

**DEPARTMENT OF BOTANY**  
**(Postgraduate and Research)**  
**MAHARAJA'S COLLEGE, ERNAKULAM**

**B.Sc. BOTANY (CBCS)**

**PROGRAMME SPECIFIC OUTCOME**

The student after completing the B.Sc. Botany programme will able

- to acquire the techniques in microbial culture and identification
- to acquire core competency in differentiate different plant groups including lower groups and higher groups
- to acquire knowledge in identifying the algae, fungi, bryophyte, pteridophyte with their internal as well as external features
- to have an idea about the fossil plants and evolutionary trends in plants
- to understand the internal features of angiosperms and their developmental features
- to demonstrate the knowledge in understanding research activities and its methodologies and applications, basic biostatistics, basic computer knowledge and working of biophysical instruments
- to acquire the skills in various plant propagation and breeding methods and to have an idea about organic farming, nursery management and plant diseases.
- to have knowledge about the basic principles and mechanism in plant genetics
- to have an idea about the concept of evolution
- to identify, describe and to illustrate morphological and reproductive characters of plants and also to familiarize the economic and ethno botanical importance of plants
- to familiarize the functional aspects of plants
- to familiarise different types of ecosystem, resources, pollution abatement and biodiversity conservation
- have knowledge about cell organelles and their functions and also to understand the physiological function in plants
- to understand the fundamentals of biotechnology and bioinformatics, and
- to inculcates the scientific temperament and to carry out innovative research projects

## **COURSE OUTCOME**

### **Semester I**

#### **Course 1 – BOT1COR01 – An introduction to the world of plant diversity and Phycology**

##### **Learner is able to**

1. compare and distinguish the different types of living organism
2. understand different types of classification of living organism
3. familiarize the evolutionary trend in the plant world
4. familiarize the life cycle of different types of algae
5. understand the economic importance of algae
6. acquire the algal culture methods

### **Semester II**

#### **Course 2 – BOT1COR02 - Microbiology, Mycology and Lichenology**

##### **Learner is able to**

1. recognize the diverse and unique nature of microbes.
2. interpret the relevant characteristics of fungi and lichens.
3. appraise the relevance and significance of microbes in our day to day lives.
4. discover the evolutionary trends in microbes.
5. validate poisonous and edible mushrooms and design techniques to cultivate mushrooms.

### **Semester III**

#### **Course 3 – BOT1COR03 - Bryology, Pteridology, Gymnosperms and Paleobotany**

##### **Learner is able to**

1. interpret different groups of Bryophytes and Pteridophytes.
2. analyze the different theories regarding the origin of both Bryophytes and Pteridophytes and develop ideas regarding their evolution.
3. compare the structural evolution of gametophytes and sporophytes in both Bryophytes and Pteridophytes.
4. clarify organization of different types of stele, sori and sporangial characters in Pteridophytes in an evolutionary perspective.
5. validate the ecological and economical roles played by both Bryophytes and Pteridophytes.

### **Semester IV**

#### **Course 4 – BOT1COR04 - Anatomy, Microtechnique and Reproductive botany of Angiosperms**

##### **Learner is able to**

1. understand different types of meristems, secretory tissues, non-living inclusions in plant cells.
2. Interpret structure, function and roles of vascular cambium and cork cambium.

3. Categorize different types of anomalous secondary growth in dicots and monocot plants and their anatomical peculiarities and adaptational significance.
4. Understand the significance and properties of wood and plant fibres.
5. Analyze leaf initiation, types of stomata and trichomes and appraise anatomical peculiarities in C3, C4 and CAM plants.
6. Compare nodal anatomy , Floral anatomy and their evolutionary significance in Angiosperms.
7. Utilization of anatomical tools in solving taxonomic disputes and their pharmacognostic significance.

## **Semester V**

### **Course 5 – BOT1COR05 - Research methodology, Biostatistics, Biophysics and Informatics**

#### **Learner is able to**

1. Understand the scientific method and to develop scientific aptitude.
2. Organize and plan to carry out a research project Prepare a project proposal.
3. Design the project proposal as well as to prepare a project report.
4. Understand the scope & importance of biostatistics
5. Get the knowledge to apply statistical analysis for biological research.
6. familiarizes with biological instrumentation.
7. understand the basic computer skills.

