

Department of Botany
Programme Outcomes, Programme Specific Outcomes and Course Outcomes

Programme outcomes (POs), Program Specific outcomes (PSOs) and Course outcomes (COs) of the Programmes offered by the University

Programme code	Programme Name	Department
BOT	M.Sc. Botany	PGTD Botany

Programme outcome (POs) : As per Syllabus(BOS, Botany):-

The M.Sc. - Botany curriculum is designed to equip students with subject domain knowledge and technical skills pertaining to plants in a holistic manner. It aims to train the students in all the areas of plant sciences with a unique combination of core and elective papers with significant interdisciplinary components as per CBCS. Students have exposure to cutting-edge technologies that are currently used in the subject. They are made aware about the social and environmental issues, significance of plants and their relevance to the national economy.

Programme Specific Outcomes (PSOs): As per Syllabus(BOS, Botany):-

Course Outcomes (COs): As per Syllabus(BOS, Botany):-

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. They becomes competent enough in various analytical and technical skills related to plant sciences.

PSO3. 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, developmental biology, physiology, biochemistry, plant interactions with microbes and insects, morphology, anatomy, reproduction, genetics, microbiology, molecular biology, recombinant DNA technology, proteomics and transgenic technology. Students are also familiarized with the use of bioinformatics tools and databases and in the application of statistics to biological data.

PSO4. 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.

S.No	Name of the course (Paper)	Course Code	Course Outcome
1	Cell Biology,Cytology & Genetics	2161	Course Objectives: The paper deals with Mendelian and non-Mendelian inheritance, quantitative genetics, molecular markers and linkage mapping, prokaryotic and eukaryotic genome-structure, gene function and regulation, epigenetics, cytogenetics and crop evolution. Course Learning Outcomes: 1. They understand the pattern of inheritance in various life forms. 2. They develop a strong fundamentals basics for further molecular studies.
2	Resource Utilization and Conservation	2162	Course Objectives: The paper deals with origin, diversification, utility and conservation strategies of natural resources. It focuses the roles of various organization related to the plant sciences.

			<p>Course Learning Outcomes:</p> <ol style="list-style-type: none"> 1. They understand the pattern origin, diversification and cultivation of plants in nature. 2. They are able to design the strategies for conservation of these natural resources. 3. They become well worst with the role and functions of various organizations.
3	Biology & Diversity of Algae & Bryophytes	2163	<p>Course Objectives:</p> <p>This course aims to increase the understanding of the students about the diversity of lower plants, their classification, structure and growth.</p> <p>Course Learning Outcomes:</p> <p>The students will develop understanding about the diversity, identification, classification and economic importance of lower plants.</p>
4	Plant Development & Reproduction	2164	<p>Course Objectives:</p> <p>This course aims at making the students acquainted with the fundamentals and present understanding of the mechanisms associated with development, differentiation and structure of various plant organs, the metabolic and physiological changes occurring in them.</p> <p>Course Learning Outcomes:</p> <p>Student will develop the understanding of growth, development and reproduction in plants as well as understand the physiological and metabolic changes happening along with the environmental impact.</p>

5	Lab-I	3001	--
6	Lab-II	6 300	--
7	Cytogenetics & Molecular Biology	2171	<p>Course Objectives:</p> <p>The objective of the present course content is to provide a foundation and background in cellular and acellular entities of plants and animals, cell structure in relation to functions, eukaryotic genome structure (including nuclear and organellar), and regulatory mechanisms.</p> <p>Course Learning Outcomes:</p> <p>The students will be learning</p> <ol style="list-style-type: none"> 1. About the acellular entities including infective particles comprising only protein or RNA, which are parasites of plants and/or animals and of the observations/proposals which challenge the established dogmas, such as, cell being the basic unit of life or higher plants are multicellular rather than supracellular, and current state of knowledge about the plant cell structure and their turn over, starting from cell wall to chromatin, in relation to their functions. 2. Students will understand the role of plant cytoskeleton and accessory proteins in major cellular processes of plants. 3. Student will focus on various components of the eukaryotic nuclear and organellar genome, with special reference to their regulatory role

			4. They understand the principle mechanisms of genome replication, maintenance, function and regulation of expression.
8	Biology & Diversity of Microbes & Fungi	2172	<p>Course Objectives:</p> <p>This course aims to increase the understanding of the students about the diversity of microorganisms including fungi, their classification, structure and growth.</p> <p>Course Learning Outcomes:</p> <p>The course will increase the understanding of the students about the classification, structure, role and infectious cycle of microbes and Fungi.</p>
9	Plant Physiology	2173	<p>Course Objectives:</p> <p>This course aims to educate student about the mechanism and physiology life processes in plants. It focus on the plant nutrient uptake and translocation, photosynthesis, respiration and nitrogen metabolism.</p> <p>Course Learning Outcomes:</p> <ol style="list-style-type: none"> 1. Students will be able to understand the various physiological life processes in plants 2. They will also gain about the various uptake and transport mechanisms in plants and are able to coordinate the various processes. They understand the role of various hormones, signaling compounds, thermodynamics and enzyme kinetics. During the course students will gain knowledge about various mechanisms such as channel or transport proteins involved in nutrient uptake in plants.

