



"Education through self-help is our motto" - KARMAVEER

Rayat Shikshan Sanstha's  
**DAHIWADI COLLEGE, DAHIWADI**

Tal. Man, Dist. Satara : 415 508

[Arts, Science, Commerce, BCA, B.Voc.Agri.,  
Bank Management, Defence Studies & Vocational Education]

Founder : Padmabhushan Dr. Karmaveer Bhaurao Patil D.Litt.

[NAAC Third Cycle Reaccredited 'A' Grade (with CGPA 3.25)]

Estd : 1965

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## Bachelor of Science (B.Sc.)

(Department of Botany )

### Programme Outcomes (PO's)

After completing B.Sc. programme the student will be able to:

- PO1:** Bachelor of Science offers theoretical as well as practical knowledge about different special subject areas.
- PO2:** This course forms the basis of science for coherent understanding of the academic field to pursue multi and interdisciplinary science careers in future. These subject areas include, Chemistry, Physics, Botany, Zoology, Mathematics, Microbiology and Computer Science.
- PO3:** Able to plan and execute experiments or investigations, analyze and interpret data information collected using appropriate methods.
- PO4:** It helps to develop scientific temper, attitude and thus can prove to be more beneficial for the society as the scientific developments and make a nation or society to grow at a rapid pace through research.
- PO5:** Think critically, follow innovations and developments in science and technology.
- PO6:** Understand the issues of environmental contexts and sustainable development.
- PO7:** Acquire the skills and ability to engage in independent and life-long learning in the broadest context socio technological changes.
- PO8:** To demonstrate professional and ethical attitude with enormous responsibility to serve the society.

### Programme Specific Outcomes (PSO's)

- PSO1:** A student completing the course is able to understand different branches of Botany such as systematics, evolution, ecology, developmental biology, physiology, biochemistry, plant interactions with microbes and insects, morphology, anatomy, reproduction, genetics and molecular biology of various life-forms.
- PSO2:** The student completing the course is capable to perform short research projects using various tools and techniques in plant sciences and develop scientific

temperament and research attitude.

**PSO3:** They become competent enough in various analytical and technical skills related to plant sciences.

**PSO4:** The student completing the course is able to identify various life forms of plants, design and execute experiments related to basic studies on evolution, ecology, physiology, biochemistry, plant interactions with microbes and insects, morphology, anatomy, reproduction.

## Course Outcomes (CO's)

### B.Sc. I

#### Paper I: Biodiversity of Microbes, Algae and Fungi

**CO1:** Describe the diversity among Bacteria, Viruses and Algae.

**CO2:** Know the systematic, morphology and structure of Bacteria, Viruses Algae and Fungi.

**CO3:** Compare the life cycle pattern of Bacteria, Viruses, Algae and Fungi.

**CO4:** Explain the useful and harmful roles of Bacteria, Viruses, Algae and Fungi.

**CO5:** Classify algae and fungi according to their systems of classification.

**CO6:** Interpret uses and economics importance of algae and fungi.

#### Paper II: Biodiversity of Archegoniate- Bryophytes, Pteridophytes, Gymnosperms.

**CO7:** Know the evolution of Bryophytes, Pteridophytes and Gymnosperms.

**CO8:** Analyze the morphological diversity of Bryophytes, Pteridophytes and Gymnosperms.

**CO9:** Summarize the economic importance of Bryophytes and Pteridophytes.

**CO10:** Recognize Gymnosperms with respect to distinguishing characters, comparison with Angiosperms, economic importance and classification.

