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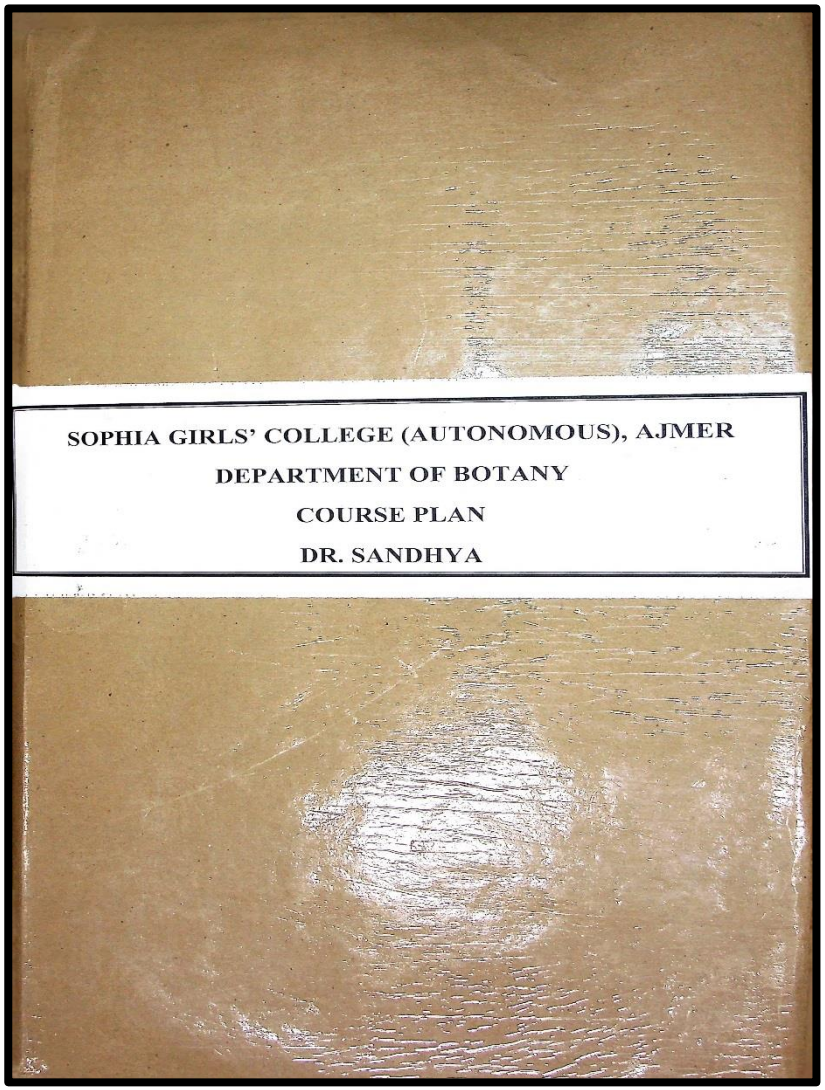
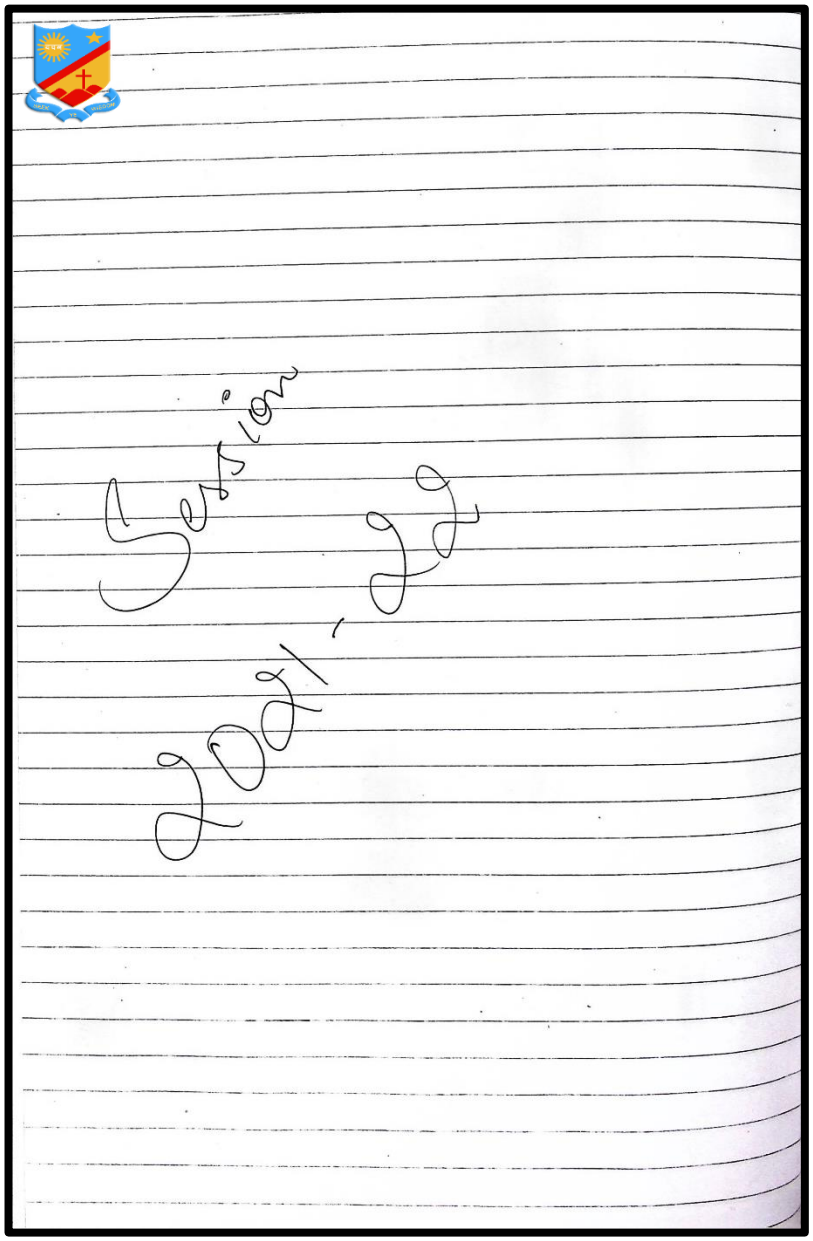