10	Plant Metabolism	2174	<p>Course Objectives:</p> <p>This course aims to educate student about the various metabloc pathways leadito the formation of significant molecules and their catabolism. It focuses upon the vital role of each of these molecules in plants.</p> <p>Course Learning Outcomes:</p> <ol style="list-style-type: none"> 1. The student will enrich themselves with the phenomenon of metabolism of primary and secondary metabolites and their role in plants. 2. They are upgraded in analytical skills and instrumentation.
11	Lab-III	3003	--
12	Lab-IV	3004	--
13	Biology & Diversity of Pteridophytes & Gymnosperms	2181	<p>Course Objective:-</p> <p>The coure focuses on morphology, anatomy, reproduction and evolution in Pteridophytes and Gymnosperms.</p> <p>Course Learning Outcomes:-</p> <p>The students develop the basic understanding of important characteristics, anatomy, reproduction and evolution along with economic importance of these two groups.</p>
14	Taxonomy of Angiosperms	2182	<p>Course Objectives:</p> <p>This course aims to add to understanding of the students about the diversity of plants, their Description, Identification, Nomenclature and their classification including recent advances in the field.</p> <p>Course Learning Outcomes:</p>

			<p>The students will be learning</p> <ol style="list-style-type: none"> 1. The students will know about the systematic position of Generas, Species and , Families. 2. The students develop knowledge about plant nomenclature.
15	Plant Tissue Culture -I	2183	<p>Course Objective:-</p> <p>The course aims at the concept, scope, instrumentation, basic requirements and applied aspects of plant tissue culture. It focuses on various types plants cultures.</p> <p>Course Learning Outcome:-</p> <p>Student will understand the basic properties of plant cell and with apply the their basic knowledge of PTC in various fields for conservation, medicine, product development etc.</p>
16	Plant Tissue Culture -II	2184	
17	BioInformatics-I	2185	<p>Course Objective:-</p> <p>The course consists of the utilization of IT in biological sciences, with focus on basic parameters like computer design, OS, Networking, Databases design and upgradation and various tools and softwares for studying the various biological molecules.Thrus is given to various emerging fields in Bioinformatics in relation to Biodiversity, Agriculture and Drug Designing.</p> <p>Course Learning Outcome:-</p> <ol style="list-style-type: none"> 1. They will developed firm base for hardwares, softwares, networking, processing of computers. 2. They are able to understand the designing and function of nvarious databases and bioinformatic resourses.
18	BioInformatics-II	2186	

			3. They are able to select specific softwares and tolls to solve certain biological problems with respect to Nucleotides and Proteins.
19	Reproductive Biology of Angiosperms-I	2195	Course Objective:- The paper contains structure and function of reproductive organs and their significance in plant reproduction. Pollination, Fertilization, Embryogenesis, Aeropallinology are the areas which are stressed upon. Course Learning outcomes:- <ol style="list-style-type: none"> 1. Students will able to differentiate reproductive organs at Morphological, Anatomical, Physiological and Biochemical level. 2. This knowledge will be help to apply in agriculture for nproduction of hybrids. 3. The allergic problems in Humans can be justified on the basis of pollens.
20	Reproductive Biology of Angiosperms-II	2196	
21	Lab-V	3005	--
22	Lab-VI	3006	--
23	Lab-VI- Reproductive Biology Of Angiosperms	3041	--
24	Lab-VI-Plant Tissue Culture	3042	--
25	Plant Ecology	2211	Course Objectives: This course aims to introduce the concepts and principles of ecology, biological diversity, conservation, sustainable development, population, community and ecosystem structure and function, application of these concepts to solve

			<p>environmental problems.</p> <p>Course Learning Outcomes:</p> <p>The students will be learning</p> <ol style="list-style-type: none"> 1. They will be understand the cosept, types, development and functions of various ecosystems and their communication. 2. The various environmental factors governing these ecosystems are also clearly understood.
26	Environmental Ecology	2212	<p>Course Objectives:</p> <p>This course focus on the Environmental Impact Assesment (EIA), Energy resourses, various types environmental pollution, water pollution and conservation stratagies with suistainable management.</p> <p>Course Learning Outcomes:</p> <p>The students will be learning</p> <ol style="list-style-type: none"> 1. They will be understand the factors leading to Environmental degration, their reasons and their impact on the Environment. 2. This knowledge can help to form stratagies for conservation and suistainable management under the given legislative measures.
27	Plant Biotechnology	2213	<p>Course Objectives:</p> <p>This course would provide students with an understanding of principles and techniques of plant tissue culture, concepts and methods associated with development and analysis</p>

			<p>of transgenic plants, and their applications in basic and applied research.</p> <p>Course Learning Outcomes:</p> <p>The students will learn about</p> <ol style="list-style-type: none"> 1. Concepts, tools and techniques related to <i>in vitro</i> propagation of plants. 2. Different methods used for genetic transformation of plants, use of <i>Agrobacterium</i> as a vector for plant transformation, components of a binary vector system. 3. Various case studies related to basic and applied research in plant sciences using transgenic technology. 4. Principles and methods used for phenotypic, genetic and molecular analysis of transgenic plants.
28	Genetic Engineering	2214	<p>Course Objectives:</p> <p>This course is designed to provide a contextual and inquiry based learning of modern day advances in the field of recombinant DNA technology..</p> <p>Course Learning Outcomes:</p> <p>Students will acquire understanding of:</p> <ol style="list-style-type: none"> 1. Basic principles and modern age applications of recombinant DNA technology. 2. Learning molecular and technical skills along with applications of the instrumentation. 3. Designing/conducting experiments and analysing experimental data.

			4. Ethics of Recombinant DNA Technology.
29	Lab-VII	3007	--
30	Project	3008	--