

**D.A.V AUTONOMOUS COLLEGE, TITILAGARH**

**DEPARTMENT OF BOTANY**

**Program outcomes, Program specific outcomes and  
course outcomes of Botany**

Subject specific outcomes	<ul style="list-style-type: none"><li>• Students will gain knowledge and learn techniques in Plant sciences.</li><li>• They will understand the difference between Prokaryotic and Eukaryotic cell, its functions in control and regulation of various metabolic pathways of organisms.</li><li>• Analyze complex interactions among the Plants, Microbes and Animals, understands the evolutionary aspects of Plants.</li><li>• Their distribution and relationship with the environment and interaction with other organisms.</li><li>• Understands the Basic Life forms from Cryptogams to Phenerogams.</li><li>• Understand the Physiological and Developmental processes of Plants.</li><li>• Gain knowledge of Agro Forestry/Pharmacognosy /Gardening/Mushroom/biofertilizers etc to develop entrepreneur attitude.</li><li>• Understands about various concepts of Genetics, Taxonomy, Ecology, Molecular biology, Tissue Culture and Its applied aspect.</li></ul>
Program specific outcomes	<ul style="list-style-type: none"><li>• Understand the nature and basic concepts of cell biology, genetics, molecular biology, taxonomy, physiology, ecology, plant diseases and disease spreading agents and applied Botany.</li><li>• Understand the relationships among Plants, plants and microbes.</li><li>• Perform experiments as per laboratory standards in the areas of Taxonomy, Physiology, Ecology, Cell biology, Genetics, molecular Biology, Plant biotechnology and Plant Tissue Culture.</li><li>• Qualitative approach has been made to crack the different State and National level exam concern with Plant Sciences/Life sciences/Biotechnology.</li><li>• Gains knowledge about research methodologies, effective communication and skills of problem solving methods</li></ul>

**D.A.V AUTONOMOUS COLLEGE, TITILAGARH**  
**CBCS COURSES IN B. SC.BOTANY**

**SEMESTER - I**

CORE PAPER	TITLE OF THE PAPER	CREDIT
AECC-I	ENVIRONMENTAL STUDIES	4
I	MICROBIOLOGY AND PHYCOLOGY	4
II	BIOMOLECULES AND CELL BIOLOGY	4
PRACTICAL	BASED ON THEORY PAPER I & II	2

**SEMESTER - II**

CORE PAPER	TITLE OF THE PAPER	CREDIT
III	MYCOLOGY AND PHYTOPATHOLOGY	4
IV	ARCHEGONIAE	4
PRACTICAL	BASED ON THEORY PAPER III & IV	2

**SEMESTER- III**

CORE PAPER	TITLE OF THE PAPER	CREDIT
V	ANATOMY OF ANGIOSPERMS	4
VI	ECONOMIC BOTANY	4
VII	GENETICS	4
PRACTICAL	BASED ON THEORY PAPER III , IV & VII	6

**SEMESTER- IV**

CORE PAPER	TITLE OF THE PAPER	CREDIT
VIII	MOLECULAR BIOLOGY	4
IX	PLANT ECOLOGY & PHYTOGEOGRAPHY	4
X	PLANT SYSTEMATICS	4
PRACTICAL	BASED ON THEORY PAPER VIII , IX & X	6

**STEMESER -V**

CORE PAPER	TITLE OF THE PAPER	CREDIT
XI	REPRODUCTIVE BIOLOGY OF ANGIOSPERMS	4
XII	PLANT PHYSIOLOGY	4
(DSE-I)	ANALYTICAL TECHNIQUES IN PLANTS SCIENCES	4
(DSE-II)	NATURAL RESOURCE MANAGEMENT	4
PRACTICAL	CORE COURSE IX & X	6

**SEMESTER -VI**

CORE PAPER	TITLE OF THE PAPER	CREDIT
XIII	PLANT METABOLISM	4
XIV	PLANT BIOTECHNOLOGY	4
(DSE-III)	HORTICULTURE PRACTICES & POST HARVEST TECHNOLOGY	4
(DSE-IV)	PROJECT WORK	4

