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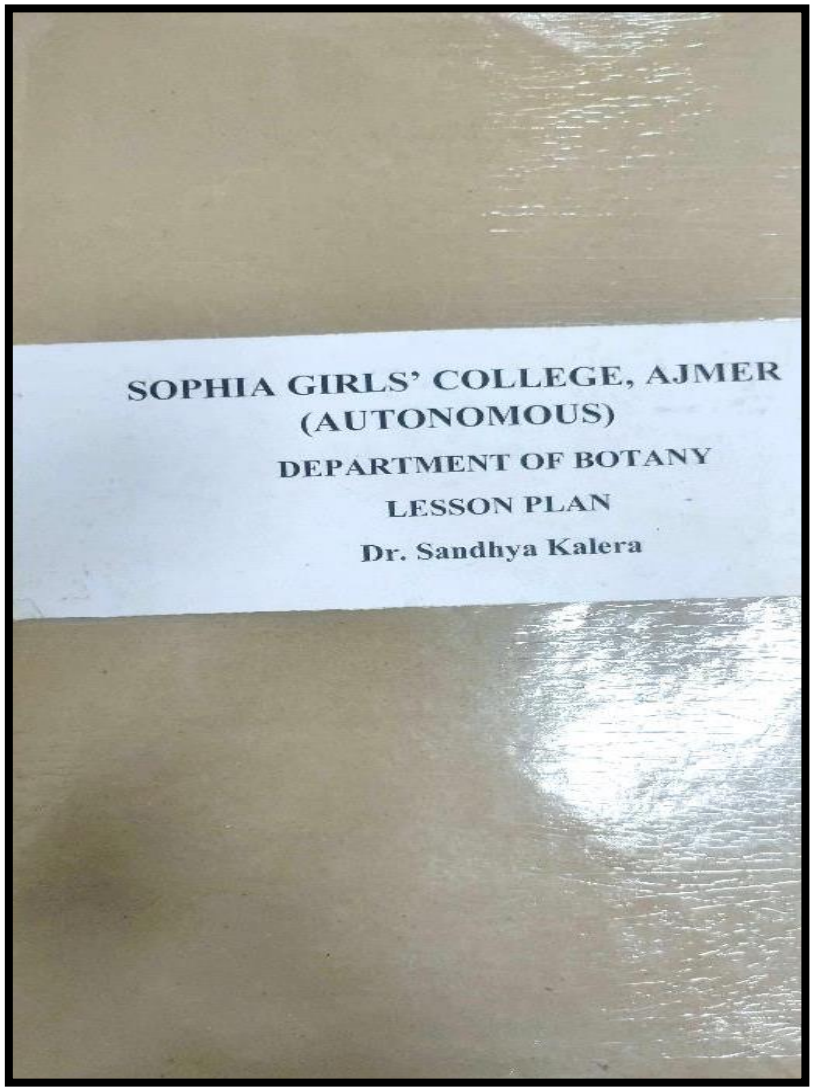
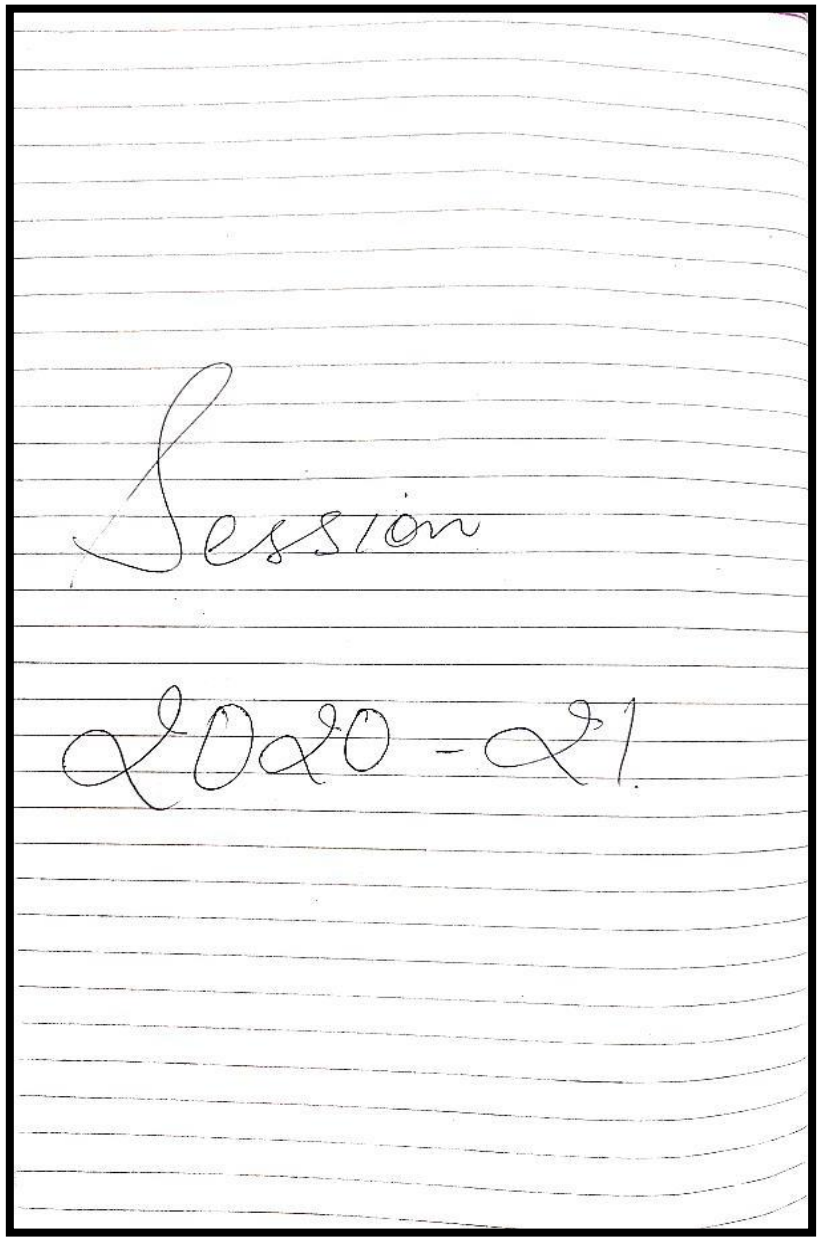