**CO11:** Justify life cycle of various forms of Bryophytes, Pteridophytes and Gymnosperms.

**CO12:** Illustrate the life cycle of *Gnetum*.

#### Practical Course I:

**CO13:** The students should learn various forms of Bacteria.

**CO14:** To study the morphology and life cycle of *Nostoc*.

**CO15:** To study the morphology and life cycle of *Spirogyra*.

**CO16:** To study the morphology and life cycle of *Mucor*.

**CO17:** To study the morphology and life cycle of *Funaria*.

**CO18:** To study the morphology and life cycle of *Selaginella*.

#### Paper III: Plant Ecology

**CO19:** To study the plant communities and ecological adaptations in plants.

**CO20:** Classify different ecosystems and their importance.

**CO21:** Describe the impact of climatic condition for the growth and development of the plant

**CO22:** Illustrate social approach to biodiversity conservation.

**CO23:** Discover the Botanical regions of India and vegetation types of Maharashtra.

**CO24:** Know about Bioremediation, Global Warming and Climate Change.

#### Paper IV: Plant Taxonomy

**CO25:** Define plant taxonomy and taxonomic related terminologies.

- C026:** Explain classification systems of angiosperms.
- C027:** Determine Botanical Nomenclature of angiospermic plant.
- C028:** Recognize ecological plant groups with examples.
- C029:** Explain plant families with example.
- C030:** Execute computer knowledge in plant taxonomy and digital herbarium.
- C031:** Know modern trends in Taxonomy.
- C032:** Know the conceptual development of taxonomy and systematic.
- C033:** Develop knowledge about plant nomenclature.

### **Practical Course II:**

- C034:** To study of morphological and anatomical adaptations in hydrophytes.
- C035:** To study of morphological and anatomical adaptations in Xerophytes.
- C036:** To study of morphological and anatomical adaptations in Epiphytes.
- C037:** To study of flowering twig morphology – Vegetative characters.
- C038:** To study of flowering twig morphology - Floral -/reproductive characters.
- C039:** To study of Vegetative and Floral characters of plant families.

## **B.Sc. II**

### **Paper V: Embryology of Angiosperms**

- C040:** Recognize the scope and importance of Embryology.
- C041:** Discuss the structure and development in microsporangium and megasporangium.
- C042:** Summarize the process of microsporogenesis and megasporogenesis.
- C043:** Identify the process of pollination and fertilization.
- C044:** Enlightened about the basic structure of the embryo.
- C045:** Illustrate the types of microscope, ovules, embryo, seed and endosperm.

### **Paper VI: Plant Physiology**

- C046:** Illustration of plant structures in the context of physiological functions of plants.
- C047:** They will learn about the growth and development of plants and its regulations.
- C048:** They will able to learn the physiological details of photosynthesis.
- C049:** They will able to summarize red-ox systems of plants.
- C050:** Explain the mechanism and application of photoperiodism.
- C051:** Describe the plant growth regulators and their types.

### **Practical Course III:**

- C052:** To study of typical flower and its parts
- C053:** To study of germination of pollen grains.
- C054:** Detection of pollen fertility by staining technique.
- C055:** To Study dicotyledon and monocotyledon embryo.
- C056:** To study the structure of stomata and determination of stomatal density.
- C057:** To study of evolution of oxygen during photosynthesis.

### **Paper VII: Plant Anatomy**

- C058:** Identify the scope and importance of Anatomy.
- C059:** To perform the techniques in Anatomy.
- C060:** Compare and contrast the connections between plant anatomy and the other disciplines of biology
- C061:** Outline and compare structural differences among different taxa of vascular plants.
- C062:** Interpret the principles involved in distribution of mechanical tissues.
- C063:** Analyze the various components of stem and wood during its secondary growth.

## **Paper VIII: Plant Metabolism**

- CO64:** Educate about the various metabolic pathways leading to the formation of significant molecules and their catabolism.
- CO65:** Aware about the vital role of each of the molecules in plants.
- CO66:** Enrich themselves with the phenomenon of metabolism of primary and secondary metabolites and their role in plants.
- CO67:** Upgraded in analytical skills and instrumentation.
- CO68:** Determine factors affecting enzyme activity.
- CO69:** Demonstrate various physiological and metabolic pathways in plants.

