

## COURSE OUTCOMES OF B.Sc. BOTANY

B.Sc. Botany is a 6-semester course conducted by Dr. Ambedkar College, Deekshabhoomi, Nagpur as per the syllabus provided by Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur. Each semester students have to take two theory papers, and practical based on it. Coursework is according to theory papers, practical, and related assignments such as field tour, field observation, unit test, class seminars, and different activities of botanical society conducted throughout the program.

### Course Outcomes (COs): As per Syllabus (BOS, Botany):-

#### SEMESTER-I

##### **Paper – I: Viruses, Prokaryotes, Algae and Biofertilizers**

Course outcome: *Students will be able to*

CO1: identify various microbial life forms in depth with ultrastructure, reproduction and economic importance.

CO2: to gain knowledge about Cyanobacteria with ultrastructure and economic importance and Algae: Classification and economic importance.

CO3: to understand complete Life history of *Chara*, *Vaucheria*, *Ectopus* and *Batrachospermum*.

CO4: to acquire Skill development practices in the field of Biofertilizers. Commercial production of *Rhizobium*, *PSB*, *Azotobacter* and *Azolla*.

##### **Paper – II: (Fungi, Plant Pathology, Lichens, Bryophyta and Mushroom Cultivation)**

Course outcome: *Students will Remember and understand*

CO1: The General characteristics, Classification & economic importance of Fungi. Study in detail the life history of *Albugo*, *Mucor*, *Puccinia*, *Cercospora*

CO2: To explore host, pathogen, symptoms, Causes and Control of Leaf curl of Papaya, Citrus canker and Red rot of Sugarcane. To understand the types and reproduction in Lichens.

CO3: The General characteristics, Classification & economic importance of Bryophytes. Study in detail the life history of *Marchantia*, *Anthoceros*, *Funaria*

CO4: To acquire Skill development practices in the field of mushroom cultivation

**Practical CO:-** The course focuses on viruses, prokaryotes, algae, fungi, plant pathology, lichens, bryophyta and biopreneurship through biofertilizers and mushroom cultivation.

## **SEMESTER-II**

### **Paper-I: (Palaeobotany, Pteridophytes, Gymnosperms and Soil analysis)**

Course outcome: *Students will gain the skills to identify and evaluate critical information of*

CO1: Palaeobotany, types of fossils, and geological time scale

CO2: Pteridophytes, classification, life history, heterospory, seed habit, and steles.

CO3: General characteristics, classification, life cycle of gymnospermic forms.

CO4: Soil analysis: properties, types, and method of collection of soil samples.

### **Paper – II: (Morphology of Angiosperms and Floriculture)**

Course outcome: *After completion of this course students will gain knowledge of -*

CO1: Vegetative morphology of angiospermic plant parts.

CO2: Reproductive morphology, evolutionary significance, identification and description of floral characters of angiosperms.

CO3: To get an insight on taxonomic terminologies and description of carpel and types of fruit.

CO4: Skill development practices in floriculture related to cultivation, irrigation and harvesting.

**Practical CO:-** The course focuses on morphology, anatomy, reproduction and evolution in pteridophytes, gymnosperms, and angiosperms including biopreneurship through floriculture and soil analysis.

## **SEMESTER-III**

### **Paper-I: (Angiosperm Systematics, Embryology and Indoor Gardening)**

Course outcome: *Students will be able to understand*

CO1: Origin of angiosperms, fossils angiosperms, plants diversity, description, identification, nomenclature and their classification including modern trends in the plant systematics.

CO2: Systems of classification and study of Angiosperm families

CO3: Embryology, pollination, and Fertilization in plants development.

CO4: Various analytical and technical skills related to Skill landscaping and Indoor gardening

## **Paper – II: (Angiosperm Anatomy and Horticulture)**

*Course outcome: This course aims to add to understanding of the students about the*

CO1: Tissue, apical meristem of root and shoot: structure and functions.

CO2: Types of vascular bundles, normal primary structure of root, stem, and normal, anomalous secondary growth.

