**BACHELOR OF SCIENCE BOTANY**

**SEMESTER – I**

**CORE CODE I: PROFESSIONAL ENGLISH FOR LIFE SCIENCES**

**(21UPEL01)**

 **COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Recognise their own ability to improve their own competence in using the language.

**CO2:** Use language to speak with confidence in an intelligible and acceptable manner.

**CO3:** Understand the importance of reading for life.

**CO4:** Read independently unfamiliar texts with comprehension.

**CO5:** Understand the importance of writing in academic life.

**CORE PAPER – 1-PLANT DIVERSITY - I (ALGAE AND BRYOPHYTES)**

**(21UBO01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Students know about the general characteristics of algae and bryophytes, including their structure, functions, and economic importance.

**CO2:** Understand the structure, reproduction, and life cycle of Cyanophyceae and Chlorophyceae.

**CO3:** Understand the structure, reproduction, and life cycle of Xanthophyceae, Bacillariophyceae, Phaeophyceae, and Rhodophyceae.

**CO4:** Knowledge of features, classification, and affinities of Bryophytes and diversity in gametophytic and sporophytic organisation of Moss and Hornwort

**CO5:** Recognise the diversity in the gametophytic and sporophytic organisation of liverworts.

**SEMESTER II**

**CORE CODE II: PROFESSIONAL ENGLISH FOR LIFE SCIENCES**

**(21UPEL02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Attend interviews with boldness and confidence.

**CO2:** Adapt easily into the workplace context, having become communicatively competent.

**CO3:** Apply to the Research & Development organisations or sections of companies and offices with winning proposals.

**CO4:** Write simple sentences without committing errors of spelling or grammar.

**PAPER II:  PLANT DIVERSITY –II   FUNGI, LICHENS, BACTERIA**

**AND VIRUSES (21UBO02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** The study of viruses, bacteria, and fungi will enable the students to compare and understand the key concepts of the diverse microbial world.

**CO2:** Students will learn how viruses and sub-viral pathogens serve as important model systems in the study of the various phenomena common to life, in addition to the techniques and tools related to the study of plant viruses.

**CO3:** Students will understand the role played by bacteria in the colonisation of land by higher forms and comprehend their relevance in the fields of molecular biology and biotechnology, environmental microbiology, and industrial microbiology.

**CO4:** Students will understand the pathogenicity of fungi and host responses, as well as the importance of fungi as saprobes.

**CORE COURSE – II MAJOR PRACTICAL - I (ALGAE, FUNGI, LICHENS,**

**BACTERIA, VIRUSES) (21UBOP01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Study the general parts and usage of the microscope.

**CO2:** Students will be able to observe the morphological structure of the microscope.

**CO3:** Learn about the structure, pigmentation, food reserves, and methods of reproduction of algae.

**CO4:** Learn about the structure, pigmentation, food reserves, and methods of reproduction of fungi.

**CO5**: Know about the economic importance of algae, fungi, and lichen. Study some plant diseases with special reference to the causative agents, symptoms, etiologic, and control measures.

**SBEC– I: MUSHROOM TECHNOLOGY (21UBOS01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** To motivate the students to self-employment.

**CO2:** Identify the varieties of common edible mushrooms and poisonous mushrooms.

**CO3:** Students can learn about their spawn protection.

**CO4:** Study the structure, classification, and types of mushrooms

**CO5:** Recognise the technology used in mushroom cultivation.

**SEMESTER III**

**PAPER III: PTERIDOPHYTES, GYMNOSPERMS, AND PALEOBOTANY (21UBO03)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Knowledge of different classes of pteridophytes along with their stellar details and seed habit.

**CO2:** Complete insight into the morphological, anatomical, and reproductive diversity within the pteridophytes

**CO3:** Knowledge of morphological, anatomical, and reproductive diversity within Gymnosperms

**CO4:** Understanding the Economic Importance of Gymnosperms and Basic Knowledge of Fossils

**ALLIED COURSE-III: ALLIED CHEMISTRY-1 (21UCHA01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Students are able to understand the volumetric principle and prepare standard solutions.

**CO2:** Students are able to recognise various types of bonds.

**CO3:** Students gain knowledge on drugs and their modes of action.

**CO4:** Able to identify acids and bases and to acquire knowledge about pH and buffer

**CO5:** Able to categorise the kinds of catalysis and gas laws

**SBEC– II: HORTICULTURE (21UBOS02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Explain the fundamentals of horticulture.

