D.S.GOVERNMENT DEGREE COLLEGE FOR WOMEN

ONGOLE

CO PO MAPPING

FOR

B.Sc (BOTANY)

(W.E.F 2020 – 21)

DEPARTMENT OF BOTANY

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VISION

- To inspire, educate, and empower the next generation of Botanists, researchers who will drive sustainable solutions for a greener future.

MISSION

- To provide an immersive learning experience that encompasses classroom instruction, laboratory work, field studies, and practical applications.
- To provide hands-on experiences to foster a deep understanding of plant life, ecosystems, and their relevance to human society.
- To nurture scientific temperament and encourage students for lifelong learning by drawing attention to the vast world of knowledge of plant kingdom.
- To facilitate the academic, moral and financial development of the student who shall be self-reliant and responsible in the society.

Programme Outcomes (POs):

1. Acquire a comprehensive understanding of domain-specific knowledge and demonstrate their acquired skills effectively during practical transactions within the specific domain.
2. Demonstrate proficient analytical and problem-solving skills through the application of critical thinking strategies to address real-world situations effectively.
3. Master effective communication, collaborate skilfully with diverse stakeholders, nurture meaningful dialogues, build strong professional bonds in and beyond college.
4. Exhibit proficiency in ethically using information from diverse sources, analysing and synthesizing data effectively for real-world research.
5. Exemplify ethical standards in personal and professional contexts, appreciate diverse cultures, evaluate social responsibility's impact on well-being, and advocate for women students' betterment.
6. Actively promote social awareness through community service, contributing to a more inclusive and compassionate global community.
7. Embrace continuous learning, create professional growth chances, and prioritize personality development and physical well-being for a holistic approach.
8. Foster self-confidence, advocate women empowerment, demonstrate expertise for growth in studies, employment, and entrepreneurship, creating a brighter and equitable future.

Programme Specific Outcomes (PSOs):

PSO 1: Graduates will demonstrate a deep understanding of Botany, Zoology, and Chemistry principles, fostering interdisciplinary competence.

PSO 2: Graduates will excel in designing and conducting interdisciplinary research projects across the three disciplines.

PSO 3: Graduates will address ecological and environmental challenges with sustainable solutions, considering human impacts.

PSO 4: Graduates will master laboratory, fieldwork, and data analysis techniques in Botany, Zoology, and Chemistry.

PSO 5: Graduates will communicate scientific findings effectively and uphold ethical standards in research and practice.

Botany Course: I Fundamentals of Microbes and Non Vascular Plants

CO1: Understand microbial life and nonvascular plants

- Comprehension: Understand the concept of origin of life
- Recognise: Identify life forms such as Viruses, Bacteria, Algae, Fungi & Bryophyta based on their characters.
- Summarise: Summarize the general characters of organisms, compare them and classify them
- Illustration: Explain the life cycles of members of Algae, Fungi and Bryophyta with illustrations.

CO2: Explore Diversity of life forms and their economic Impact

- Understand and Analyse: Understand the characters of special groups of Bacteria viz. Archaebacteria, Actinomycetes, cyanobacteria and differentiate them.
- Evaluation: Evaluate the economic importance of Bacteria, Algae and Fungi in Agriculture, industry, pharmacy and in genetic engineering.

CO3: Understand the plant disease Dynamics

- Understanding and Evaluation: comprehend the plant disease dynamics and evaluate the economic impact of diseases on crops.
- Analysis: Analyse the plant disease symptoms and identify the pathogen as virus, Bacteria or Fungi.
- Application: Apply appropriate strategies for the control and management of the diseases in real life situations.

CO No.	Upon the successful completion of the course, students will be able to,	POs mapped	Cognitive levels
CO 1	Understand microbial life and nonvascular plants	PO1, PO2, PO4	L1,L2,L4
CO 2	Explore diversity of life forms and their economic impact	PO1,PO2,PO3,PO4, PO7	L2,L4, L5
CO 3	Understand the plant disease dynamics	PO1,PO2, PO3, PO4, PO6	L1, L2, L3, L4,L5

Mapping Cos to POs: Alignment on a three point scale from Weak to Strong:

CO	PO							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO1	3	3		3			2	
CO2	3	3	3	3			3	1
CO3	3	3	3	3		3	1	

Botany Course: II BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY

CO1: Comprehend the morphology and lifecycle of Vascular plants

- Knowledge and Understanding: Understand the morphological, anatomical and reproductive characteristics of plant groups like Pteridophytes, Gymnosperms and Angiosperms.
- Analysis: Analyse the characteristics of plant groups, compare them and differentiate them.
- Explanation: Explain the life cycles of Pteridophytes and Gymnosperms with illustrations.

