**Programme Specific Outcome, Programme Outcome and Course Outcome of the M.SC (Botany) Programme**

At the end of the M.SC programme in Botany a student will have

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| PSO1 | * Fundamental concepts of botany
* Skills required:
* Logical analysis
* Experimental thinking
* Problem-solving
* Investigation
* Communication
* Presentation skill
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| PSO2 | A thorough understanding of:* Biotechnology and genetic engineering
* Experimental skills
* Basic knowledge of:
	+ Plant physiology
	+ Plant taxonomy
	+ Plant ecology
	+ Evolution
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| PSO3 | * Advanced research skills
* Scientific communication and presentation skills on botanical topics
* Conceptual knowledge of conservation biology
* Economical understanding of botany
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| PSO4 | * Advanced research and innovation
* Data analysis skills
* Critical thinking and problem-solving skills for experiments and project work
* Professional development and ethics
* Completion of an original research project or dissertation in botany
* Expertise in a specialized area of botany
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**Post-Graduate Attributes in Botany**
Upon completion of this program, a student will have the necessary skills to understand and analyze in a scientific and logical manner all major botanical phenomena.

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| PO1 | Critical Thinking | * capability to apply analytical thought to the study of plant sciences, including the evaluation of plant-related policies, ecological practices, scientific evidence, and research findings.
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| PO2 | Communication Skills | * Proficient in written and oral communication of scientific knowledge, as well as the use of digital media and technology for scientific discussions and presentations.
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| PO3 | Skill Enhancement | * Inculcation of theoretical and practical knowledge in plant sciences and its applications.
* Development of entrepreneurship and employability skills to contribute to the holistic development of society.
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| PO4 | Ethical and Moral Reasoning | * Ability to engage in ethical and moral reasoning in botanical research, environmental conservation, and sustainable resource management.
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| PO5 | Research Skills | * Capability to conduct independent botanical research, gather relevant data, and use appropriate methodologies to investigate various plant-related issues.
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| PO6 | Lifelong Learning | * Understanding the importance of continued learning, innovation, and professional development beyond formal education in plant sciences.
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| PO7 | Interdisciplinary Knowledge | * Ability to integrate knowledge from multiple scientific disciplines, such as genetics, microbiology, biotechnology, and environmental sciences, fostering a well-rounded scientific approach.
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| PO8 | Disciplinary Knowledge | * A strong foundation in fundamental botanical principles, including plant physiology, taxonomy, ecology, genetics, and plant biotechnology.
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**Course Outcome of the M.S.C (Botany) Programme**