COURSE_PLAN_2021-22_Dr._SANDHYA


Session
2021-22

SOPHIA GIRL'S COLLEGE, AJMER (*AUTONOMOUS*)

B.Sc. I (SEMESTER I)

MICROBIOLOGY AND PLANT PATHOLOGY (PAPER II) (BOT 102)

Max. Marks : 75 (50Ext; 25 Int) Min. Marks: 30(20 Ext;10 Int) Credit: 03

COURSE PLAN

SEM I Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEPTEMBER	UNIT I **Classification of living world** (Whittakar's five kingdom classification)	Classification, Prokaryotes, Eukaryotes, Cell structure	PPT, Online Lecture (google meet), Objective questions, pdf notes, Collaborative learning	Relate the structure and nature of micro-organisms	*Knowledge Based* -Name the causal organism of citrus canker. -What is blister? *Understanding Based* -What is SARSCOV 2. -Outline the procedure of gram stanning. *Higher Order Thinking Skills Based* -Identify the role of bacteria in agriculture. -Discuss economic	Knowledge--60 Understanding-30 Higher Order-10
	Bacteria- structure, reproduction (Binary fission, transformation, conjugation & transduction). Gram staining, economic and biological importance	Prokaryotic cell structure, Reproduction, Gram positive and Gram negative Bacteria, Economic importance of bacteria	PPT, Online Lecture, Youtube videos, Objective questions, Quiz			
	General features of: Rickettsias, Archaebacteria and Actinomycetes	Comparison of different groups of bacteria	PPT, Online Lecture, Objective questions			
OCTOBER-DECEMBER	UNIT II	Capsid, Lysis. Lysogeny,	PPT, Online	Understand the etiology and		