CO2: Apply Taxonomic Principles

- Understanding: Understanding species concept and rules of ICBN
- Application: Apply taxonomic principles to identify the local plants.
- Analysis: Analyse the characteristics of a plant and categorize plant species into their respective families.

CO3: Analyse Phytogeographic Patterns

- Recognize: Locate different phytogeographical regions of the India and world.
- Comprehension: Understand the principles of phytogeography
- Analysis: Analyse phytogeographic patterns on both global and regional scales.
- Analysis: Anlayse the factors that contribute to endemism and discontinuous species distributions.

CO4: Evaluate the economic, ecological and pharmacological Significance

- Evaluation: Evaluate the economic importance of Pteridophytes, Gymnosperms and Angiospermic plants.
- Application: Understand the medicinal importance of different plants from various families and apply them in real life situations.
- Understanding: Understand and evaluate the ecological importance of phytogeographic regions like Himalayas, Western Ghats, Eastern Ghats etc.

CO No.	Upon the successful completion of the course, students will be able to,	POs mapped	Cognitive levels
CO 1	Comprehend the morphology and lifecycle of Vascular plants	PO1, PO2	L2, L4
CO 2	Apply Taxonomic Principles	PO1, PO2, PO4	L2,L3, L4
CO 3	Analyse Phyto geographic patterns	PO1, PO2, PO4	L1,L2,L4
CO 4	Evaluate the economic, ecological and pharmacological significance	PO1,PO3,PO4, PO7	L2,L3, L5

Mapping COs to POs: Alignment on a three point scale from Weak to Strong:

CO	PO							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO1	3	3		1				
CO2	3	3		3			1	
CO3	3	3		3				
CO4	3		3	3		1	3	1

Botany Course: III ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS, PLANT ECOLOGY AND BIODIVERSITY

CO1: Understand plant Anatomy and evaluate importance of timber yielding plants

- Explanation: Explain the organization of apical meristems using the Tunica-carpus theory and Histogen theory.
- Comprehension: Understand the different tissue systems in plants - epidermal, ground, and vascular tissues.
- Evaluation: Evaluate the economic importance of timbers such as Teak, Red sanders, and Rosewood.

CO2: **Understand plant reproduction and compare patterns of embryo development**

- Explanation: Describe the structure of anthers, ovules, microsporogenesis and megasporogenesis.
- Comparison: Differentiate cellular, nucellar and helobial endosperms and compare developmental patterns of dicot and monocot embryos.
- Application: Apply the knowledge of plant reproduction in propogation of plants in reallife.

CO3: Understand Ecology and analyse the impact of climatic factors on plants

- Comprehension: Comprehensive understanding of ecological concepts such as ecosystems their components, population ecology and community ecology.
- Understanding: Understand the process of Hydrosere, Xerosere.
- Analysis and application: Analyse the impact of climatic, edaphic, and biotic factors on plants and apply the knowledge in real life situation.

CO4: Comprehend the concept of Biodiversity

- Understanding: Understand the concept of biodiversity and identify biodiversity hotspots in India, specifically the North Eastern Himalayas and Western Ghats.
- Analysis and application: Analyse the factors responsible for loss of biodiversity and apply the knowledge in conserving biodiversity.
- Evaluation: Evaluate the aesthetic, pharmacological, cultural, ecological and economic value of biodiversity
- Appraisal: Appraise the measures for biodiversity conservation by NBPGR, NBA

CO No.	Upon the successful completion of the course, students will be able to,	POs mapped	Cognitive levels
CO 1	Understand Plant Anatomy and evaluate importance of timber yielding plants	PO1, PO3, PO7	L2,L5
CO 2	Understand plant reproduction and compare patterns of Embryo development	PO1,PO2, PO4	L2,L3,L4
CO 3	Understand Ecology and analyse impact of climatic factors on plants	PO1, PO2,PO4,PO7	L2,L3, L4
CO 4	Comprehend the concept of Biodiversity	PO1, PO2, PO4, PO5, PO6	L2, L3,L4,L5

Mapping COs to POs: Alignment on a three point scale from Weak to Strong:

CO	PO							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO1	3		3	1			1	
CO2	3	3		3			1	
CO3	3	3		3		3		
CO4	3	3		3	2	3	1	

Botany Course: IV Plant Physiology and Metabolism

CO1: Understand Plant-Water Relations and nutrient uptake

- Comprehension: Understand the importance of water in plant life and mechanisms for transport of water and solutes in plants.
- Application: Understand the mineral deficiency symptoms on plants and apply the knowledge in real life situations
- Analysis: Differentiate between passive and active processes of mineral ion absorption.
- Evaluation: Evaluate the importance of minerals in plant nutrition and growth.