## COURSE SPECIFIC OUT COMES B.Sc (BOTANY)

### SEMESTER – I

CORE PAPER	TITLE OF THE PAPER	COURSE SPECIFIC OUTCOMES
I	MICROBIOLOGY AND PHYCOLOGY	<ol style="list-style-type: none"> <li>1. Understand the microbial diversity along with its mode of nutrition, reproduction and its economic importance.</li> <li>2. Know the role of microbe in the maintenance of the ecological imbalance.</li> <li>3. Know the importance of microbes in modern research and its application.</li> <li>4. Knowledge on the systematics of viruses, algae, bacteria and their various metabolic processes.</li> <li>5. Understand the difference between beneficial and harmful viruses or bacteria.</li> <li>6. Understand the high industrial application of microbes based on the metabolites which are useful for the human application in various fields of medicine and nutrient.</li> <li>7. Role of beneficial or harmful viruses in research, medicine and diagnostics, as causal organisms of plant diseases</li> </ol>
II	BIOMOLECULES AND CELL BIOLOGY	<ol style="list-style-type: none"> <li>1. Knowledge on the different bonding pattern among the chemical compounds and further understand the polar compounds.</li> <li>2. Understand the significance of pH, buffers and their role in biological metabolism.</li> <li>3. Understand the structure, types and importance of different biomolecules (Lipids, Carbohydrates, Nucleic Acids, Protein)</li> <li>4. Develop the concept on various bioenergetic reactions and its mechanism under various conditions.</li> <li>5. Understand the different redox reactions and the mechanism of ATP serving as the currency molecule.</li> <li>6. The students will be able to understand the fundamental biochemical principles of enzymes, such as the structure and function of enzymatic process in living system.</li> <li>7. Understand Cell wall Plasma membrane, Cell organelles and cell divisions.</li> </ol>
PRACTICAL	BASED ON THEORY PAPER I & II	

**SEMESTER –II**

CORE PAPER	TITLE OF THE PAPER	COURSE SPECIFIC OUTCOMES
III	MYCOLOGY AND PHYTOPATHOLOGY	<ol style="list-style-type: none"> <li>1. General characteristics, classification and economic importance of Fungi and Lichens.</li> <li>2. Understand the representative forms in Fungi and Lichens.</li> <li>3. Application of Botany in agriculture through study of plant pathology.</li> <li>4. Students on the completion of this paper will gain a clear view of the plant disease causing pathogens and their life cycle.</li> <li>5. Students will know the symptoms of various plants diseases and their by undertake different control measures to protect plants or crops from disaster.</li> <li>6. Knowledge on the different disease management and usage of various control agent's against various pathogens.</li> </ol>
IV	ARCHEGONIATE	<ol style="list-style-type: none"> <li>1. Understand the diversity of plants from Bryophytes to Gymnosperms.</li> <li>2. General characteristics, classification and economic importance of Bryophyta, Pteridophyta and Gymnosperms.</li> <li>3. Understand the life history from representative forms of Bryophyta, Pteridophyta and Gymnosperms.</li> <li>4. Concept of Heterospory and seed habit .</li> <li>5. Understand the geological time scale.</li> <li>6. The process of fossilization and types of fossils.</li> </ol>
PRACTICAL	BASED ON THEORY PAPER III & IV	

**Semester III**

CORE PAPER	TITLE OF THE PAPER	COURSE SPECIFIC OUTCOMES
V	ANATOMY OF ANGIOSPERMS	<ol style="list-style-type: none"> <li>1. Allow the students to understand the anatomical features of angiosperms and function of various tissues in plants life.</li> <li>2. Differentiation of tissue system in Monocot and Dicot root, stem and leaf.</li> <li>3. Understand the Anomalous secondary growth in root and stem.</li> </ol>
VI	ECONOMIC BOTANY	<ol style="list-style-type: none"> <li>1. To understand the Importance and scope of Economic Botany Cultivation and uses of Cereals &amp; Pulses Vegetables, Sugars and fruits.</li> <li>2. Information of oil &amp; Wild edible fruit plants .</li> <li>3. Information of Fibre &amp; forage plants Spices, condiments and beverages plants. Rubber and dye, yielding plants, Timber yielding plants and Bamboo.</li> </ol>