CO3: Periderm, growth rings, Sap-heartwood, leaf anatomy.

CO4: Skill development practices in horticulture: methods of propagation of horticultural crops and bonsai preparation.

**Practical-CO:** The students become competent enough to develop knowledge about the systematics, embryology, anatomy and through skill based biopreneurship horticulture and indoor gardening practices.

## **SEMESTER-IV**

### **Paper-I: (Cell Biology, Plant Breeding, Evolution and Seed Technology)**

*Course outcome: After successful completion of this course, students will be able to understand*

CO1: Concept of Cell biology, cell organization, Structure and functions

CO2: Basic of Chromosome morphology, molecular organization and cell division:

CO3: Biostatistics, fundamental techniques in plant breeding and evolutionary significance .

CO4: Skill development practices in seed technology.

### **Paper – II: (Genetics, Molecular Biology and Plant Nursery)**

*Course outcome Students will be able to conceive the idea of*

CO1: Mendelism, interaction of genes, linkages and crossing over.

CO2: Mutation, chromosomal aberrations, DNA damage and repair.

CO3: Concept of gene, regulation, protein synthesis and genetic code.

CO4: Skill Development practices in plant nursery planning and management:

**Practicals CO:** Students learn to carry out practical work on cell division, genetics, molecular Biology in the laboratory and skill based biopreneurship through seed technology and plant nursery practices.

## SEMESTER-V

### **Paper-I: (Plant Physiology, Mineral Nutrition and Hydroponics)**

Course outcome: *Students will be able to improve the basic understanding on various physiological life processes in plants,*

CO1: To gain knowledge about the various uptakes and transport mechanisms in plants and are able to coordinate the various processes. They understand the role of Plant-Water relation, Transpiration, Mineral uptake.

CO2: Enrich themselves with the phenomenon mechanism of Photosynthesis and Respiration: and their role in plants.

CO3: Understand the process of N- Fixation, Plant Movements, Photoperiodism, Nitrogen Metabolism, and Plant Movements.

CO4: Skill Development practices like Mineral nutrition and Hydroponics.

### **Paper – II: (Plant Ecology and Organic Farming)**

Course outcome: *Students will remember and understand*

CO1: The basics and principles of ecology, biological diversity, conservation, sustainable development, population, community, climatic factors and edaphic factors.

CO2: The concept, types, development and functions of various ecosystems and their communication.

CO3: Fundamentals of plant succession and adaptations and biogeochemical cycles.

CO4: Skill development practices in organic farming.

**Practical CO:** Students will handle and understand the analytical and instrumentation skills, and various ecological fields parameters and skill based biopreneurship through hydroponics and organic farming.

## **SEMESTER-VI**

### **PAPER-I: (Biochemistry, Biotechnology and Herbal Technology)**

Course outcome: *Students will be able to*

CO1: Basic concepts of Biochemistry, Lipids metabolism, of enzyme action and mechanism.

CO2: To acquire knowledge in Plant tissue culture, Methods of sterilization and Preparation of Culture Media, Protoplast culture and Applications of tissue culture.

CO3: Understand the fundamentals of Genetic engineering including Cloning vectors and Agro bacterium mediated gene transfer and its role in crop improvement.

CO4: Skill Development practices in Herbal, Dye yielding and cosmetics technology.

### **Paper-II: (Phytogeography, Utilization of Plants, Techniques and Pharmacognosy)**

Course outcome: *Student will understand the basics and fundamental of*

CO1: Phytogeography, Pollution, Natural resources and Conservation strategies.

CO2: Utilization of plants, branches and scope of ethnobotany.

CO3: Principle, types and application of Microscopy and various biophysical techniques

CO4: Skill development practices in Pharmacognosy.

**Practical-CO:** The course aims at the concept, scope, instrumentation, basic requirements and applied aspects of biochemistry, biotechnology, and skill based biopreneurship through utilization of plants, pharmacognosy, medicine, and herbal product development.