CO2: Critically Understand Plant Metabolic processes like respiration, photosynthesis and Nitrogen metabolism

- Interpretation: Interpret the role of enzymes in plant metabolism
- Comprehension: Understand the sequential events that take place in glycolysis, Krebs cycle, electron transport chain.
- Analysis: Differentiate between the carbon assimilation pathways (C3, C4, and CAM).
- Understand and Application: understand the concept of asymbiotic and symbiotic Nitrogen fixation and apply the knowledge of symbiotic nitrogen fixation in real life.

CO3: Analyse Plant Growth, Development, and evaluate the effect of light in flowering process

- Analysis: Understand and Analyse the effect of phyto hormones on plant growth and development and compare their physiological effects.
- Evaluation: Evaluate the importnace of light in flowering process in long day, short day and day neutral plants.
- Analysis: Differentiate between ageing and scenscence.
- Undertstanding and application: Understand the plant stress responses towards temperature and salinity and apply the knowledge in real life.

CO No.	Upon the successful completion of the course, students will be able to,	POs mapped	Cognitive levels
CO 1	Understand Plant-Water Relations and nutrient uptake	PO1, PO2, PO4, PO7	L2,L3,L4,L5
CO 2	Critically Understand Plant Metabolic processes like respiration, photosynthesis and Nitrogen metabolism	PO1,PO2,PO4,PO6,PO7	L2,L3,L4
CO 3	Analyse Plant Growth, Development and evaluate the effect of light in flowering process	PO1,PO2,PO4,PO7	L2,L3,L4,L5

Mapping COs to POs: Alignment on a three point scale from Weak to Strong:

CO	PO							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO1	3	3		3			3	1
CO2	3	3		3		2	3	
CO3	3	3		3			3	

Botany Course: V Cell Biology, Genetics and Plant Breeding

CO1: Understand the cell structure and differentiate between prokaryotic and eukaryotic cell

- Comprehension: Understand the cell theory and cell structure at ultrastructural level.
- Analysis: Differentiate between prokaryotic and eukaryotic cells.
- Summarize: Summarize the structural and functional aspects of cell organelles.

CO2: Understand the Chromosome Structure, genetic principles and apply Mendel's laws

- Understanding and Analysis: Define and distinguish between euchromatin and heterochromatin, and understand their roles in gene expression.
- Application: Apply Mendel's laws of inheritance to predict genotypic and phenotypic ratios in monohybrid and di hybrid crosses.
- Analysis and evaluation: Analyse gene interactions, such as incomplete dominance, co-dominance, and multiple allelism, using plant-based examples evaluate their importance.

CO3: Construct chromosomal maps and apply Plant Breeding principles

- Evaluation: Evaluate the significance of Chromosomal linkage in genetic recombination.
- Construction: construct the chromosomal maps viz. 2 point testcross and 3 point test cross
- Comprehension: Understand plant breeding techniques and principles.
- Analyse: Distinguish between methods like mass selection, pure line selection, and clonal selection.
- Comprehension: Understand the importance of molecular breeding techniques, such as DNA markers (RAPD, RFLP), in enhancing plant breeding efficiency.

CO No.	Upon the successful completion of the course, students will be able to,	POs mapped	Cognitive levels
CO 1	Understand the cellular structure and differentiate between prokaryotic and eukaryotic cell	PO1,PO4	L2,L4
CO 2	Understand the Chromosome Structure, genetic principles and apply Mendal's laws	PO1,PO2,PO4	L2,L3,L4,L5
CO 3	Construct chromosomal maps and apply Plant Breeding principles	PO1,PO2,PO4,PO7	L2,L4,L5,L6

Mapping COs to POs: Alignment on a three point scale from Weak to Strong:

CO	PO							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO1	3			3			1	
CO2	3	3		3			1	
CO3	3	3		3			3	1

Botany Course: VI Plant Propagation

CO1: Understand the Plant Propagation Methods and apply them in real life

- Comprehension: Understand the fundamental concepts and techniques involved in plant propagation.
- Analysis: Differentiate between asexual and sexual methods of propagation, identify various plant parts suitable for propagation
- Application: Apply the propagation techniques in real life.
- Evaluation: Evaluate the advantages and disadvantages of different propagation methods.

