

**Payyanur College, Payyanur
(Affiliated to Kannur University)**

Programme Outcomes (POs)

BSc DEGREE PROGRAMME (FOR SCIENCE)

PROGRAMME OUTCOMES (PO)

PO1. Critical Thinking:

- 1.1. Acquire the ability to apply the basic tenets of logic and science to thoughts, actions and interventions.
- 1.2. Develop the ability to chart out a progressive direction for actions and interventions by learning to recognize the presence of hegemonic ideology within certain dominant notions.
- 1.3. Develop self-critical abilities and also the ability to view positions, problems and social issues from plural perspectives.

PO2. Effective Citizenship:

- 2.1. Learn to participate in nation building by adhering to the principles of sovereignty of the nation, socialism, secularism, democracy and the values that guide a republic.
- 2.2. Develop and practice gender sensitive attitudes, environmental awareness, empathetic social awareness about various kinds of marginalization and the ability to understand and resist various kinds of discriminations.
- 2.3. Internalize certain highlights of the nation and region history. Especially of the freedom movement, the renaissance within native societies and the project of modernization of the post-colonial society.

PO3. Effective Communication:

- 3.1. Acquire the ability to speak, write, read and listen clearly in person and through electronic media in both English and in one Modern Indian Language
- 3.2. Learn to articulate, analyze, synthesize, and evaluate ideas and situations in a well-informed manner.
- 3.3. Generate hypotheses and articulate assent or dissent by employing both reason and creative thinking.

PO4. Interdisciplinarity:

- 4.1. Perceive knowledge as an organic, comprehensive, interrelated and integrated faculty of the human mind.
- 4.2. Understand the issues of environmental contexts and sustainable development as a basic interdisciplinary concern of all disciplines.
- 4.3. Develop aesthetic, social, humanistic and artistic sensibilities for problem solving and evolving a comprehensive perspective.

Programme Specific Outcomes (PSOs)

Name of the Programme: **BSc BOTANY**

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1.

Skill development for the proper description using botanical terms, identification, naming and classification of life forms especially plants and microbes.

PSO2.

Acquisition of knowledge on structure, life cycle and life processes that exist among plant and microbial diversity through certain model organism studies.

PSO3.

Understanding of various interactions that exist among plants, animal and microbes; to develop the curiosity on the dynamicity of nature.

PSO4.

Understanding of the major elements of variation that exist in the living world through comparative morphological and anatomical study.

PSO5.

Ability to explain the diversity and evolution based on the empirical evidences in morphology, anatomy, embryology, physiology, biochemistry, molecular biology and life history.

PSO6.

Skill development for the collection, preservation and recording of information after observation and analysis- from simple illustration to molecular database development.

PSO7.

Making aware of the scientific and technological advancements- Information and Communication, Biotechnology and Molecular Biology for further learning and research.

PSO8.

Internalization of the concept of conservation and evolution through the channel of spirit of inquiry.

Course Outcomes (COs)

Name of the Programme: **BSc BOTANY**

COURSE OUTCOMES (COs)

