

## Department of Botany

### **Programme Outcomes (PO)**

**After the completion of B.Sc. Honours Degree Programme, the students will be able to:**

- PO1: Professional knowledge:** Acquire comprehensive knowledge of major concepts, theoretical principles and experimental findings to various subjects in pure sciences such as Physics, Chemistry, Botany, Zoology, Mathematics, etc.
- PO2: Critical thinking and Cognitive skills:** Convey the intricate science information effectively and efficiently, analyze and solve the problems related to plants, animal sciences without relying on assumptions and guesses.
- PO3: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO4: Effective Communication:** Demonstrate familiarity with and ability to analyze both verbally and in writing issues and forms of contemporary art with a clear understanding of historical precedents.
- PO5: Instruments and Experiments:** Acquired the skills in handling scientific instruments, planning and performing in laboratory experiments and drawing logical inferences from the scientific experiments.
- PO6: Research and Analysis:** Demonstrate analytical skill and proficiency in a range of tools and techniques used in research in science and interdisciplinary.
- PO7: Employability and higher Education:** Show proficiency in professional, employability and soft skills required for higher education and placements.
- PO8: Ethics:** Imbibe ethical, moral and social values in personal and social life leading to highly cultured and civilized personality in science field.

**PO9: Science and Society:** Apply reasoning informed by the scientific knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional science practice.

**PO10: Interdisciplinary Learning:** Integrate academic curriculum with other co-curricular goals, such as career development, life-long learning, develop interdisciplinary learning and opportunity to extend their knowledge across disciplines.

## **Programme Specific Outcomes (PSO)**

**At the completion of the programme, student will attain the ability to:**

**PSO1:** Taxonomic studies will help in exploration of flora.

**PSO2:** Microbiology and plant diseases will enable to know about the various microbes and plant diseases, respectively along with their control.

**PSO3:** Laboratory works will provide knowledge of various techniques and scientific equipments efficiently.

**PSO4:** Study of Basic Genetics will have the way of deciphering complex modern Biology.

**PSO5:** Development of awareness about the type of pollution and their control.

**PSO6:** Study of RDT, Molecular Biology, Biotechnology and others will help in developing genetically engineered crops, protecting endangered plants and large scale production of different vaccines including very recently developed Corona-19 vaccine too.

**PSO7:** Acquire awareness towards gender, environment, sustainability, human values, and professional ethics and understand the difference between acting, responding, reacting to various social issues.

## **SEMESTER I**

## **BOT CC101: Microbiology and Phycology**

### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Classify the Plant kingdom
- CO2:** Describe the diversity, structure and importance of viruses and bacteria
- CO3:** Describe the general account of Mycoplasma and diseases caused by them
- CO4:** Explain the thallus organization, economic importance and the life cycle of various algae

## **Semester I**

## **BOT CC102: Biomolecules and Cell Biology**

### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Describe the structure and properties of biomolecules
- CO2:** Explain the classification, properties and functions of enzymes
- CO3:** Describe cell wall, cell membrane and the structure, chemistry and functions of cellular organelles
- CO4:** Explain the eukaryotic cell cycle, mitotic and meiotic cell divisions; and regulation of cell cycle

## **SEMESTER- II**

## **BOT CC203: Mycology and Phytopathology**

### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Describe the thallus organization, nutrition and economic importance and life cycle of various fungi
- CO2:** Explain the diversity, structure and importance of lichen and mycorrhiza
- CO3:** Describe the terms, scope and importance of plant pathology
- CO4:** Describe the etiology, symptoms and control measures of plant diseases

### **Semester II**

#### **BOT CC204: Archegoniate**

### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Explain the morphological diversity and evolution of bryophytes, pteridophytes and gymnosperms
- CO2:** Compare the life cycle of various bryophytes, pteridophytes and gymnosperms
- CO3:** Describe the economic importance of the bryophytes, pteridophytes and gymnosperms
- CO4:** Describe fossil pteridophytes (*Rhynia* and *Calamites*)

### **SEMESTER – III**

#### **BOT CC305: Anatomy of Angiosperms**

### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Explain the tissue system in plants and their functions
- CO2:** Understand the normal and anomalous secondary growth in plants and their causes
- CO3:** Learn about the structural adaptations in plants growing in different environmental conditions
- CO4:** Describe the structure and function of periderm