VII	GENETICS	<ol style="list-style-type: none"> <li>1. To understand the Mendel's Law of Heredity Non-Mendelian Inheritance.</li> <li>2. Plant Breeding: Introduction and its objectives Plant genetic resources &amp; Hybridization</li> <li>3. Gene organization &amp; genetic code Special types of chromosome.</li> <li>4. Role of biotechnology in crop improvement.</li> <li>5. Concept of totipotency, steps in micropropagation.</li> <li>6. Understand the Mendelian genetics and interaction of genes.</li> <li>7. Structure and function of Extra nuclear genome.</li> <li>8. Knowing the effect of chromosomal aberrations. Variation in chromosome number, sex linkage and sex determination.</li> <li>9. Application in genetic counseling and RDNA technology.</li> </ol>
PRACTICAL	BASED ON THEORY PAPER V,VI & VII	

### Semester IV

COREPAPER	TITLE OF THE PAPER	COURSE SPECIFIC OUTCOMES
VIII	MOLECULAR BIOLOGY	<ol style="list-style-type: none"> <li>1. Students will know about the genetic organization of an organism and its expression, replication of genetic materials.</li> <li>2. Students will gain knowledge about mutation which is responsible genetic variations among organisms and various diseases caused by genetic mutations.</li> <li>3. Provide knowledge about various biomolecules and enzymes in cellular metabolism. 4. Gain knowledge about various carbohydrates and their use in cellular metabolism.</li> </ol>
IX	PLANT ECOLOGY & PHYTOGEOGRAPHY	<ol style="list-style-type: none"> <li>1. Importance of ecology in relation to understand the plant and environment interaction.</li> <li>2. Understand the concept of ecosystem; biotic and abiotic factors. Biogeochemical cycle, community ecology and assessment of environmental pollution.</li> <li>3. Plant succession and climax concept and phytogeographical regions of India.</li> <li>4. Develop understanding on Population and Community ecology along with its characteristics and structure.</li> <li>5. Gain knowledge on the measures to study population or community.</li> <li>6. Knowledge on the different physiogeographic regions of India, factors serving for the geographic divisions and its vegetation</li> </ol>

X	PLANT SYSTEMATICS	<ol style="list-style-type: none"> <li>1. Understand in details with practical knowledge of the morphology of different types of inflorescence.</li> <li>2. Practical understanding of the different types of fruits and their morphology.</li> <li>3. Practical observation of the morphology and types of pollen grains of different plant species under palynological studies.</li> <li>4. Embryological understandings of the different types of ovules, anthers and hands on training of the different techniques to study the pollen grains and further differentiate among them.</li> <li>5. Practical knowledge on taxonomy through field study and mehtods to identify the plant species and further techniques of herbarium preparation.</li> </ol>
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### Semester V

CORE PAPER	TITLE OF THE PAPER	COURSE SPECIFIC OUTCOMES
XI	REPRODUCTIVE BIOLOGY OF ANGIOSPERMS	<ol style="list-style-type: none"> <li>1. Students will gain a clear understanding of the most advanced plant reproduction i.e. Angiosperms.</li> <li>2. Understand the floral morphology of angiosperms and different theories related to the evolution of advanced leaf like or floral parts of the plants.</li> <li>3. Knowledge on the historical prescriptive of palynology and its aspects and prospects.</li> <li>4. Understand the process of development of micro and mega spores and its involvement in the process of plant development.</li> <li>5. Knowledge on the process of embryo development and various modification plants undergo during embryogenesis against its role for crop improvement.</li> <li>6. Importance of pollination and their types in reproduction of plants; developmental process of male and female gametophyte.</li> <li>7. Stages involved in Seed development; causes of seed dormancy and its importance.</li> <li>8. Phases of plant growth and development and how growth hormones play an important role?</li> </ol>