## **Practical Course IV:**

- CO70:** To study of simple tissues.
- CO71:** To study of complex tissues.
- CO72:** Double stained permanent micro preparation of any suitable material.
- CO73:** To study of anomalous/abnormal secondary growth in Bignonia (Dicot stem).
- CO74:** Study of anomalous/abnormal secondary growth in Dracaena (Monocot stem).
- CO75:** Determination of rate of respiration during seed germination by Ganong's respirometer.
- CO76:** Demonstration of fermentation.
- CO77:** Separation of Amino acids by Thin Layer chromatography.

## **Botany (Plant Protection) Semester: III (DSC IC 45)**

### **Paper I: Major Crops and methods of Integrated Plant Protection**

**Course objectives:** Students will able to

- CO78:** Understand concept and importance of plant protection.
- CO79:** Study gross morphology & agronomy of agricultural crops.
- CO80:** Understand the different methods of plant protection.
- CO81:** Imbibe the knowledge about the recent methods of plant protection

**Program outcomes:** Students are able to:

- CO82:** Understand concept and importance of plant protection and describe gross morphology and agronomy of agricultural crops Floricultural crops and fruit crops
- CO83:** Study the different methods of plant protection.
- CO84:** Understand the concept of integrated disease management.
- CO85:** Explain the development of crop resistance.

## **Botany (Plant Protection) Semester: III (DSC IC 46)**

### **Paper II: Insect pests and their management**

**Course objectives: Students are able to**

- CO86:** Understand concept of entomology.
- CO87:** Study identification of agronomical pests.
- CO88:** Understand the different methods of management of insect pests.
- CO89:** Study formulations of insecticides.

**Program outcome: Students will able to**

- CO90:** Understand the identification and classification of agricultural pests
- CO91:** Understand agricultural pests; explain the identification of stored grain pests.
- CO92:** Study different methods of management of insect pests. Explain formulations of insecticides.

**CO93:** Understand recent trends in pest management, explain the precautionary measures used during pesticide application.

### **Botany (Plant Protection) Semester: IV Theory**

#### **Paper III (DSC ID 46) Introduction to Weeds and their management**

**Course objectives: Students will be able to**

**CO94:** Study about weeds.

**CO95:** Understand identification and morphology of agronomical weeds.

**CO96:** Understand about the different methods of management of weeds.

**CO97:** Study laboratory techniques.

**Program outcome: Students are able to:**

**CO98:** Study morphology of weeds. Ecology of weeds.

**CO99:** Understand identification of agricultural weeds based on morphology.

**CO100:** Study the traditional methods of weed control. Different methods of management of weeds. Illustrate laboratory techniques.

**CO101:** Understand physiology on application of herbicides.

### **Botany (Plant Protection) Semester IV**

#### **Paper IV Crop diseases, their management and Pathophysiological skills**

**Course objectives:**

Students will be able to

**CO102:** Understand the basic knowledge about Crop diseases.

**CO103:** Impart the knowledge of mechanism of plant infection.

**CO104:** To impart the knowledge about the agricultural crop diseases.

**CO105:** To impart the knowledge about management of crop diseases and pathophysiological

**Program Outcomes:**

Students are able to:

**CO106:** Understand concepts of plant protection.

**CO107:** Understand basic terminologies used in plant protection.

**CO108:** Understand Mechanism of plant infection. mode of infection of plant disease

**CO109:** Impart the agricultural crop diseases. Management of crop diseases., the pathophysiological skills.

### **PRACTICAL COURSE I (Based on paper I and Paper III)**

**Course Objectives: Student will be able to:-**

**CO110:** Understand fundamentals of plant pathology, how to study any disease and pathogen.

**CO111:** Understand the knowledge of study of any plant pathogen.

**CO112:** To aware and teach students about technique used to determine amino acids by paper chromatography.

**CO113:** To aware and teach students about determination of sucrose percentage by hand refractometer.

**CO114:** Understand agronomic studies of crops

**CO115:** To enlighten students with the knowledge of eco-friendly sustainable agriculture.

**Program outcomes: Students will be able to**

**CO116:** Understand about identification of diseases with symptoms and by nature of

damage.