### **Semester III**

#### **Course Outcomes**

#### **BOT CC306 Economic Botany**

**After the completion of the course, the student will be able to:**

- CO1:** Create awareness about plants of economic importance
- CO2:** Know about their distribution patterns
- CO3:** Identify them on the basis of their botanical features
- CO4:** Learn about their cultivation and economic importance

#### **BOT CC307 :Basics of Genetics**

**Course Outcome:**

**After the completion of the course, the student will be able to:**

- CO1:** Understand Mendelian laws of inheritance and its variations
- CO2:** Comprehend the effect of chromosomal abnormalities leading to genetic disorders
- CO3:** Know the details of mutations and their uses

**CO4:** Know about the sex determination and sex-linked inheritance

## **SEMESTER – IV**

### **BOT CC408 Molecular Biology**

#### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Decipher the structures and chemical properties of DNA and RNA and their role
- CO2:** Gain an understanding of various steps in transcription and translation in prokaryotes and eukaryotes
- CO3:** Know about gene regulation in prokaryotes and eukaryotes
- CO4:** Gain knowledge of modern biology techniques

## **Semester IV**

### **BOT CC409 :Plant Ecology and Phytogeography**

#### **Course Outcomes**

**After the completion of the course, the student will have to:**

- CO1:** Knowledge of plant communities and ecological adaptations in plants
- CO2:** Knowledge about the soils on the basis of physical, chemical and biological components
- CO3:** Know about the types of pollution and their control measures
- CO4:** Knowledge about the conservation of biodiversity, phytogeographical regions of India and non-conventional energy

## **Semester IV**

### **BOT CC410 Plant Systematics**

#### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Identify and classify the local flora
- CO2:** Know about the rules of ICBN
- CO3:** Awareness of different systems of Plant Classification
- CO4:** Preparation of herbarium and its importance

## **SEMESTER – V**

### **BOT CC511 Reproductive Biology of Angiosperms**

#### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Know about the reproductive biology of angiosperms
- CO2:** Understand structure and functions of anther wall and pollen wall, pollen biology
- CO3:** Learn detailed study of structure of pistil, megasporangium, double fertilization and endosperm
- CO4:** Comprehend the causes of Polyembryony and apomixes with its classification

### **BOT CC512 Plant Physiology**

### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Understand Water relation of plants with respect to various physiological processes
- CO2:** Know about the mineral nutrition
- CO3:** Classify aerobic and anaerobic respiration, significance of respiration and photosynthesis
- CO4:** Understand dormancy and germination in plants; learn about types and roles of phytohormones

### **SEMESTER – VI**

#### **BOT CC613: Plant Metabolism**

### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Understand the anabolic and catabolic pathways of metabolism
- CO2:** Recognize the importance of carbon assimilation in photorespiration
- CO3:** Understand ATP synthesis in respiration
- CO4:** Interpret the biological nitrogen fixation

#### **BOT CC614: Plant Biotechnology**

### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Have knowledge about the core enzymes involved in Recombinant DNA Technology
- CO2:** Have knowledge about the different steps of Recombinant DNA Technology



- CO3:** Understand the principle and basic protocols for Plant Tissue Culture and its application
- CO4:** Know about the role of rDNA and Plant Biotechnology as well as biosafety concerns of GMO

## **SEMESTER – I**

### **BOT GE101     Biodiversity (Microbes, Algae, Fungi and Archegoniate**

#### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Know about viruses and bacteria
- CO2:** Know about different stages of algae
- CO3:** Get the knowledge of fungi and its different types
- CO4:** Know the anatomy and reproduction of specified bryophytes, pteridophytes and gymnosperms along with their ecological and economical importance

## **SEMESTER – II**

### **BOT GE202:Plant Ecology and Taxonomy**

#### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Comprehend the basic concepts of plant ecology and taxonomy and botanical nomenclature
- CO2:** Understand the characteristics of different plant communities
- CO3:** Know the structure and functions of eco-system
- CO4:** Be aware about environmental pollution