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	Virus- Structure, multiplication and transmission of virus (TMV & Bacteriophage) **Covid 19-** Disease symptoms, Causal organism and Prevention	Bacteriophage	Lecture, Youtube videos, Objective questions, Quiz	epidemiology of plant diseases	importance of mycoplasma.	
	Mycoplasma- structure and economic importance. Phytoplasma, Little leaf of brinjal	Pleomorphic, Disease symptoms, Pathogenic aspect of mycoplasma	PPT, Online Lecture, Objective questions			
	A general account of diseases caused by plant pathogens: Bacterial diseases- Citrus canker, Tundu disease of wheat Viral disease- Tobacco mosaic	Causal organism, Disease symptoms, Control measures	PPT, Online Lecture, Youtube videos, Objective questions, Quiz			
JANUARY-FEBRUARY	UNIT III Host parasite interaction, Important symptoms of plant diseases caused by fungi	Host, Parasite, Necrosis, Hypertrophy, Rust, Mildew	PPT, Online Lecture, Youtube videos, Objective questions	Predict the control measures to minimize the adverse effect of pathogens on commercial crops		
	Disease cycle and control of: Fungal diseases- White rust of crucifers, Green ear disease of bajra, Loose Smut of wheat, Red rot of sugarcane, Tikka disease of groundnut	Etiology, Epidemiology, Control measures	PPT, Online Lecture, Objective questions			

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B.Sc. II (SEMESTER III)

ANATOMY OF ANGIOSPERMS (PAPER I) (BOT-301)

Max. Marks : 75 (50Ext; 25 Int) Min. Marks: 30(20 Ext;10 Int) Credit: 03

COURSE PLAN

SEM III Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEPTEMBER	UNIT I The basic body plan of a flowering plant – Modular type of growth	Meristem, node, internode, leaf primordium, metamer, module	PPT, Online Lectures (Google meet), Objective questions	Anticipate plant structure at microscopic level with the major goals of understanding the structure common to all vascular plants	*Knowledge Based* -What is cambium? -Name the types of tissues found in plants. *Understanding Based* -Relate Abscission and role of hormones. -Interpret the function of pneumatophores .. *Higher Order Thinking Skills Based* -What is the importance of mycorrhiza. -Assess the	Knowledge--50 Understanding-35 Higher Order-15
	The shoot system: Shoot apical meristem and its histological organization, Structure of primary shoot in monocotyledons and dicotyledons.	Theories of apical meristem, dermal tissue, ground tissue, vascular tissue	PPT, Online Lectures (Google meet), Pdf notes, Youtube videos, MCQs, Group discussion			
	The root system: Root apical meristem, Differentiation of primary and secondary tissues and their roles, Structural modification for storage, respiration, reproduction and for interaction with microbes	Theories of apical meristem, dermal tissue, ground tissue, vascular tissue, storage root, aerial root, mycorrhiza, root nodule	PPT, Online Lectures (Google meet), Pdf notes, Youtube videos, MCQs			
OCTOBER-DECEMBER	UNIT II Cambium and its functions. Formation of secondary xylem,	Secondary growth, structure and function of xylem	PPT, Online Lectures (Google meet), Youtube videos, MCQs	Explain the		