### **Course 6 – BOT1COR06 - Plant breeding, Horticulture and Plant pathology**

#### **Learner is able to**

1. Develop conceptual understanding of plant genetic resources, Plant Breeding, Gene Bank and Gene Pool
2. Familiarise the genetic basis of Heterosis
3. Classify sexual and asexual modes of reproduction
4. Understand non-conventional breeding methodologies.
5. Understand the different classification of horticultural crops, nursery management and use of technology in horticulture.
6. Evaluate the importance of floriculture and contribution species on economy
7. Identify the common plant diseases according to geographic allocations and device control measures

### **Course 7 – BOT1COR07 - Genetics and Evolution**

**Learner is able to**

1. infer the Mendelian and Post Mendelian genetics
2. Know about interaction of genes, multiple alleles and linkage and crossing over.
3. infer the basic principles of inheritance as well as extranuclear inheritance
4. outline the mechanism of sex determination in organisms
5. Know the concepts and evolutionary sequence of various groups of plants and to identify the forces that drives evolution

**Course 8 – BOT1COR08 - Angiosperm morphology, Taxonomy and Economic botany****Learner is able to**

1. understand the aim, objectives, significance and fundamentals of taxonomy
2. describe the plants in its technical terms
3. interpret the rules of ICN and to understand the common plants locally available, their position in the classification and the naming of plants
4. generalize the characters of the families according to Bentham and Hooker system of classification
5. augment the observation capacity and drawing skills
6. learn basic techniques in herbarium preparation and to evaluate the important herbaria and botanical gardens
7. familiarise the core concept of economic botany and increase the awareness of plants and plant products encountered in everyday life
8. categorize various ethnic groups and to understand how plants are useful or related to social, cultural and economic activities of the indigenous society.

**Course 9 – BOT1COR09 – Plant genetic resources (Choice based course)****Learner is able to**

1. familiarise the conservation of plant genetic resources
2. understand the concepts of centers of origin
3. identify the different types of agencies involved in the management of plant genetic resources
4. understand major threats of plant genetic resources
5. acquire the concepts of remote sensing principle
6. understand different types of crops in Kerala
7. acquire mushroom cultivation techniques

### **Course 9 – BOT1COR09 – Horticulture and nursery management (Choice based course)**

#### **Learner is able to**

1. familiarize the classification of horticultural plants and its importance
2. acquire the knowledge of propagation of horticultural plants
3. acquire different types of vegetative propagation methods
4. understand gardening and its importance
5. familiarize floriculture, olericulture and pomology

### **Course 9 – BOT1COR09 – Agribased microenterproses (Choice based course)**

#### **Learner is able to**

1. understand the knowledge of organic farming and composting techniques
2. familiarize horticulture and nursery management
3. understand different types of food spoilage and its preservation techniques
4. acquire mushroom cultivation techniques
5. familiarize plant tissue culture and micropropagation

## **Semester VI**

### **Course 10 – BOT1COR10 – Plant physiology and Biochemistry**

#### **Learner is able to**

1. understands the basic principles related to various physiological functions in plant life.
2. Familiarize with the basic skills and techniques related to plant physiology and biochemistry.
3. understands the structure and function of the molecules associated with plant life.
4. Familiarize with applied aspects of plant physiology in other fields like agriculture.

### **Course 11 – BOT1COR11 – Ecology and Environmental science**

#### **Learner is able to**

1. understand the core concept of biotic and abiotic components and to evaluate and examine the structure, function and energy sources of ecological system
2. analyze the characteristics of different plant communities and to assess the adaptation of plants in relation to different environment
3. understand the concept of different natural resources, their utilization and to evaluate the management and conservation strategies of different natural resources
4. critically analyze the sustainable utilization of land, water, forest and energy resources
5. develop understanding of the concept and scope of plant biodiversity; to identify the

- causes and implications of loss of biodiversity and to apply skills to manage and conservation of biodiversity
6. develop understanding on the concept and issues of global environmental change and to examine the climate change and its effects on living beings
  7. evaluate human influenced driver of climate system and its applications
  8. analyse the issues, different sources of environmental problems and mitigation measures of various pollutions
  9. evaluate the utility of legislation and policies for environmental protection, and
  10. analyse and to develop understanding of the human rights and importance of an individual and public in conservation and protection of natural resources and environment.

