



### Department of Botany

### M.Sc. Botany

| S.No.              | Course Code | Course Name                                 | Course Outcomes  |
|--------------------|-------------|---|--|
| <b>SEMESTER- I</b> |             |   |  |
| 1.                 | 21PBYC11    | Core Course - I:<br>Taxonomy of Angiosperms | <b>CO1[K2]:</b> illustrate the morphological key characters of Angiosperms<br><b>CO2[K3]:</b> explain the economic importance of angiosperm families<br><b>CO3[K4]:</b> classify the taxonomy of angiosperms<br><b>CO4[K5]:</b> justify the new plant species<br><b>CO5[K6]:</b> prepare the herbarium and key for angiosperm families   |
| 2.                 | 21PBYC12    | Core Course - II:<br>Developmental Botany   | <b>CO1[K2]:</b> demonstrate the meristematic theory and their classification.<br>Anomalous secondary growth in Dicot and Monocot<br>Anomalous secondary growth in Dicot and Monocot<br><b>CO2[K3]:</b> articulate on leaf origin, Floral anatomy and types of plant galls<br><b>CO3[K4]:</b> compare the development of microsporogenesis and megasporogenesis<br><b>CO5[K4]:</b> analyze the embryo culture and crop improvement in hybridization<br><b>CO4[K5]:</b> assess the pollen and embryo development |



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| 3.    | 21PBYC13    | Core Course - III:<br>Plant Diversity   | <b>CO1[K1]:</b> identify the core concepts the structure, reproduction and life-cycle of higher and lower plants<br><b>CO2[K2]:</b> classify diversity of plant kingdom and their salient features.<br><b>CO3[K3]:</b> build the knowledge about structure and life cycle pattern of algae, fungi, lichens, bryophytes, Pteridophytes & Gymnosperms.<br><b>CO4[K5]:</b> justify the evolutionary trends the salient features of pteridophytes and cryptogam plants.<br><b>CO5[K6]:</b> evaluate the acquired plant based medicine, ornamental and spiritual well being, fodder and fuel wood |
| 4.    | 21PBYC1P    | Core Course - IV:<br>Practical: Taxonomy of Angiosperms, Developmental Botany And Plant Diversity | <b>CO1[K2]:</b> demonstrate the preparation of temporary and permanent mount Slides and sectioning of plant materials.<br><b>CO2[K3]:</b> determine various groups of plants based on structural and anatomical variations<br><b>CO3[K4]:</b> examine the internal anatomical features of Plant systems.<br><b>CO4[K5]:</b> evaluate the anatomical variation among the plant species.<br><b>CO5[K6]:</b> develop the suitable technique for the study of internal structure of Pteridophytes, Gymnosperms and Angiosperms.  |



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| 5.    | 21PBY011    | Elective Course - I:<br>Herbal Technology        | <b>CO1[K1]:</b> define the importance of medicinal plants<br><b>CO2[K2]:</b> explain the phytochemistry and pharmacological aspects of medicinal plants<br><b>CO3[K3]:</b> utilize the medicinal plants for biological activity<br><b>CO4[K3]:</b> separate the biological active compounds from plants through chromatographic techniques<br><b>CO5[K4]:</b> analyze the various collection methods for ethnobotanical knowledge from tribals. |
| 6.    | 21PBY012    | Elective Course - I:<br>Biofertilizer Technology | <b>CO1[K1]:</b> identify the potential organisms to be used as Bacterial and fungal biofertilizers<br><b>CO2[K2]:</b> illustrate the knowledge on organic farming<br><b>CO3[K3]:</b> develop the knowledge about Biofertilizer production and application<br><b>CO4[K3]:</b> examine the compost preparation and uses<br><b>CO5[K4]:</b> conclude the comparative study of Vermicomposting and Vermiwash  |



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| 7.                   | 21PBY013    | Elective Course - I:<br>Ethnobotany and Bio-Resources                                     | <b>CO1[K1]:</b> explain the life style and traditional practices of plants by Indian Tribals.<br><b>CO2[K2]:</b> perform the conservation practices for floristic and cultural diversity of the region.<br><b>CO3[K3]:</b> analyze the various collection methods for ethnobotanical knowledge from tribals.<br><b>CO4[K3]:</b> assess the methods to transform ethnobotanical knowledge into value added products.<br><b>CO5[K4]:</b> design the protocol for digitization of ethnobotanical knowledge  |
| <b>SEMESTER - II</b> |             |   |  |
| 8.                   | 21PBYC21    | Core Course - V:<br>Instrumentation Techniques and Biostatistics and Research Methodology | <b>CO1[K2]:</b> demonstrate general laboratory procedures and maintenance of research equipments, microscopy, pH meter and preparation of different buffers<br><b>CO2[K3]:</b> determine the methods of writing scientific paper and methods of statistical tool to solve the problems and know the importance of impact factor & citation index<br><b>CO3[K4]:</b> analyze scientific data, research proposals & identification of funding agencies<br><b>CO4[K5]:</b> resolve the research problems quantitatively using appropriate statistical methods and publish the data<br><b>CO5[K5]:</b> evaluate and interpret visual representations of quantitative research data from experiment, such as graphs or charts by using statistical tool |