Sl. No	Name of the Course	Outcomes
1.	IB01BOT/PLS CYTOLOGY AND ANGIOSPERM ANATOMY	<p>CO1: Knowledge on general terms with updated information used in cell biology.</p> <p>CO2: Observation of variations that exist in internal structure of various parts of a plant and as well as among different plant groups in support for the evolutionary concept.</p> <p>CO3: Skill development for the proper description of internal structure using botanical terms, their identification and further classification.</p> <p>CO4: Induction of the enthusiasm on internal structure of locally available plants.</p> <p>CO5: Understanding various levels of organization in a plant body with an outlook in the relationship between the structure and function through comparative studies.</p>
2.	2B02BOT/PLS REPRODUCTIVE BOTANY	<p>CO1: Observation and classification of the floral variations from the premises of college and house.</p> <p>CO2: Understanding the various reproductive methods sub-stages in the life cycle of plants.</p> <p>CO3: Observation and classification of the morphological variations in fruits and seeds of angiosperms.</p> <p>CO4: Enthusiasm to understand evolution based on the variations in reproduction among plants.</p>
3.	3B03BOT/PLS PLANT DIVERSITY I- ALGAE AND BRYOPHYTES	<p>CO1: Understanding diversity in morphology, anatomy, reproduction and life cycle in lower groups of plants, algae and bryophytes.</p> <p>CO2: Skill Development in collection and preservation of algae and bryophytes.</p> <p>CO3: Realizing the economic/ecological importance of Algae and Bryophytes.</p> <p>CO4: Understanding the evolutionary lineages in algae and bryophytes</p>
4.	4B04BOT/PLS PLANT DIVERSITY II –	<p>CO1: A comparative knowledge of lower vascular plants and lower group of flowering plants.</p>

	PTERIDOPHYTES AND GYMNOSPERMS	<p>CO2: Skill development for the proper description, identification and classification through morphological, anatomical and life cycle studies.</p> <p>CO3: Awareness on the morphological, anatomical and reproductive features of primitive and advanced plants with an evolutionary link between them.</p> <p>CO4: Skill development in collection preservation and studies in diversity studies of pteridophytes and gymnosperms.</p>
5.	4B05BOT/PLS CORE PRACTICAL 1	<p>CO1: Learning the fundamental techniques used in a botany lab.</p> <p>CO2: Understands the working of science by first-hand experience.</p> <p>CO3: By comparing different plants and their vegetative and reproductive structures a generalization in evolutionary concept is attained.</p> <p>CO4: Internalization of practical skills for further application in free, independent, individual needs and helps in designing scientific experimentation.</p>
6.	5B06BOT/PLS ANGIOSPERM SYSTEMATICS AND ETHNOBOTANY	<p>CO1: Understanding the main features in Angiosperm evolution.</p> <p>CO2: Skill development in identification and classification of flowering plants.</p> <p>CO3: Ability to identify, classify and describe a plant in scientific terms, thereby.</p> <p>CO4: Identification of plants using dichotomous keys.</p> <p>CO5: Recognition of locally available angiosperm families and plants.</p> <p>CO6: Recognition of economically important plants.</p> <p>CO7: Appreciation of human activities in conservation of useful plants from the past to the present.</p>
7.	5B07BOT/PLS PLANT PHYSIOLOGY AND METABOLISM	<p>CO1: Preliminary understanding of the basic functions in a plant body.</p> <p>CO2: Awareness on the interdisciplinary nature of botany, chemistry and physics by studying the principles of plant life, growth and reproduction.</p> <p>CO3: Recognizing the wonderful mechanism of transport and the Interrelationships existing between metabolic pathways thereby gaining an idea about the importance of plants in the dynamicity of nature.</p>

		CO4: Enhance research interest among students by introducing the historical aspects of physiological research
8.	5B08BOT/PLS MICROBIOLOGY, MYCOLOGY, LICHENOLOGY AND PHYTOPATHOLOGY	CO1: Understanding and appreciating the unity and diversity of microbes and fungi, CO2: Understanding the significance of microbes in nature's dynamicity. CO3: Develop skill in studying the fungal diversity through the study of representative taxon and methodology. CO4: Understanding the inter-relationship between plants and microbes both beneficial and harmful. CO5: Skill development to diagnose plant disease and to apply general control measures.
9.	5B09BOT/PLS RESEARCH METHODOLOGY, INSTRUMENTATION AND BIOSTATISTICS	CO1: Learning of the fundamental characteristics of science as a human enterprise, product and intellectual process CO2: Understanding the working of science for further application in free, independent, individual needs and in designing scientific experimentation. CO3: Appreciation of several scientific works and assessment of its influence on society. CO4: Acquire knowledge on the principles, components and applications of various scientific equipment in biology. CO5: Foundation knowledge in the basic concepts, components and functions of informatics. CO6: Appreciate the importance of statistical principles in biological research.
10.	6B10BOT/PLS ENVIRONMENTAL SCIENCE AND PHYTOGEOGRAPHY	CO1: Understanding the fundamental concepts in ecology, environmental science and phytogeography. CO2: Concept development in conservation, global ecological crisis, Sustainable development and pros and cons of human intervention. CO3: Enable the student to appreciate bio diversity and the importance of various conservation strategies, laws and regulatory authorities. CO4: Recognition of the need for more research to create a baseline data for sustainable exploitation-Think globally and Act locally CO5: Analyze the interrelationship between the geography and pattern of distribution of plants.