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| **PAPER-BOT-101:** |
| CO1 | Learn and describe the history of microbiology and analyse its impact on public health and society. |
| CO2 | Describe the different types of microbiology and their effects on plants. Analyse the impact of plant diseases on crop production and food security |
| CO3 | ain basic knowledge about algae, their classification, and their applications in various industrial processes. |
| CO4 | Understand the economic and ecological roles of fungi and their associated technologies. |
| CO5 | Evaluate the economic and medicinal importance of bryophyta. |
| **PAPER-BOT-102: Diversity of Vascular Plants** |
| CO1 | Gain details knowledge about life cycle and classification of pteridophytes. |
| CO2 | Structure ,reproduction and evolution of psilosida |
| CO3 | Described knowledge about evolution and classification of gymnosperm.  |
| CO4 | Gain details structure and reproduction and lifecycle of cycadales.  |
| CO5 | Basic concept of fossilization and fundamentals and application of paleobotany. |
| **PAPER-BOT-103: Cell and Molecular Biology** |
| CO1 | Gain basic knowledge about the cell wall and cell membrane, along with their functions and movement. |
| CO2 | Learn about the structure, function, and location of cell organelles |
| CO3 | Understand the nucleus and nuclear processes such as DNA replication, transcription, etc |
| CO4 | Acquire in-depth knowledge of the process of protein synthesis and its site of synthesis. |
| CO5 | Learn about cell shape and movement. Gain in-depth knowledge of the cell cycle and programmed cell death processes. |
| **PAPER-BOT-104: plant biochemistry**  |
| CO1 | Give brief knowledge of biochemistry, concept of thermodynamics and principles of biophysical chemistry.  |
| CO2 | Help to develop an understanding of structure, physical and chemical properties and it’s biological activity .  |
| CO3 | Gain a deeper understanding of classification, structure, physical and chemical properties of protein and amino acids |
| CO4 | Gain knowledge on structure and properties of lipids and it’s importance of secondary metabolites. |
| CO5 | Basic of enzyme kinetics and regulation of enzyme activity |
| **PAPER-BOT-201: Cytogenetics , Plant Breeding**   |
| CO1 | Learn about genetic recombination and mapping techniques, karyotype analysis, DNA damage and repair mechanism.  |
| CO2 | Gain knowledge on plant Breeding Techniques for crop production. |
| CO3 | Basic knowledge on transduction and conjugation in bacteria  |
| CO4 | Learn about molecular Cytogenetics, regulation of gene expression in bacteria, flow cytometry and insitu hybridization. |
| CO5 | Learn about sampling techniques, testing of hypothesis, statistical methods, correlation and regression. |
| **PAPER-BOT-202: Biotechnology and genetic engineering of plant** |
| CO1 | Learn about tissue and organ culture, history and scope and concept of cellular differentiation and clonal propagation. |
| CO2 | Gain knowledge on development of somatic hybrids and cybrid for crop improvement. |
| CO3 | Gain knowledge on recombination DNA techniques, analysis of recombinant clones and DNA sequencing. |
| CO4 | Learn about agrobacterium mediated gene transfer for development of transgenic plant. |
| CO5 | Learn techniques about electrophoresis, stectroscopy, chromatography, ELISAEtc. |
| **PAPER-BOT-203: Plant physiology**   |
| CO1 | Gain knowledge about mechanism of membrane transport and translocation of water and solute through xylem and phloem. |
| CO2 | Gain knowledge about mechanism of photosynthesis and photoprotective mechanism.  |
| CO3 | Learn about Respiration and lipid metabolism |
| CO4 | Learn about Nitrogen metabolism, sensory photobiology and stress physiology. |
| CO5 | Gain knowledge on photoreceptors, flowering and senescence in plant and know about plant growth regulation. |
| **PAPER-BOT-204: Plant taxonomy, ecology and evolution** |
| CO1 | Learn about ICBN and rules for plant nomenclature, merits and demerits of major system of classification.  |
| CO2 | Gain knowledge about taxonomy evidence and range of floral structure of different orders. |
| CO3 | Gain knowledge on habitat and population characteristics. |
| CO4 | Learn structure and attributes of community, ecological succession, structure and function of ecosystem. |
| CO5 | Learn about theories of evolution and maintenance of gene frequency in population. |
| **PAPER-BOT-301: Plant development and reproduction economic botany** |
| CO1 |  It helps to learn and evaluate meristematic tissue differentiation, analysis and evaluate floral development and its genetic regulation |
| CO2 | Fundamental understanding of organison’s growth and development, to analysis and evaluate molecular and cytological events. |
| CO3 | To analysis and understand the plant sexual reproduction and knowledge about male reproductive part of plant |
| CO4 | Knowledge about female reproductive part of plant, to understand and analysis the sexual reproduction of plant. |
| CO5 | Provide knowledge & help to understand the use of plants and their cultivation methods and sustainable use. |
| **PAPER-BOT-302: Conservation biology** |
| CO1 |  To understand & analyse verity of life forms on earth and their role to keep planet healthy |
| CO2 | Acquire knowledge about various resources and their protection from wastes |
| CO3 | To understand, recognize and evaluate the production of plant & animals in their natural habitat. |
| CO4 | Knowledge and information as well as understanding of preservation of species in artificial habitats. |
| CO5 | It empowers to understand & protect creative work, inventions, ideas, fostering innovation and encouraging entrepreneurship. |
| **PAPER-BOT-303(A): Plant and environment**  |
| CO1 |  To evaluate and understand different spheres of earth and vegetation type. |
| CO2 | To analysis and understand the role of plants in environmental protection |
| CO3 | To evaluate the advanced optimization techniques |
| CO4 | To evaluate and understand ecological damage, climate change, resource management, policy development |
| CO5 | Understanding a potential renewable and sustainable energy source |
| **PAPER-BOT-303(B): Environmental studies** |
| CO1 |  To analysis the concept and components of environment |
| CO2 | To understand the significant negative impacts of environment on ecosystem &economy |
| CO3 | To evaluate & analysis the sustainable use of planet’s resources |
| CO4 | Knowledge to minimize loss of life, property damage, disruption to livelihood |
| CO5 | To gain knowledge about addressing climate change and promoting sustainable practices. |
| **PAPER-BOT-304: Plant physiology and developmental biology** |
| CO1 | To evaluate & understand the process of sustaining life on earth |
| CO2 | To evaluate & understand the way organisms react to light |
| CO3 | To understand how plants adapt to different environments |
| CO4 | To analysis & understand plant sexual reproduction |
| CO5 | To analysis & understand plant sexual reproduction |
| **PAPER-BOT-305:**  |
| CO1 |  To develop knowledge of specialized skills, critical thinking improvement, deeper understanding, team-work |
| **PAPER-BOT-401(A): Biochemistry and molecular biology 1** |
| CO1 | To understand and analysis the biological process in living organism |
| CO2 | To gain knowledge information and to evaluate metabolism, digestion, biological functions. |
| CO3 | To analysis the biological process in living organism. |
| CO4 | Evaluation of various biological functions. |
| CO5 | To analysis and understand body’s defence mechanism. |
| **PAPER-BOT-402(A):Biochemistry and molecular biology 2** |
| CO1 |  To analysis and understand the transfer of genetic information from one generation to next. |
| CO2 | Understanding the protein formation. |
| CO3 | Evaluation & analysis of all differentiations & respond to environmental changes. |
| CO4 | Understanding identifiable land marks on genome to track in heritance of specific traits or diseases.  |
| CO5 | Useful in knowing and understanding the importance in modulating gene expression. |
| **PAPER-BOT-401(B): Plant Biotechnology 1** |
| CO1 | To analyse rapid production of plants |
| CO2 | Evaluation of improvement of polygenic traits |
| CO3 | To understand the chemical & physical structure of biological macro molecules |
| CO4 | To analysis and create DNA sequences that combine genetic information from different resources |
| CO5 | Knowledge to treat genetic and acquired diseases. |
| **PAPER-BOT-402(B): Plant Biotechnology 2** |
| CO1 |  To understand the protoplast transformation & introducing foreign DNA into plant. |
| CO2 | Evaluating disease diagnosis & population genetics. |
| CO3 | Provide deep knowledge of genetic blue-print & functional protein produced by organism. |
| CO4 | Evaluation of gene expression & function in cells. |
| CO5 | Understand & protect creative work, inventions and ideas. |