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| 9.    | 21PBYC22    | Core Course - VI: Cell and Molecular Biology   | <b>CO1[K1]:</b> outline about the structure and function of Cells<br><b>CO2[K2]:</b> explain the knowledge of advances in cell biology<br><b>CO3[K3]:</b> develop the knowledge of cell organelles, Prokaryotic and Eukaryotic cells<br><b>CO4[K4]:</b> distinguish between chloroplast and mitochondria genome organization<br><b>CO5[K5]:</b> justify the study of mitosis and meiosis in cell divisions                                  |
| 10.   | 21PBYC23    | Core Course VII: Plant Biotechnology and Bioinformatics  | <b>CO1[K1]:</b> describe the molecular biology of plasmid and plant genome<br><b>CO2[K2]:</b> interpret the genetically modified DNA and gene transfer method<br><b>CO3[K3]:</b> demonstrate and validate the GM plants<br><b>CO4[K4]:</b> examine the tissue culture media and culturing of organs or whole plant<br><b>CO5[K5]:</b> assess the biological sequence and construct phylogenetic tree  |
| 11.   | 21PBYC2P    | Core Course - VIII: Practical: Instrumentation Techniques, Biostatistics, Cell And Molecular Biology, Plant Biotechnology and Bioinformatics | <b>CO1[K2]:</b> explain the cell components and observation of cell organelles<br><b>CO2[K3]:</b> demonstrate the molecules isolated from cell<br><b>CO3[K4]:</b> compare the sequence of different plant gDNA and bacterial plasmid and gDNA for making recombinant DNA<br><b>CO4[K5]:</b> access the sequence retrieval tools and comparison tools.<br><b>CO5[K6]:</b> assemble the plant genome & microbes by using Bioinformatics tools |



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| 12.                   | 21PBYN21    | Non Major Elective Course: Home Gardening          | <b>CO1[K1]:</b> illustrate the types and significance of gardening<br><b>CO2[K2]:</b> explain garden tools and its applications<br><b>CO3[K3]:</b> develop the vegetable crop cultivation<br><b>CO4[K4]:</b> justify the importance of home garden and gardening techniques<br><b>CO5[K5]:</b> assess the steps involved in home garden establishment  |
| <b>SEMESTER - III</b> |             |  |  |
| 13.                   | 21PBYC31    | Core Course - IX: Microbiology and Plant Pathology | <b>CO1[K1]:</b> describe the cultural characters of microorganism<br><b>CO2[K2]:</b> classify and identify the bacteria by morphology, biochemical methods<br><b>CO3[K3]:</b> discover the plant pathogenic organism and treat the plants<br><b>CO4[K4]:</b> inspect the symptoms and apply of control measures<br><b>CO5[K5]:</b> justify suitable control measure for plant disease management |
| 14.                   | 21PBYC32    | Core Course - X: Genetics and Evolution            | <b>CO1[K1]:</b> define the principles and concept of Mendelian laws<br><b>CO2[K2]:</b> explain mutation and population genetics<br><b>CO3[K3]:</b> determine the sex linked inheritance<br><b>CO4[K4]:</b> examine genetic recombination at molecular level<br><b>CO5[K4]:</b> analyze the origin of the human species   |



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| 15.   | 21PBYC33    | Core Course - XI:<br>Biochemistry  | <b>CO1[K1]:</b> outline the fundamentals of the classification, significant properties and functions of different biomolecules<br><b>CO2[K2]:</b> illustrate the metabolism of biochemical pathways and the mechanism of action<br><b>CO3[K3]:</b> formulation of specific chemical buffer solution for the sensitive biochemical reaction<br><b>CO4[K4]:</b> analyze the process of biomolecule production<br><b>CO5[K5]:</b> compare the metabolism and modify accordingly. |
| 16.   | 21PBYC3P    | Core Course - XII:<br>Practical:<br>Microbiology, Plant<br>Pathology, Genetics<br>And Biochemistry | <b>CO1[K2]:</b> differentiate the microorganisms by morphological and biochemical characters<br><b>CO2[K3]:</b> discover the plant diseases and pathogens<br><b>CO3[K4]:</b> compare the plants diseases and their symptoms<br><b>CO4[K5]:</b> measure the bacterial population of given sample by plating techniques<br><b>CO5[K6]:</b> solve the monohybrid & dihybrid cross problems in genetics.  |
| 17.   | 21PBYO31    | Elective Course - II:<br>Biodiversity and<br>Conservation  | <b>CO1[K1]:</b> state the vegetation and their relationship with the ecosystem<br><b>CO2[K2]:</b> classify the environmental biology in ecosystem<br><b>CO3[K3]:</b> develop the indigenous knowledge, biopiracy and bio prospecting<br><b>CO4[K4]:</b> analyze the cause and consequences of loss of biodiversity, threats and conservations.<br><b>CO5 [K4]:</b> simplify the <i>in situ</i> conservation and <i>ex situ</i> conservation                                   |