CO2: Analyse the causes for Polyembryony and apply Apomictic embryos in propogation of certain plants

- Analysis and Evaluation: Analyse the causes for Polyembryony and evaluate its horticultural significance.
- Application: understand the concept of apomixis and apply their knowledge by successfully propagating a range of plant species like Mango, Citrus and Allium.

CO3: Skill development in plant propogation techniques like layering, grafting, budding etc

- Skill development: Develop skill in variety of propogation techniques which will be valuable for pursuing careers in horticulture, nursery.
- Comprehension: Comprehend the physiological and biochemical basis of successful rooting and grafting.
- Analysis and Application: Able to analyse effect of plant harmones and apply suitable plant growth regulators to enhance rooting and grafting success rates.

CO No.	Upon the successful completion of the course, students will be able to,	POs mapped	Cognitive levels
CO 1	Understand the Plant Propagation Methods and apply them in real life	PO1,PO2,PO4,PO7	L1,L2,L3,L4,L5
CO 2	Analyse the causes for Polyembryony and apply Apomictic embryos in propogation of certain plants	PO1,PO2,PO4	L2,L3,L4,L5
CO 3	Skill development in plant propogation techniques like layering, grafting, budding etc	PO1,PO2,PO3,PO4,PO7	L2,L3,L4

Mapping COs to POs: Alignment on a three point scale from Weak to Strong:

CO	PO							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO1	3	3	1	3			1	
CO2	3	3		3			1	
CO3	3	3	3	3			3	1

Botany Course: VII Seed Technology

CO1: Understand Seed Dormancy and Germination; apply knowledge in real life

- Understanding and analysis: comprehend the structure of seeds and differentiate the dicot and monocot seeds.
- Analysis and Application: Analyse the causes of seed dormancy and apply suitable methods for breaking seed dormancy.
- Comprehension: Understand the concepts of seed viability, vigour, and longevity.

CO2: Proficiency in Seed Processing and Storage techniques

- Comprehension and application: Understand seed processing principles, including pre-cleaning, drying, extraction, cleaning, grading, and pre-storage treatments, while adhering to safety protocols and apply the knowledge in real life.
- Analyse: Differentiate between orthodox and recalcitrant seeds.
- Evaluation: Understand the factors effecting longevity of seeds in storage and evaluate the effectiveness of different methods of storage.

CO3: Identify seed borne diseases and apply suitable disease management methods

- Recognize: Identify common seed-borne diseases.
- Comprehension: Understand seed-borne diseases transmission.
- Analysis: Analyse the causal organism of diseases by conducting seed health tests.
- Application: Apply suitable disease management methods to control seed borne diseases.

CO4: Understand seed policies, Seed Certification regulations

- Knowledge: Knowledge of seed certification objectives, regulations, and standards, including the Indian Seed Act, seed rules, and seed order.
- Application: Grasp the process involved in issuing certificates, tags, sealing and genetic purity and apply the same in real life situation.

CO No.	Upon the successful completion of the course, students will be able to,	POs mapped	Cognitive levels
CO 1	Understand Seed Dormancy and Germination; apply knowledge in real life	PO1,PO2,PO3,PO4	L2,L3,L4
CO 2	Proficiency in Seed Processing and Storage techniques	PO1,PO2,PO3,PO4,PO7	L2,L3,L4,L5
CO 3	Identify seed borne diseases and apply suitable disease management methods	PO1,PO2,PO4,PO6,PO7	L1,L2,L3,L4
CO 4	Understand seed policies, Seed Certification regulations	PO1,PO2,PO3,PO4,PO5, PO7,PO8	L1, L2,L3

Mapping COs to POs: Alignment on a three point scale from Weak to Strong:

CO	PO							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO1	3	3	2	3			1	
CO2	3	3	3	3			3	
CO3	3	3		3		3	3	
CO4	3	3	3	3	2	1	3	3