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	A general account of wood in relation to conduction of water and minerals			developmental processes that leads to mature anatomy and anomalous growth in plants	phenomenon of senescence in plants.	
	Characteristics of growth rings, Sap wood and heart wood, Secondary phloem: structure and function,	Annual rings, elements of phloem	PPT, Online Lectures (Google meet), Youtube videos, MCQs, pdf notes, Collaborative learning			
	Periderm. Anomalous growth: primary (*Triticum, Nyctanthes*) and secondary (*Salvadora, Bignonia, Dracaena*)	Cork cambium, lenticels, cortical bundles, phloem islands	PPT, Online Lectures (Google meet), MCQs			
JANUARY-FEBRUARY	UNIT III **Leaf:** Origin and development	Primordium, meristem,	PPT, Online Lectures (Google meet), MCQs	Relate the internal structure and adaptations to water stress		
	Internal structure in relation to photosynthesis and water loss	Mesophyll, stomata, monocot and dicot leaf	PPT, Online Lectures (Google meet), MCQs			
	Adaptations to water stress, Senescence and abscission	Xerophytes, abscission zone	PPT, Online Lectures (Google meet), Assignment, MCQs			

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B.Sc. III (SEMESTER V)

PLANT PHYSIOLOGY AND METABOLISM (PAPER I) (BOT-501- A)

Max. Marks : 75 (50Ext; 25 Int) Min. Marks: 30(20 Ext;10 Int) Credit: 03

COURSE PLAN

SEM V Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEPTEMBER	UNIT I **Plant-water relations:** Importance of water to plant life, Physical properties of water, diffusion and osmosis, Absorption, transport of water, Transpiration: physiology of stomata	Hydrogen bond, cohesion, adhesion, DPD, osmosis, plasmolysis, transpiration	Flipped classroom, PPT, Pdf notes, Online lectures (Google meet), Youtube videos, CEC videos, MCQs,	Interpret the fundamental concepts of plant physiology and enzymology	*Knowledge Based* -What is mineral toxicity? -Where does light reaction takes place? *Understanding Based* -Identify the significance of Pentose phosphate pathway. -What do you infer from red drop. *Higher Order Thinking Skills Based* -Justify the occurrence of	Knowledge--40 Understanding-40 Higher Order-20
	Transport of organic substances: Mechanism of phloem transport, Source-sink relationship	Girdling, source, sink, hydrostatic pressure	PPT, Pdf notes, Online lectures (Google meet), Youtube videos, MCQs			
OCTOBER - DECEMBER	UNIT II **Photosynthesis:** Pigments, Light harvesting complexes, Absorption and action spectra, Enhancement effect, Concept of two photosystems, Z-scheme,	Photosystem, red drop, Z-scheme, light reaction, cyclic and non cyclic ETC, synthesis of ATP	PPT, Pdf notes, Online lectures (Google meet), Youtube videos, CEC videos, MCQs. Collaborative learning			

	Photophosphorylation,			Compare photosynthesis and respiration	photorespiration. -Disprove relay pump theory of ascent of sap.	
	Calvin cycle, C_4 pathway, CAM plants, Photorespiration	Dark reaction, reduction of CO_2, C_2 cycle	PPT, Pdf notes, Online lectures (Google meet), Youtube videos, MCQs			
	Respiration: ATP-the biological energy currency, Aerobic and anaerobic respiration, Kreb's cycle, Electron transport mechanism (chemi-osmotic theory), Oxidative phosphorylation, Pentose phosphate pathway	Glycolysis, TCA cycle, phosphorylation, HMP pathway	Flipped classroom, PPT, Pdf notes, Online lectures (Google meet), MCQs			
JANUARY - FEBRUARY	UNIT III **Mineral nutrition:** Essential macro- and micro-elements, their role, Deficiency and toxicity symptoms	Macro- and micro-elements, role in plants	Assignment (PPT), Pdf notes, Youtube videos, MCQs	Explain the process of nitrogen and lipid metabolism		
	Nitrogen metabolism: Biology of nitrogen fixation, Importance of nitrate reductase and its regulation, Ammonia assimilation.	Nitrate reduction, symbiotic N_2 fixation, diazotrophs, leghaemoglobin, GOGAT pathway	PPT, Pdf notes, Online lectures (Google meet), Youtube videos, MCQs			
	Lipid metabolism: Structure and function of lipids, Fatty acid biosynthesis, β-oxidation, Storage and mobilization of fatty acids.	Lipids, fats, glyoxylate cycle	PPT, Pdf notes, Online lectures (Google meet), Youtube videos, MCQs			