XII	PLANT PHYSIOLOGY	<ol style="list-style-type: none"> <li>1. Understanding of physiological processes involved in the plant sciences.</li> <li>2. Knowledge on metabolic processes</li> <li>3. Mineral nutrition, energy conservation through photosynthesis, breakdown of stored foods through respiration.</li> <li>4. Provide knowledge on nitrogen metabolism with special reference to assimilation of nitrogen in amino acids and protein.</li> <li>5. Role of plant growth regulators and their application in agriculture and horticulture.</li> <li>6. Growth and other related physiological aspects such as circadian rhythm, photoperiodism and vernalization.</li> <li>7. Movements, responses to light, water and gravity.</li> </ol>
DSE-I	ANALYTICAL TECHNIQUES IN PLANTS SCIENCES	<ol style="list-style-type: none"> <li>1. Knowledge on the different instruments and techniques used in understanding various biological mechanisms.</li> <li>2. Understand the application of biological techniques in modern research.</li> <li>3. Understand the working principle, types and uses of various biotechniques like microscopy, chromatography, spectrophotometry and various other microtechniques.</li> <li>4. Understand the importance of various instruments in performing various experiments in studying various organisms both micro and macro organisms.</li> <li>5. Basic knowledge on various solution preparations for laboratory use and use of different nutrient media for invitro maintenance of living cells.</li> </ol>
DSE-II	NATURAL RESOURCE MANAGEMENT	<ol style="list-style-type: none"> <li>1. To understand the Concept of Biodiversity Its applications at various levels.</li> <li>2. Biodiversity in Terrestrial &amp; Aquatic Environment Biodiversity distribution</li> </ol>

### Semester -VI

CORE PAPER	TITLE OF THE PAPER	COURSE SPECIFIC OUTCOMES
XIII	PLANT METABOLISM	<ol style="list-style-type: none"> <li>1. Understanding of physiological processes involved in the plant sciences.</li> <li>2. Knowledge on metabolic processes</li> <li>3. Mineral nutrition, energy conservation through photosynthesis, breakdown of stored foods through respiration.</li> <li>4. Provide knowledge on nitrogen metabolism with special reference to assimilation of nitrogen in amino acids and protein.</li> <li>5. Role of plant growth regulators and their application in agriculture and horticulture.</li> <li>6. Growth and other related physiological aspects such as circadian rhythm, photoperiodism and vernalization.</li> <li>7. Movements, responses to light, water and gravity.</li> </ol>

XIIV	PLANT BIOTECHNOLOGY	<ol style="list-style-type: none"> <li>1. To understand the Basics and techniques in Plant Tissue Culture (PTC) Micropropagation &amp; Secondary metabolite production in Plants</li> <li>2. To get aware with modern Tissue Culture Techniques Methods of gene transfer &amp; Transgenic Crop Production.</li> <li>3. Applications of Plant Biotechnology &amp; Transgenic plants</li> </ol>
DSE-III	HORTICULTURE PRACTICES & POST HARVEST TECHNOLOGY	<ol style="list-style-type: none"> <li>1. To understand the Importance and scope of Economic Botany Cultivation and uses of Cereals &amp; Pules Vegetables, Sugars and fruits.</li> <li>2. To understand the Gardening, its types Ornamental Plants.</li> <li>3. Design and layout of gardens at various places.</li> <li>4. Gives knowledge related to floriculture and landscape gardening .</li> <li>5. To understand the Nursery Management &amp; Ornamental Plants Principles of Garden Designs &amp; Commercial Floriculture</li> </ol>
DSE-IV	PROJECT WORK	<ol style="list-style-type: none"> <li>1. Acquire critical thinking and skills to plan and execute a minor research project.</li> <li>2. Properly collect and analyze data.</li> <li>3. Develop written and verbal presentation skills.</li> </ol>