### **SEMESTER – III**

#### **BOT GE303:Plant Anatomy and Embryology**

##### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Understand the fundamental concepts of plant anatomy and embryology
- CO2:** Learn about the structural adaptations in plants growing in different environmental conditions
- CO3:** Know about secondary growth in plants
- CO4:** Gain the knowledge of flower, pollination and fertilization

### **SEMESTER – IV**

#### **BOT GE404 :Plant Physiology and Metabolism**

##### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Understand Water relation of plants with respect to various physiological processes
- CO2:** Know about mineral nutrition
- CO3:** Know the details of Respiration and Photosynthesis
- CO4:** Comprehend the Biological nitrogen fixation and its importance

### **SEMESTER – I**

#### **ENG AEC101 :English Communication**

##### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Communicate effectively using the techniques in the area of spoken as well as written communication.
- CO2:** Hone their LSRW skills within their communication.
- CO3:** Design and answer job interview questions.
- CO4:** Demonstrate the ability to craft professional messages that are clear yet courteous.

### **HINAECC101– हिंदी-व्याकरण और सम्प्रेषण**

परिणाम - 1. विभिन्न प्रतियोगी परीक्षाओं के लिए तैयार करना ।

२. सम्प्रेषण-क्षमता की वृद्धि करना ।

३. कार्यालयी-पत्र लेखन की क्षमता विकसित करना ।

४. हिंदी के व्याकरणिक एवं सैद्धांतिक स्वरूप की जानकारी हासिल करना ॥

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### **SEMESTER – II**

### **EVS AEC202 :Environmental Science**

#### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Understand multidisciplinary nature of environmental studies.
- CO2:** Understand the concept and types of natural resources and environmental pollution.

**CO3:** Evaluate the anomalies created due to haphazard population growth and its impact on environment.

**CO4:** Understand about the organizations, conventions and legislations working on mitigation of environmental issues.

### **SEMESTER – III**

#### **IRS SEC301: Inter-Religious Studies (Value Based)**

##### **Course Outcomes**

**After the completion of the course, the student will be able to:**

**CO1:** Develop Inter-religious harmony & better understanding of other religions.

**CO2:** Interpret the different religions of the world.

**CO3:** Identify the common elements that bind different religions together.

**CO4:** Acquaint with the salient features of different religions.

### **Semester IV**

#### **BOT SEC 402 : Mushroom Culture Technology**

##### **Course Outcomes**

**After the completion of the course, the student will be able to:**

**CO1:** Know about various types and categories of mushrooms.

**CO2:** Undertake mushroom cultivating technology

**CO3:** Know about uses of mushroom

**CO4:** Highlight the benefits of mushroom cultivation and its marketing

## **SEMESTER – V**

### **BOT DSE501: Genetics and Plant Breeding**

#### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Understand the patterns of inheritance in different organisms
- CO2:** Know the basics of linkage of genes, sex determination and quantitative inheritance
- CO3:** Obtain knowledge of methods of crop improvement
- CO4:** Decipher various methods of plant propagation and its importance in human welfare

## **Semester V**

### **BOT DSE502: Biostatistics**

#### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Comprehend the fundamental concepts related to descriptive and inferential biostatistics
- CO2:** Develop skills in data tabulation, its treatment, analysis, interpretation and graphical representation of data
- CO3:** Analyze the implications of inferential statistics in biology
- CO4:** Develop the competence in hypothesis testing and interpretation

## **SEMESTER – VI**

## **BOT DSE603: Research Methodology**

### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Understand the concept of research and different types of research in the context of biology
- CO2:** Develop laboratory experiment related skills
- CO3:** Develop competence on data collection and process of scientific documentation
- CO4:** Understand the ethical aspects of research

## **Semester VI**

### **BOT DS604 : Dissertation**

### **Course Outcomes**

**After the completion of the course, the student will be able to:**

- CO1:** Acquire special/advanced knowledge through a project work with an advisory support of a teacher/faculty member
- CO2:** Apply knowledge involving / analyzing /exploring a real life situation / difficult problem
- CO3:** Practical work in the field and laboratory experiments will enhance skills in handling scientific instruments
- CO4:** Enhance presentation (oral and writing) skills