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B.Sc. III (SEMESTER V)

PLANT BIOCHEMISTRY (PAPER I) (BOT-501- B)

Max. Marks : 75 (50Ext; 25 Int) Min. Marks: 30(20 Ext;10 Int) Credit: 03

COURSE PLAN

SEM V Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEPTEMBER	UNIT I **Basics of enzymology:** Nomenclature, Classification, Characteristics, Concept of holoenzyme, apoenzyme, coenzyme and cofactors	Catalyst, specificity, classification, coenzyme,	PPT, Pdf notes, Online lectures (Google meet), Youtube videos, CEC videos, MCQs	Understand the advanced concepts of enzymes as drivers of living systems including catalysis mechanisms and kinetics of enzymes as affected various types of inhibitors	*Knowledge Based* -What is inulin? -Define acid number. *Understanding Based* -Summarize the mechanism of enzyme action. -Explain storage polysaccharides. *Higher Order Thinking Skills Based* -Discuss GS-GOGAT system. -Describe the function of alkaloids in	Knowledge--40 Understanding-40 Higher Order-20
	Mechanism of action, Enzyme kinetics, Michaelis-Menten equation and its significance, Lineweaver-Burk equation	Activation energy, K_m value	PPT, Pdf notes, Online lectures (Google meet), Youtube videos, MCQs			
	Regulation of enzyme activity, Enzyme inhibition	Allosteric enzymes, Competitive, non-competitive and uncompetitive inhibition	PPT, Pdf notes, Online lectures (Google meet), MCQs			
OCTOBER-DECEMBER	UNIT II **Carbohydrates:** Classification, Structure and functions of	Types of carbohydrates, Functions of polysaccharides	PPT, Pdf notes, Online lectures (Google meet), Youtube videos,	Relate the		
		triple fusion	Youtube videos,			

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	monosaccharides (glucose, fructose); Disaccharides (sucrose, maltose, lactose), Oligosaccharides and polysaccharides (structural-cellulose, hemicelluloses, pectin, chitin, mucilage; storage – starch, inulin)		CEC videos, MCQs	properties of macromolecules, their cellular activities and biological responses	plants.	
	Proteins: Structure; primary, secondary, tertiary and quaternary, Simple and conjugated proteins, Synthesis of amino acids by reductive amination, GS-GOGAT system and transamination	Components and types of proteins, amino acid synthesis	PPT, Pdf notes, Online lectures (Google meet), Youtube videos, MCQs			
JANUARY-FEBRUARY	UNIT III **Lipids:** Classification, Structure, Occurrence and biological functions of lipids, Nomenclature and properties of fatty acids and triglycerides, Saponification number, Acid number	Characteristics, structure and function of lipids,	PPT, Pdf notes, Online lectures (Google meet), Youtube videos, MCQs	Identify the characteristics and significance of secondary metabolites and lipids		
	Secondary metabolites: Structure and functions of secondary metabolites: Alkaloids and tannins, Flavonoids, Cardiac glycosides and Anthocyanins	Types and significance of secondary metabolites	PPT, Pdf notes, Online lectures (Google meet), Youtube videos, MCQs			

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B.Sc. I (SEMESTER II)

CELL BIOLOGY (PAPER II) (BOT 202)

