



# **Sree Narayana Mangalam College Maliankara**

*(Affiliated to Mahatma Gandhi University, Kottayam)*

## **PROGRAMME OUTCOME**

### **PROGRAMME SPECIFIC OUTCOME, COURSE OUTCOME**

## **BSc BOTANY**

Sree Narayana Mangalam College  
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At the end of the Under Graduate Program at S.N.M College, Maliankara, a student will have developed:

## UNDER GRADUATE PROGRAMME OUTCOMES

<p><b>PO1:</b></p>	<p><b>Problem solving and critical thinking:</b> Critical thinking skills help the students understand and assess a situation based on all the facts and information available. With the help of critical thinking skills, students can sort and organise information, data and facts to define and solve a problem. This program outcome can ensure that the students receive ample opportunities to work on these skills by providing them with pragmatic modes of learning in their respective subjects.</p>
<p><b>PO2:</b></p>	<p><b>Global Perspective and social interaction:</b> This program outcome ensures that the students attain an ability to respect the viewpoints of those from diverse cultures, races, ages, genders, religions and lifestyles to build collaborative relationships and communicate effectively. The ability to appreciate, value, and learn from other cultures and perspectives. It also suggests in recognising instances of unhealthy influences around them and the relying on inspirations of growth and stability.</p>
<p><b>PO3:</b></p>	<p><b>Ethics:</b> This program outcome helps in adhering to basic ethical values combined with strong subject awareness that promises in creating a complete package of genuine result guaranteeing individuals. To be ethical means that you respect, care and love hard work and consider it a valuable quality. Ethics in work place means dependable, productive, collaborative, passionate and openness to team work. .</p>
<p><b>PO4:</b></p>	<p><b>Environment and Sustainability:</b> This program outcome makes students aware of, sensitive to, and knowledgeable about the environment and its interconnectedness to social and economic systems, while encouraging them to develop attitudes of concern and motivation, as well as practical, complex systems and critical thinking skills to identify and solve environmental problems. An individual can be called educated when he/she recognises and shows respects to other forms of living things.</p>
<p><b>PO5:</b></p>	<p><b>Effective Citizenship:</b> This program outcome develops the student's capacity to feel socially responsible to her community and to take corresponding action</p>

	to support its assets and to deal with its concerns. It also develops ability to demonstrate empathetic social concern and equity-based national development.
<b>PO6:</b>	<b>Effective Communication:</b> This program outcome create ability to communicate effectively and possess scientific temper and modern outlook of the world. Ability to speak, reading, writing and listening carefully are the three most important communication skills to be developed by every individual for their life journey.
<b>PO7:</b>	<b>Life-long learning:</b> Engage in life-long learning to acclimatize themselves in an ever-changing world. We need to continually keep our skills sharp and up to date so that we have an edge in all we do.

## PROGRAMME SPECIFIC OUTCOMES

At the end of B. Sc. Botany at S.N.M College, Maliankara, a student will have developed:

<b>PSO1</b>	Understand the diversity, genetics, physiology, anatomy, and morphology of different plant groups
<b>PSO2</b>	Aware about the environment and the various issues pertaining to the environment.
<b>PSO3:</b>	To lay a strong foundation to the study in Botany and understand the evolution and diversity of cryptogams and phanerogams
<b>PSO4:</b>	Understanding life at various levels like, gene, chromosomal, molecular, cellular and physiological
<b>PSO5:</b>	Equip the students for employment, entrepreneurship, and further study in Botany

## COURSE OUTCOMES

### BO1CRT01: METHODOLOGY OF SCIENCE AND AN INTRODUCTION TO BOTANY

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Understand the universal nature of science
<b>CO2:</b>	Demonstrate the use of scientific method
<b>CO3:</b>	To lay a strong foundation to the study in Botany
<b>CO4:</b>	Impart an insight into the different types of classifications in the living kingdom
<b>CO5:</b>	Appreciate the world of organisms and its course of evolution and diversity.
<b>CO6:</b>	Develop basic skills to study Botany in detail.