**CO117:** Study of any plant pathogen by different techniques

**CO118:** Understand amino acids by paper chromatography.

**CO119:** Understand sucrose percentage by hand refractometer

**CO120:** Understand agronomic conditions of crops

**CO121:** Understand eco-friendly methods of Crop management.

## **PRACTICAL II (Based on Paper II and IV)**

**Course Objectives: Student will be able to:-**

**CO122:** Understand fundamentals of entomology, how to study and identify any insect pest.

**CO123:** Study insecticides, bactericides, fungicides attractants and repellents.

**CO124:** Understand technique of collection and preservation of insect pests.

**CO125:** Study preparation of pesticides for application.

**CO126:** Understand weeds with reference to gross morphology for identification, reproduction, dispersal and management

**CO127:** To enlighten students with the knowledge of estimation of seeds and mode of dispersal weeds.

**Program outcomes: Students will be able to**

**CO128:** Understand identify the insect pest with the help of marks of identification and by studying life cycle pattern of any insect pests.

**CO129:** Study control insect and stored grain pests.

**CO130:** Understand collect and preserve insect pest for further study.

**CO131:** Understand formulate pesticide for application.

**CO132:** understand identify weeds by studying gross morphology and by ecology. 6. Imbibe prepare herbarium.

## **B.Sc. III Paper IX- DSC –E25 Genetics and Plant Breeding**

At the end of the course, students will be able to -----.

**CO132:** Understand basic terminologies in genetics and principles of inheritance

**CO133:** Know the significance, types, and definitions of linkage, crossing over and Mutation.

**CO134:** Get knowledge and be well versed with Chromosome structure and variation

**CO135:** Acquire knowledge of aims, objectives and methods of plant breeding

## **Paper X-DSC–E26 Microbiology,Plant Pathology & Mushroom Culture Technology**

**CO136:** Know different microorganisms and preparation of culture media

**CO137:** Get knowledge about industrial production of antibiotics and organic acids.

**CO138:** Get training in plant disease identification and its management.

**CO139:** Gain information about mushroom cultivation technology.

## **Paper XI- DSC –E27 Cytology and Research Techniques in Biology**

**CO140:** Understand cell theories and cell divisions.

**CO141:** Learn the structure of different cell organelles.

**CO142:** Know cell membranes and sub-cellular structures.

**CO143:** Get training in biological research techniques.

## **Paper XII- DSC –E28 Horticulture and Gardening**

**CO144:** Know the importance and divisions of horticulture.

**CO145:** Learn cultivation of flowers and pest management.

**CO146:** Get training in propagation practices.

**CO147:** Get training in gardening.

**Paper XIII- DSC –F25 Plant Biochemistry and Molecular Biology**

**CO148:** Understand the properties and classification of carbohydrates.

**CO149:** Learn the significance, structure and classification of lipids.

**CO150:** Get information about biosynthesis of amino acids and structure of protein.

**CO151:** Understand types and models of nucleic acids.

**Paper XIV- DSC –F26 Bioinformatics, Biostatistics and Economic Botany**

**CO152:** Understand the scope, branches, concepts and application of bioinformatics. **CO153:** Know collection and presentation of data.

**CO154:** Learn the origin, names and morphology of different plants.

**CO155:** Get economic information of spices, beverages and fibres.

**Paper XV- DSC –F27 Plant Biotechnology and Palaeobotany**

**CO156:** Understand the history, scope and importance of biotechnology

**CO157:** Collect information about recombinant DNA technology.

**CO158:** Get training in plant tissue culture techniques.

**CO159:** Learn about fossils types, fossilization process and application of Paleobotany.

**Paper XVI- DSC –F28 Biofertilizers, Herbal Drug Technology**

**CO160:** Understand the types, importance of biofertilizers and organic manure

**CO161:** Know herbal medicines, classification and preparation process.

**CO162:** Get training in the preparation of herbal cosmetics.

**CO163:** Become aware of fertilizers and herbal drug technology