11

In this course, the students will

CO1:	Learn to choose their own personal moral and spiritual values.
CO2:	Learn to become responsible citizens.
CO3:	Get sensitized to value formation.