### BO2CRT02 : MICROBIOLOGY, MYCOLOGY AND PLANT PATHOLOGY

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Understand the world of microbes, fungi and lichens.
<b>CO2:</b>	Appreciate the adaptive strategies of the microbes; bacteria, virus, fungi and lichens.
<b>CO3:</b>	To study the economic and pathological importance of microorganisms.
<b>CO4:</b>	Understand the mechanism of pathogenesis and disease control
<b>CO5:</b>	Identify different diseases in plants and its remedial measures
<b>CO6:</b>	Identify different fungi and understand their ecological and economic significance

### BO3CRT03 : PHYCOLOGY AND BRYOLOGY

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Understand the evolutionary importance of algae as progenitors of land plants
<b>CO2:</b>	Understand the unique and general features algae and bryophytes and familiarize it

<b>CO3:</b>	Identify different algae and bryophytes based on external morphology, internal structure.
<b>CO4:</b>	Realize the application of Phycology in different fields
<b>CO5:</b>	Understand different artificial culture and economic importance of algae
<b>CO6:</b>	Describe the classification of algae and bryophytes

#### **BO4CRT04 : PTERIDOLOGY, GYMNOSPERMS AND PALEOBOTANY**

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Understand the diversity in habits, habitats and organization of various groups of plants.
<b>CO2:</b>	To impart an insight into the modern classifications in lower forms of plants.
<b>CO3:</b>	Understand the evolutionary trends in pteridophytes and gymnosperms.
<b>CO4:</b>	Study the anatomical variations in vascular plants.
<b>CO5:</b>	Understand the significance of Paleobotany and its applications.
<b>CO6:</b>	Understand different ecological and economic importance of pteridophytes and gymnosperms.

#### **BO5CRT05 : ANATOMY, REPRODUCTIVE BOTANY AND MICROTECHNIQUE**

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Imparting an insight into the internal structure and reproduction of the most evolved group of plants, the Angiosperms.
<b>CO2:</b>	Understand the individual cells and also tissues simultaneously.
<b>CO3:</b>	Understand the structural adaptations in plants growing in different environments.
<b>CO4:</b>	Understand the morphology and development of reproductive parts.
<b>CO5:</b>	Get an insight into the fruit and seed development.
<b>CO6:</b>	Understand the techniques used to preserve and study plant materials.

## BO5CRT06: RESEARCH METHODOLOGY, BIOPHYSICS AND BIostatISTICS

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Will be able to conduct independent research and prepare research reports.
<b>CO2:</b>	Knowledge to write a research project.
<b>CO3:</b>	Gain knowledge about basic computer skills for conducting research
<b>CO4:</b>	Do numerical skills necessary to carry out research.
<b>CO5:</b>	Understand the principles, working and application of different instruments used in biological studies
<b>CO6:</b>	For an overview of different statistical tools used in biological research.

## BO5CRT07: PLANT PHYSIOLOGY AND BIOCHEMISTRY

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Acquire basic knowledge needed for proper understanding of plant functioning.
<b>CO2:</b>	Familiarize with the basic skills and techniques related to plant physiology.
<b>CO3:</b>	Understand the role, structure and importance of the biomolecules associated with plant life.
<b>CO4:</b>	Gain knowledge about various hormones involved in plant growth and their role in development.
<b>CO5:</b>	Understand the effect of environmental stress on the physiology of plants
<b>CO6:</b>	Familiarize detection techniques for various biomolecules present in biological samples.

## BO5CRT08: ENVIRONMENTAL SCIENCE AND HUMAN RIGHTS

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Acquaint the student with the significance of Environmental Science. Students will be able to design novel mechanisms for the sustainable utilization of natural resources.
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<b>CO2:</b>	Gain awareness about the extent of the total biodiversity and the importance of their conservation.
<b>CO3:</b>	Understand the structure and function of the ecosystems
<b>CO4:</b>	Understand various kinds of pollution in the environment, their impacts on the ecosystem and their control measures
<b>CO5:</b>	Become aware about environmental laws in India and the role of various movements in the protection and conservation of nature and natural resources.
<b>CO6:</b>	Become aware about various Human rights and the role of various movements in the establishing human rights.

### **BO5OPT01 : AGRI-BASED MICROENTERPRISES (OPEN COURSE)**

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Provide basic information about the business/entrepreneurship opportunities in plant sciences.
<b>CO2:</b>	Inform the student about sustainable agriculture and organic farming.
<b>CO3:</b>	Inculcate an enthusiasm and awareness about ornamental gardening, nursery management and mushroom cultivation.
<b>CO4:</b>	Realize the application of Phycology in different fields
<b>CO5:</b>	Understand different artificial culture and economic importance of algae
<b>CO6:</b>	Describe the classification of algae and bryophytes

### **BO6CRT09: GENETICS, PLANT BREEDING AND HORTICULTURE**

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Imparting an insight into the principles of heredity.
<b>CO2:</b>	Understand the patterns of inheritance in different organisms.
<b>CO3:</b>	Understand the methods of crop improvement.
<b>CO4:</b>	Understand the importance of horticulture in human welfare.
<b>CO5:</b>	Developing gardening techniques among students..
<b>CO6:</b>	Understand the inheritance pattern of nuclear and extranuclear genes



## BO6CRT10 : CELL AND MOLECULAR BIOLOGY

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Understand the ultra-structure and functioning of cells at the sub-microscopic and molecular level.
<b>CO2:</b>	Get an idea of origin, concept of continuity and complexity of life activities.
<b>CO3:</b>	Familiarization of life processes.
<b>CO4:</b>	Understand the basic and scientific aspect of diversity.
<b>CO5:</b>	Understand the cytological aspects of growth and development.
<b>CO6:</b>	Understand DNA as the basis of heredity and variation.