		<p>CO6: Appreciate key concepts from economic, political, and social analysis as pertained to the design and evaluation of environmental policies and institutions.</p> <p>CO7: Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.</p> <p>CO8: Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.</p>
11.	6B11BOT/PLS GENETICS, MOLECULAR BIOLOGY AND PLANT BREEDING	<p>CO1: Identify the basic principles and current trends in classical genetics.</p> <p>CO2: Recognize the historical process of the evolution of molecular genetics from classical genetics.</p> <p>CO3: Review the relevance of the application of genetic principles in agriculture, medicine, research and industry.</p> <p>CO4: Outlining the use of genetic principles for conservation, defining and better understanding of nature.</p> <p>CO5: Develop theoretical background on molecular genetics to provide a strong support for the student for future research and employability.</p> <p>CO6: Appreciate the way scientists work in understanding biological processes and the organization of cell.</p> <p>CO7: Cite examples for scientific interventions to human and plant life through brief exposure to plant breeding principles.</p> <p>CO8: Modify the concept on gender, human diseases and their management based on the study of genetic principles of human beings.</p>
12.	6B12BOT/PLS BIOTECHNOLOGY AND BIOINFORMATICS	<p>CO1: Develop knowledge of the fundamental techniques of biotechnology and the history of its development.</p> <p>CO2: Recognize theoretical knowledge on the equipment used in biotechnology which will give a support during future prospects.</p> <p>CO3: Connect the genetic engineering principles in agriculture, medicine, research and industry for a better world.</p> <p>CO4: Identify the significance of nanobiotechnology results for updated knowledge in that field.</p>

		<p>CO5: Appreciate and criticize the information technology aided advancements in biology.</p> <p>CO6: Develop awareness on the economic, social and environmental problems of gene manipulation.</p>
13.	6B13BOT/PLS EVOLUTION AND PALAEOBOTANY	<p>CO1: Understand the basic principles and current trends in classical evolution.</p> <p>CO2: Develop awareness on the historical process of plants and animals with an emphasis on human beings.</p> <p>CO3: Relate the evolutionary principles with agriculture, medicine, research and industry.</p> <p>CO4: Apply the principles of genetics and evolution in conservation, defining and better understanding of nature.</p>
14.	6B14BOT/PLS CORE PRACTICAL II	<p>CO1: Learning the fundamental techniques used in a botany lab related to Mycology, Microbiology, Angiosperms systematics</p> <p>CO2: Understands the working of science by first-hand experience.</p> <p>CO3: Comparison skill is attained by comparing different plants and their vegetative and reproductive structures.</p> <p>CO4: Inculcation of practical skills for further application in free, independent, individual needs and helps in designing scientific experimentation.</p>
15.	6B16BOT/PLS CORE PRACTICAL III	<p>CO1: Learning the fundamental techniques used in a botany lab related to Modern biology, biology, Genetics, Bioinformatics and Instrumentation.</p> <p>CO2: Understands the working of science by first-hand experience.</p> <p>CO3: Internalization of practical skills for further application in free, independent, individual needs and helps in designing scientific experimentation.</p>
16.	6B16BOT/PLS PROJECT/FIELD STUDY/VIVA VOCE	<p>CO1: Learning the fundamental techniques used in research</p> <p>CO2: First-hand experience in doing science.</p> <p>CO3: Development of the skill to communicate science.</p> <p>CO4: Internalization of skills for further application in designing scientific experimentation.</p>
COMPLEMENTARY ELECTIVE COURSES		