Max. Marks : 75 (50Ext; 25 Int) Min. Marks: 30(20 Ext;10 Int) Credit: 03

COURSE PLAN

SEM II Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
MARCH - APRIL	UNIT I Structure of Prokaryotic and Eukaryotic cell	Prokaryotes, Eukaryotes, Cell structure	Group discussion, PPT, Pdf notes YouTube videos, MCQs	Illustrate structure and function of cell and cell organelles	*Knowledge Based* -List the types of DNA. -Draw a labelled diagram of nucleus. *Understanding Based* -Compare mitochondria and chloroplast -Summarize repetitive DNA. *Higher Order Thinking Skills Based* -Describe the Genetic code. -Illustrate numerical changes in chromosomes.	Knowledge--60 Understanding-30 Higher Order-10
	The cell envelopes: structure and function of Plasma membrane and Cell wall	Fluid mosaic model, layers of cell wall	PPT, Lecture, Pdf notes YouTube videos, Assignment			
	Structure and function of cell organelles: Golgi body, Endoplasmic reticulum, Peroxisome, Vacuole, Mitochondria, Chloroplast, Ribosome and Centriole	Processing and packaging of proteins, microbodies, respiration, photosynthesis	PPT, Lecture, Pdf notes YouTube videos, Assignment, Ouiz			
APRIL - MAY	UNIT II **Nucleus:** Structure and function of Nucleus and Nucleolus	Nuclear pore, nucleoplasm, chromatin, nuclear lamina	Blended learning, Pdf notes YouTube videos, MCQs	Describe chromosome organization and		
		triple fusion	Youtube videos,			

	Endosperm, Embryogenesis	Nuclear, cellular, helobial endosperm, proembryo	PPT, Pdf notes YouTube videos			
MAY - JUNE	UNIT III Methods of Vegetative propagation	Natural, artificial, cutting, layering, grafting	Blended learning, Pdf notes YouTube videos, Assignment6	Understand the concept of latent life in plants		
	Latent life-Dormancy: Importance and types of seed dormancy, overcoming seed dormancy.	Primary and secondary dormancy, stratification, pre-chilling, ripening	PPT, Pdf notes YouTube videos, MCQs			
	Parthenocarpy, Types of fruits	Caryopsis, capsule, lomentum, berry, drupe, cremocarp	Flipped classroom, PPT, Pdf notes YouTube videos, Assignment			

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B.Sc. III (SEMESTER VI)

GENETICS AND BIOTECHNOLOGY OF PLANTS (PAPER II) (BOT-602-A)

Max. Marks : 75 (50Ext; 25 Int) Min. Marks: 30(20 Ext;10 Int) Credit: 03

COURSE PLAN

SEM V Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
MARCH-APRIL	UNIT I **Genetic inheritance:** Mendelism, Laws of segregation and independent assortment	Gene, dominant, recessive, allele, inheritance	Flipped classroom, PPT, Pdf notes YouTube videos, Numerical	Deduce how genes function and how characters are inherited from one generation to the next	*Knowledge Based* -List the types of gene interaction. -Recall the pribnow box. *Understanding Based* -Summarize translation in prokaryotes. -Compare transition & transversion. *Higher Order Thinking Skills Based* -Demonstrate a two-point test cross for linkage mapping. -Illustrate regulation in	Knowledge--40 Understanding-40 Higher Order-20
	Linkage and linkage mapping, Allelic and non-allelic interactions	Linked genes, test cross, back cross, genotype, phenotype	PPT, Pdf notes YouTube videos, Numerical			
	Gene expression: Transfer of genetic information-transcription, translation, Regulation of gene expression in prokaryotes and eukaryotes	Central dogma, initiation, elongation, termination, attenuation, anti-termination	Blended learning, PPT, Lecture, Pdf notes YouTube videos, CEC videos			
APRIL - MAY	UNIT II **Genetic variations:** Mutations-spontaneous and induced, DNA repair	Mutagen, transition, transversion, base analogues, mismatch repair	Assignment, Pdf notes, PPT, Quiz	Analyze the biotechnological procedures for modifying		
	Genetic engineering: Tools and techniques of recombinant	rDNA, vector, marker gene,	Blended learning, PPT, Pdf notes			

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