## BO6CRT11: ANGIOSPERM MORPHOLOGY, TAXONOMY & ECONOMIC BOTANY

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Understand the diversity in habits, habitats and organization of various family of plants and Identify the common species of plants growing in Kerala and their systematic position.
<b>CO2:</b>	To impart an insight into the modern classifications of plants.
<b>CO3:</b>	Acquainted with the aims, objectives and significance of taxonomy.
<b>CO4:</b>	Acquainted with the basic technique in the preparation of herbarium.
<b>CO5:</b>	Familiarizing with the plants having immense economic importance..
<b>CO6:</b>	Develop inductive and deductive reasoning ability.

## BO6CRT12 : BIOTECHNOLOGY AND BIOINFORMATICS

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Understand the current developments in the field of Biotechnology and Bioinformatics.
<b>CO2:</b>	Equip the students to carry out plant tissue culture.
<b>CO3:</b>	Introduce the vast repositories of biological data knowledge.

<b>CO4:</b>	Equip to access and analyze the data available in the databases.
<b>CO5:</b>	Understand the process involved in recombinant DNA technology
<b>CO6:</b>	Understand the application of genetic engineering in various spheres of life

### **BO6PET03 : PHYTOCHEMISTRY AND PHARMACOGNOSY (ELECTIVE COURSE)**

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Understand the structure and function of basic secondary metabolites in medicinal and aromatic plants.
<b>CO2:</b>	Familiarize with the common separation and characterization techniques used in phytochemistry.
<b>CO3:</b>	Understand the basic officinal part present in the common medical plants and their use in ayurvedic formulations.
<b>CO4:</b>	Study the anatomical, morphological and phytoconstituents in medicinal plants.
<b>CO5:</b>	Understand the significance of Pharmacognosy and its applications.
<b>CO6:</b>	Understand different phytoconstituents present in plants and their biological activities.

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## COMPLEMENTARY COURSES

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### BO1CMT01 : CRYPTOGAMS, GYMNOSPERMS AND PLANT PATHOLOGY

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Understand the Evolutionary importance of Algae as progenitors of land plants
<b>CO2:</b>	Understand the unique and general features Cryptogams and familiarize it
<b>CO3:</b>	Identify different lower group plants based on external morphology, internal structure.
<b>CO4:</b>	Realize the application of Plant pathology
<b>CO5:</b>	Understand different diseases affecting crop plants
<b>CO6:</b>	Understand different ecological and economic Importance of Pteridophytes and Gymnosperms.

### BO1CMT02 : PLANT PHYSIOLOGY

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	Understand the diversity in habits, habitats and organization of plants.
<b>CO2:</b>	To provide an idea on the functions of plants
<b>CO3:</b>	To evaluate aspects on photosynthesis and respiration
<b>CO4:</b>	To understand different metabolic pathways
<b>CO5:</b>	Understand the significance of Plant physiology
<b>CO6:</b>	Understand the various phytohormones associated with plants

### BO1CMT03 : ANGIOSPERM TAXONOMY AND ECONOMIC BOTANY

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	To envisage knowledge on flowering plants
<b>CO2:</b>	To study different classifications of flowering plants
<b>CO3:</b>	To create an idea on how the plants are named

<b>CO4:</b>	To get an input on economic aspects of plants
<b>CO5:</b>	Acquainted with the basic technique in the preparation of herbarium.
<b>CO6:</b>	Familiarizing with the plants having immense economic importance.

### **BO1CMT04: ANATOMY AND APPLIED BOTANY**

At the end of this course, a student will have developed ability to:

<b>CO1:</b>	To create an idea about the internal structures of plants
<b>CO2:</b>	To provide inputs on application of different plant derived products
<b>CO3:</b>	To introduce advanced aspects of botanical research
<b>CO4:</b>	To understand different anatomical anomalies seen in plants
<b>CO5:</b>	understand the different artificial methods of propagation of plants
<b>CO6:</b>	Understand the various entrepreneurial opportunities available by studying botany