### **Course 12 – BOT1COR12 – Cell and Molecular biology**

#### **Learner is able to**

1. understand the ultra-structure and functioning of cell in the submicroscopic and molecular level
2. get an idea of origin, concept of complexities of life activities.
3. Familiarize the life processes in cells
4. understand the cytological aspect of growth and development
5. Understand the biochemical nature of nucleic acid and their role in living systems

### **Course 13 – BOT1COR13 – Biotechnology and Bioinformatics**

#### **Learner is able to**

1. infer the fundamental principles of Biotechnology
2. Understand the techniques in tissue culture
3. Understand the fundamental of recombinant DNA technology.
4. Identify the applications of biotechnology
5. Understand the concept of bioinformatics, genomics & proteomics.

### **Course 14 – BOT1COR14 – Agribusiness (Choice based course)**

#### **Learner is able to**

1. familiarise value added food products and processing techniques
2. acquire the knowledge in nursery management, organic farming and composting techniques
3. understand the cultivation and significance of horticultural plants
4. understand the basic concepts of flower arrangement.
5. acquire mushroom cultivation techniques.

### **Course 14 – BOT1COR14– Phytochemistry and Pharmacognosy (Choice based course)**

#### **Learner is able to**

1. understand the structure and function of basic secondary metabolites in medicinal and aromatic plants.
2. familiarise the extraction and separation procedures
3. infer the role of Alkaloids, Terpenoids and Phenolics
4. familiarising a variety of medicinal plants and its pharmacological value
5. understand the concepts of Pharmacognosy
6. make use of cultural practices of medicinal and aromatic plants

### **Course 14 – BOT1COR14 – Ecotourism (Choice based course)**

#### **Learner is able to**

1. understand the concept, scope and relevance of ecotourism
2. understand the role played by the stakeholders of ecotourism and to have an idea about the responsible tourism
3. acquire knowledge about the historical monuments, wildlife sanctuaries, National parks, heritage sites, folklore arts and culture, folk medicine etc.
4. identify the positive and negative impacts, strength and weakness, economics, carrying capacity of ecotourism
5. assess various ecotourism programmes in India especially in Kerala

### **Complementary Course**

#### **Course 1 – BOT1CMP01 - Cryptogams, Gymnosperms and Plant pathology**

##### **Learner is able to**

1. Understand the diversity of plants with respect to Algae, Fungi, Lichens, Bryophytes, Pteridophytes and Gymnosperms
2. associate plant group with their characteristic features
3. recognizes economic importance of different plant groups.
4. identify the different different plant groups with reasons.

#### **Course 2 - BOT2CMP02 - Plant physiology**

##### **Learner is able to**

1. understands the basic principles related to various physiological functions in plant life.
2. Familiarize with the basic skills and techniques related to plant physiology.
3. Familiarize with applied aspects of plant physiology in other fields like agriculture

**Course 3 – BOT3CMP03 - Angiosperm morphology, Taxonomy, Economic botany and Ethnobotany**

**Learner is able to**

1. understand the aim, objectives, significance of taxonomy
2. understand the position of locally available plants in the Bentham and Hooker system of classification
3. learn basic techniques in herbarium preparation and to evaluate the importance of botanical gardens
4. familiarise the concept of economic botany and increase the awareness of locally available plants and plant products
5. understand the scope and importance of various ethnic groups in Kerala

**Course 4 - BOT4CMP04 - Anatomy and Applied botany**

**Learner is able to**

1. familiarize with different types of plant tissue.
2. identify different types of tissue system and plant organs
3. compare normal and abnormal secondary thickening in plants
4. gather knowledge in the field of crop improvement for human perspectives