**CO2: Understand the** solution to develop a wide variety of plants through vegetative propagation.

**CO3:** To learn the techniques of soil bed preparation.

**CO4:** To study various types of gardening and their management.

**CO5:** To know about commercial floriculture and their production.

**CO6:** To learn about the production and packing of flowers.

**SEMESTER IV**

**CORE- IV ANATOMY AND EMBRYOLOGY OF**

**ANGIOSPERMS (21UBO04)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Know about the structure and function of the plant meristems and simple permanent tissues.

**CO2:** Tounderstand the knowledge on the basics of tissues and anatomical features of plants.

**CO3:** Know about the structure and development of dicot and monocot embryos. Learn about double fertilisation and its significance.

**CO4:** Familiarise yourself with the basic skills on the structure and development of another. Discuss the brief account on pollination to gain knowledge of embryonic development.

**SEMESTER IV**

**SBEC– III: PLANT TISSUE CULTURE (21UBOS03)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Students will understand the basic concepts and terminology used in plant tissue culture.

**CO2:** Students will understand the basic techniques to establish different types of in vitro cultures by themselves due to hands-on training in the subject.

**CO3:** Concept and calculations for media preparation were very well learned, as the media used for different types of culture were prepared by the students.

**CO4:** The knowledge of tissue culture techniques will help the students design research projects and practical and short-term courses.

**MAJOR PRACTICAL –II**

**(PTERIDOPHYTES, GYMNOSPERMS, AND PALEOBOTANY; ANATOMY &**

**EMBRYOLOGY OF ANGIOSPERMS) (21UBOP02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** To examine the internal Structure of Pteridophytes and Gymnosperms.

**CO2:** Get knowledge of the preparation of Stain and Glycerine.

**CO3:** Students are able to prepare the permanent slides on their own.

**CO4:** Training students to prepare the micro-preparedness and showing the Stages of Mitosis.

**CO5:** To know about reduction parts of gymnosperms.

**SEMESTER - V**

**COURE COURSE – VII**

**MORPHOLOGY AND TAXONOMY ANGIOSPERMS (21UBO05)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Knowledge of Plant Parts Like Stem, Root, and Leaf and Their Modifications

**CO2:** A detailed study of flowers and their types of inflorescence, estimations, floral formulas, and study of fruits

**CO3**: A detailed study of taxonomy, systematic classifications, plant nomenclature, and herbarium techniques

**CO4:** Understanding of the Angiosperm Plant Families Annonaceae, Capparidaceae, Rutaceae, and Leguminosae

**CO5:** Understanding of the Angiosperm Plant Families Apocyanceae, Asclepiadaceae, Verbenaceae, Lamiaceae, Euphorbiaceae, Orchidaceous, Liliaceous, and Phocaea

**COURE COURSE – VIII - CELL BIOLOGY (21UBO06)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Knowledge of techniques of cell biology and characteristics of prokaryotic and eukaryotic cells

**CO2:** Understanding the ultrastructure of plant cells and cell walls An Overview of Membrane Function;

**CO3:** Understanding the phenomenon of the end membrane system

**CO4:** Knowledge of cell organelles

**CO5:** Understanding the Special Types of Chromosomes, Nucleic Acids, and Cell Division

**CORE COURSE – IX GENETICS AND PLANT BREEDING (21UBO07)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Knowledge of Mendel’s laws of inheritance and multiple alleles

**CO2:** Understand linkage, crossing over, and cytoplasmic inheritance.

**CO3:** Understand the Sex Determination in Plants, Mutations, and Chromosomal Aberrations

**CO4:** Explain about plant breeding and its methods.

**CO5:** Explain about hybridization, mutations, and ancestral culture.

**PAPER VII: PLANT AND ENVIRONMENTAL BIOTECHNOLOGY (21UBOE01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Scope and Importance of Biotechnology; Familiarisation of the Terms Associated with Plant Tissue Culture

**CO2:** Understanding Gene Transfer in Plants

**CO3:** Briefing the methods and tools associated with recombinant DNA technology, techniques, and application of biotechnology

**CO4:** The concept of genetically modified organisms Introducing genomics, proteomics, and molecular markers

**CO5:** Knowledge aboutEnvironmental Biotechnology, Biodiversity, and Conversation

**SKILL-BASED ELECTIVE COURSE IV**

**AGRICULTURE MICROBIOLOGY (21UBOS04)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Students' learned about the different groups of microorganisms.

