

# **DEPARTMENT OF BOTANY**

## **SARSUNA COLLEGE**

### **B.Sc. BOTANY**

#### **4-YEAR HONOURS & 3-YEAR MULTIDISCIPLINARY COURSE**

#### **PROGRAMME LEARNING OUTCOMES/PROGRAMME SPECIFIC OUTCOMES (PLO/PSO)**

1. Demonstrate i) systematic, extensive and coherent knowledge of the discipline of Botany, its different branches such as core, applied and organismal, relate it with the general field of Biology as well as with other scientific disciplines, and identify its applications and future possibilities; including a thorough and critical understanding of the theories, principles, concepts, practical techniques, as well as advanced and emerging research areas. (ii) procedural and technical knowledge related to different professional areas related to Botany in particular and Biological sciences in general, such as academia, research and development, biotechnology industry, environmental monitoring, bioinformatics, forestry, horticulture, marine science, agri-business etc. (iii) extensive knowledge and specialized skills in one's area of specialization within the field of Botany and other related areas including interdisciplinary areas, encompassing advanced concepts, techniques and recent developments which translates to a spirit of scientific inquiry and an aptitude for research.
2. Undertake laboratory-based training to acquire thorough knowledge of the methodologies and methods used in the field of Botany in particular and Biological sciences in general, such as microtechniques, biochemical and molecular biological techniques, biostatistics, bioinformatics etc.
3. Demonstrate familiarity with the materials and equipment used in the field of Botany, including biological specimens, chemicals and reagents, scientific instruments, scientific literature, information technology-based tools like softwares, databases etc. and the ability to apply such materials and equipment in practical situations.
4. Develop skills of collecting information and acquisition of qualitative and/or quantitative data related to Botany, both from experimental and field studies as well as from scientific literature, of

analysis and interpretation of the data by appropriate methods, and the ability to draw conclusions from the data.

5. Undertake field-based activities to develop a thorough understanding and appreciation of biodiversity and the importance of plants in the environment and human life, and demonstrate thorough knowledge of the application of plants in different spheres of life.

6. Develop skills of scientific communication related to the field of Botany including theories, experimental results and analyses in written, graphic, oral as well as electronic format.

7. Demonstrate theoretical and practical technical knowledge that translates to employable and transferable skills related to the field of Botany in particular and Biological Sciences in general, which will help in securing jobs and other employment opportunities in sectors such as academia, research and development, biotechnology industry, forestry, horticulture, environmental sciences, agri-business etc.

### **COURSE LEARNING OUTCOMES (CLO)**

#### **4 YEAR HONOURS AND 3-YEARS MULTIDISCIPLINARY COURSE**

#### **SEMESTER 1**

#### **CORE COURSE 1**

#### **PLANT DIVERSITY (THEORY)**

#### **BOT-H-CC1-1-Th**

**Total marks 75; Credits 3, Class 45 hours**

#### **1. Introduction to plant kingdom.**

Comprehend the theories on the origin of life and evolution of plant cells; Appraise the importance of plants as source of food, fuel and their role in ecosystem services (as carbon sink, sequestering etc.)

#### **2. Algae**

Explain the criteria and system of classification of Fritsch (1935); Review and compare the salient features of Cyanophyceae, Chlorophyceae, Charophyceae, Phaeophyceae, Rhodophyceae and Bacillariophyceae; Appraise the economic importance of algae in environment, agriculture, biotechnology and industry.

Identify the following algae macroscopically and/or microscopically on the basis of reproductive and structural features from preserved specimens/permanent slides : *Nostoc*, *Oedogonium* and *Ectocarpus*).

### **3. Fungi**

Illustrate and memorise the system of classification of Fungi up to Sub-division according to Ainsworth (1973); Review and compare the salient features of Myxomycota, Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina and Deuteromycotina; Appraise the economic importance of fungi in relation to food, medicine and agriculture; Comprehend fungal symbioses: Mycorrhiza, Lichen and their importance.

Identify the following Fungi macroscopically and/or microscopically on the basis of reproductive and structural features from preserved specimens/permanent slides: *Rhizopus*, *Ascobolus* and *Agaricus*

### **4. Bryophytes**

Illustrate and memorise the system of classification of Bryophytes up to Class according to Proskauer (1957); Review and compare salient features of Hepaticopsida, Anthocerotopsida and Bryopsida, Explain the amphibian nature of bryophytes; Appraise the economic and ecological importance of Bryophytes.