17.	IC01BOT MICROBIOLOGY, PHYCOLOGY, MYCOLOGY AND LICHENOLOGY	<p>CO1: Understanding of the fundamental concepts in classification of plants.</p> <p>CO2: Concept development in structure and reproduction of lower plants.</p> <p>CO3: Enable the student to appreciate bio diversity, sustainable development with the help of their core subject and subsidiary subject botany.</p> <p>CO4: Induce to experiment on the subject in an intensive way to facilitate an interdisciplinary profession/enterprise/entrepreneurship.</p>
18.	2C02BOT PHYTOPATHOLOGY AND ANGIOSPERM EMBRYOLOGY	<p>CO1: Understanding of the fundamental concepts in classification of Bryophytes, Pteridophytes, Gymnosperms.</p> <p>CO2: Concept development in structure and reproduction of lower plants.</p> <p>CO3: Enable the student to appreciate bio diversity, evolution and sustainable development with the help of their core subject and subsidiary subject botany.</p> <p>CO4: Induce to experiment on the subject in an intensive way to facilitate an interdisciplinary profession/enterprise/entrepreneurship.</p>
19.	3C03BOT ANGIOSPERM MORPHOLOGY, ANATOMY AND SYSTEMATICS	<p>CO1: Understanding of the fundamental concepts in classification of Angiosperms.</p> <p>CO2: Concept development in diversity that exist in angiosperms through studies in morphology, anatomy and systematic.</p> <p>CO3: Enable the student to appreciate economic importance of plants belonging to the specified families.</p> <p>CO4: Induce to experiment on the subject in an intensive way to facilitate an interdisciplinary profession/enterprise/entrepreneurship.</p>
20.	4C04BOT PLANT PHYSIOLOGY, ECOLOGY AND APPLIED BOTANY	<p>CO1: Understanding of the fundamental concepts in Physiology</p> <p>CO2: Concept development in plant ecology.</p> <p>CO3: Enable the student to appreciate bio diversity, sustainable development with the help of their core subject and subsidiary subject botany in hts biotechnology era.</p>

		CO4: Induce to experiment on the subject in an intensive way to facilitate an interdisciplinary profession/enterprise/entrepreneurship.
21.	4C05BOT COMPLEMENTARY BOTANY PRACTICAL	<p>CO1: Learning the fundamental techniques used in a botany lab.</p> <p>CO2: First-hand experience in doing science.</p> <p>CO3: Internalization of practical skills for further application in free, independent, individual needs and helps in designing scientific experimentation.</p>

GENERIC ELECTIVE COURSES

22.	5D01BOT - MUSHROOM CULTIVATION	<p>CO1: Knowledge on fundamentals of selected courses- Mushroom cultivation, Botany for beginners, Plant Propagation, Medicinal plants and Plant diversity and human welfare.</p> <p>CO2: Familiarity with basic concepts in botany/biology applicable to the respective interest of the student.</p> <p>CO3: Ability to appreciate the advancements in the subject.</p> <p>CO4: Ability to specialize in commercial plant cultivation and/or commercial utilization of the imparted knowledge.</p>
23.	5D03BOT- PLANT PROPAGATION	<p>CO1: Knowledge on fundamentals of selected courses- Mushroom cultivation, Botany for beginners, Plant Propagation, Medicinal plants and Plant diversity and human welfare.</p> <p>CO2: Familiarity with basic concepts in botany/biology applicable to the respective interest of the student.</p> <p>CO3: Ability to appreciate the advancements in the subject.</p> <p>CO4: Ability to specialize in commercial plant cultivation and/or commercial utilization of the imparted knowledge.</p>