**CO2:** Students Acquired Depth of Knowledge on Microbial Interaction and Their Metabolism

**CO3:** know about the soil microbial consortium and its role in the environment.

**CO4:** Students will be introduced to the importance of microbes and their pivotal role in environmental management.

**CO5:** Students will be familiar with fermentation techniques pertaining to industrial products.

**BIOLOGICAL TECHNIQUES AND COMPUTER APPLICATION (21UBOS05)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Students are able to know the basic principles and applications of microscopes.

**CO2:** Acquire knowledge on breeding methods and commercially important plants.

**CO3:** Understand the micro techniques and staining techniques.

**CO4:** Students will understand the applications and principles of laboratory instruments.

**CO5: Knowledge** of the Statistical Data

**SEMESTER VI**

**PAPER VI: PLANT PHYSIOLOGY (21UBO08)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Knowledge of different aspects of plant water relations, culture methods, and mineral nutrients

**CO2**: complete insight into plant enzymes and various perspectives on photosynthesis

**CO3:** Knowledge of major macromolecules, respiratory pathways, and fatty acid metabolism

**CO4:** Understanding the general aspects of nitrogen metabolism, growth, phytohormones, and movement in plants

**PLANT ECOLOGY AND PLANT GEOGRAPHY (21UBO09)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Learn the approaches to the study of ecology.

**CO2:** Understand the population and community ecology concepts of met population.

**CO3:** Students learn about the interaction between biotic and biotic components.

**CO4:** Students will acquire knowledge regarding vegetation and its importance.

**CO5: Develop an** understanding of population and community ecology, along with its characteristics and structure.

**CO6:** The students will understand the basic knowledge of general geology, plant ecology, and plant geography.

**CORE – X (PLANT PROTECTION) (21UBO010)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** The students will understand the fundamental aspects of plant breeding and plant pathology involving the principles, achievements, a few diseases, and their causal agents.

**CO2:** Students learned about the importance of plant protection methods and organic farming systems.

**CO3:** Students will understand the various processes in the crop improvement programme. Learn about the pathogenic microorganisms and their modes of entry and control measures.

**CO4:** Students are able to understand the detailed study of plant pathology and plant protection techniques.

**PAPER VII: PLANT BIOCHEMISTRY (21UBOE02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Knowledge of carbohydrates and the diversity of polysaccharides

**CO2:** A clear understanding of fatty acids and lipids with respect to their structure and properties.

**CO3:** Classification and organisation of proteins and their biological roles

**CO4:** An insight into the catalytic function of enzymes

**SEED TECHNOLOGY (21UBOS07)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Get an insight into fruit and seed development.

**CO2:** Students can be able to impart skills like germinating seeds.

**CO3:** Students can learn about seed certification.

**CO4:** Students are able to know the seed tag and the purity of the seed.

**CO5:** Students are able to know seed germination.

**MEDICOETHNO BOTANY (21UBOS06)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Understand different systems of traditional medicines.

**CO2:** Acquire knowledge on the collection and processing of herbal drugs.

**CO3:** Get knowledge on the pharmacological importance of medicinal plants and their bioactive compounds.

**CO4:** Acquire knowledge on different adulterants.

**CO5:** The students will be able to learn the nutritive value and medicinal properties of different plants.

**MAJOR PRACTICAL (21UBOP03)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Students can learn about how to describe plant parts with suitable plants: technical term habit, habitat

**CO2:** To identify the plant family and morphology of the parts used for the following plant species:

**CO3:** Students know about floral formulas from floral descriptions.

**CO4:** To observe the plant cell structure with onion epidermal peeling out.

**CO5:** Identification of different stages of mitosis by using squash and smear techniques—Onion Root Tip

**CO6**: Simple problems of monohybrid and dihybrid ratios and factor interaction

**MAJOR PRACTICAL (21UBOP04)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Students can learn about the physiological activities of plants through physiological experiments.

**CO2:** Study of the morphological and structural adaptation of locally available hydrophytes, correlated to the particular habitat

**CO3:** Students Determine Dissolved Oxygen in Water

**CO4:** Students determine the dissolved carbon dioxide in water.

**CO5:** Collection and study of diseased plant materials