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| 18.   | 21PBY032    | Elective Course - II:<br>Palynology and<br>Pollination Biology | <b>CO1[K2]:</b> explain the characters of pollen grains and features of Pollination biology.<br><b>CO2[K3]:</b> utilize the knowledge on Pollination and breeding system in Angiosperms<br><b>CO3[K4]:</b> distinguish the types of pollen, breeding system & self incompatibility in plants<br><b>CO4[K4]:</b> analyse the types & viability of pollen, sexual reproduction and sexual incompatibility in plant system.<br><b>CO5[K5]:</b> evaluate the Palynology, breeding system & pollination of Angiosperm plants |
| 19.   | 21PBY033    | Elective Course - II:<br>Recent Advances in<br>Botany          | <b>CO1[K1]:</b> describe the recent advances in the area of Botany<br><b>CO2[K1]:</b> define the Plant Genome<br><b>CO3[K2]:</b> infer the plant gene and genome for functional analysis<br><b>CO4[K3]:</b> analyze Phytocomponents and Nano particles in plants<br><b>CO5[K4]:</b> simplify procedure to isolate the metabolites from the medicinal plants   |





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| 20.                  | 21PBYM31    | Self-Paced Learning (Swayam Course): Forests and Their Management       | <p><b>CO1[K1]:</b> identify the background and the key words in Forests and their Management</p> <p><b>CO2[K2]:</b> demonstrate independent and self-paced learning for clear understanding of the concept</p> <p><b>CO3[K3]:</b> develop computer and communication skills to broaden their knowledge in the course</p> <p><b>CO4[K3]:</b> use high quality reading resources, communication tools and technology to send assignments and to take up test</p> <p><b>CO5 [K4]:</b> analyze critically and apply technical skills to comprehend the ideas or theories in the video lectures</p>       |
| 21.                  | 21PBYM32    | Self-Paced Learning (Swayam Course): Applied Environmental Microbiology | <p><b>CO1[K1]:</b> identify the background and the key words in Applied Environmental Microbiology</p> <p><b>CO2[K2]:</b> demonstrate independent and self-paced learning for clear understanding of the concept</p> <p><b>CO3[K3]:</b> develop computer and communication skills to broaden their knowledge in the course</p> <p><b>CO4[K3]:</b> use high quality reading resources, communication tools and technology to send assignments and to take up test</p> <p><b>CO5 [K4]:</b> analyze critically and apply technical skills to comprehend the ideas or theories in the video lectures</p> |
| <b>SEMESTER - IV</b> |             |   |  |



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| 22.   | 21PBYC41    | Core Course - XIII:<br>Plant Physiology                                  | <b>CO1[K1]:</b> describe the physiological process of photosynthesis and respiration of plants<br><b>CO2[K2]:</b> express the knowledge of phytohormones and its applications<br><b>CO3[K3]:</b> develop the concept of water relationship and its mechanism<br><b>CO4[K4]:</b> distinguish the photorespiration and respiration of plant cell<br><b>CO5[K5]:</b> justify the mechanism and functions of phytochrome |
| 23.   | 21PBYC42    | Core Course - XIV:<br>Plant Ecology                                      | <b>CO1[K1]:</b> describe the concept of ecology and components of ecosystem<br><b>CO2[K2]:</b> explain the vegetation and their relationship with the ecosystem.<br><b>CO3[K3]:</b> determine the need for conservation and management of Biodiversity<br><b>CO4[K4]:</b> analyze the status of plant population.<br><b>CO5[K5]:</b> justify the RET plants conservation.  |
| 24.   | 21PBYC4P    | Core Course - XV:<br>Practical: Plant<br>Physiology And Plant<br>Ecology | <b>CO1[K2]:</b> illustrate the morphological, ecological and physiological adaptations of plants<br><b>CO2[K3]:</b> calculate the plant population in an environment<br><b>CO3[K4]:</b> analyze the Plant population through Transect and Quadrante method<br><b>CO4[K5]:</b> assess the status of plant population<br><b>CO5[K6]:</b> perform the monohybrid and dihybrid cross experimentally                      |



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| 25.   | 21PBYJ41    | Core Course – XVI:<br>Project | <b>CO1[K2]:</b> outline the concept of research with ethics<br><b>CO2[K3]:</b> apply academic skills to present the research study findings in a formal academic oral presentations and a written research paper<br><b>CO3[K5]:</b> recommend valuable solutions to the betterment of society<br><b>CO4[K5]:</b> assess ways to collect, compile and conduct a data analysis<br><b>CO5[K6]:</b> develop laboratory skills and advanced Biotechniques |