Identify the following Bryophytes macroscopically and/or microscopically on the basis of reproductive and structural features from preserved specimens/permanent slides: *Marchantia*, *Anthoceros* and *Funaria*

### **5. Pteridophytes**

Illustrate and memorise the system of classification of Pteridophytes up to Division according to Gifford & Foster (1989); Review and compare the salient features of Psilophyta, Lycophyta, Sphenophyta and Filicophyta,; Appraise the economic importance of Pteridophytes in relation to food, medicine and agriculture.

Identify the following Pteridophytes macroscopically and/or microscopically on the basis of reproductive and structural features from preserved specimens/permanent slides: *Selaginella*, *Equisetum* and *Pteris*

### **6. Gymnosperms**

Illustrate and memorise the outline classification of Gymnosperms up to Division: Progymnospermophyta to Gnetophyta according to Gifford & Foster (1989); Review and compare

the salient features of Cycadophyta, Coniferophyta and Gnetophyta,; Appraise the economic importance of Gymnosperms as sources of wood, resin, essential oil and drugs.

Identify the following Gymnosperms macroscopically on the basis of reproductive and structural features from preserved specimens: Male cone and Female cone/ megasporophyll of *Cycas*, *Pinus* and *Gnetum*.

### **7. Angiosperms**

Review and illustrate the types and morphology of leaf, stem and root; Describe and illustrate inflorescence types with live or preserved examples; Describe and illustrate the different parts of flower and forms of calyx, corolla, androecium and gynoecium; Review and illustrate aestivation and placentation;

Dissect, draw and study different floral parts, adhesion and cohesion, aestivation and placentation in the laboratory.

Describe and illustrate the types of fruits and seeds with examples in the laboratory.

Excise, illustrate and describe different types of ovules in the laboratory.

Explore different types of inflorescence, flowers and fruits during field study and document them with descriptions and photographs.

## **SKILL ENHANCEMENT COURSE (SEC)**

### **MUSHROOM CULTIVATION TECHNOLOGY**

#### **BOT-H-SEC-1**

**Total marks 75; Credits 3, Class 45 hours**

1. Acquire and introductory knowledge of mushroom cultivation and review its history; Appraise a current overview of mushroom production in the world; Review mushroom biology including classification of mushrooms; Recognise edible mushrooms in India, poisonous mushrooms, and mushroom poisoning.

Macroscopically and microscopically identify edible mushrooms *Agaricus* and *Pleurotus* in the laboratory.

2. Describe the infrastructure for mushroom cultivation including the structural design and layout of mushroom farm and locally available substrates; Acquire familiarity with appliances

employed and their uses such as weighing balance, autoclave, laminar air flow, incubator, hot air oven, spirit lamp, Bunsen burner, pH meter, laboratory heater, low-cost stoves, water bath, humidifier, water sprayer, vessels, inoculation hook and inoculation loop, sieves, culture racks, tray, polythene bags; Master and employ the methods of sterilization.

3. Demonstrate a thorough knowledge of cultivation technology including overview of cultivation strategies, composting technology in mushroom production, mushroom bed preparation, culture media, pure culture, maintenance and preservation of pure culture; Describe the techniques of production of spawn, cultivation of oyster mushroom, paddy-straw mushroom, milky mushroom and white button mushroom; Acquire familiarity with the techniques of cultivation of medicinal mushroom *Cordyceps* and *Ganoderma*.

Acquire and employ practical knowledge of the techniques of fungal media preparation and sterilization, fungal tissue culture and subculture for maintenance, spawn production and cultivation of *Pleurotus* or *Calocybe* in the laboratory.

4. Describe mushroom diseases and management strategies; Review post-harvest technology such as short-term storage (Refrigeration- up to 24 hours), long-term storage (canning, pickles, papads etc.), drying, storage in salt solutions; Acquire familiarity with food preparation from mushrooms.

5. Appraise the different uses of spent mushroom substrate, Review the techniques for strain improvements in cultivated mushroom; Acquire thorough knowledge about the nutritional and medicinal value of edible mushrooms, Memorise the names of National level and regional level mushroom research centres; Evaluate the Cost-benefit ratio of mushroom cultivation ; Gain familiarity with mushroom based industry; Appraise mushroom market in India and abroad.