COURSE_PLAN_2020-21_DR_SANDHYA_KALERA


Session
2020-21

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 (%)
AUGUST-SEPTEMBER	UNIT I **Classification of living world** (Whittakar's five kingdom classification)	Classification, Prokaryotes, Eukaryotes, Cell structure	PPT, Online Lecture (google meet), Objective questions	Relate the structure and nature of micro-organisms	*Knowledge Based* -Define conjugation. -Write a note on mycoplasma. *Understanding Based* -Summarize the role of bacteria in Industry. -Illustrate transformation in bacteria. *Higher Order Thinking Skills Based* -Elaborate the etiology of white rust of crucifers. -Propose the control	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 **Virus-** Structure, multiplication and	Capsid, Lysis, Lysogeny, Bacteriophage	PPT,Online Lecture, Youtube videos.	Understand the etiology and epidemiology of plant		

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	transmission of virus (TMV & Bacteriophage)		Objective questions, Quiz	diseases	measures for loose smut of wheat.	
	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 (%)
JULY	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)	Anticipate plant structure at microscopic level with the major goals of understanding the structure common to all vascular plants	*Knowledge Based* -Who proposed apical meristem theory? -Name the types of cambium. *Understanding Based* -Identify the important features of a monocot stem. -Classify trichomes in leaf. *Higher Order Thinking Skills Based* -Evaluate adaptations in leaf to water stress.	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,			
	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			
AUGUST-SEPTEMBER	UNIT II Cambium and its functions.	Secondary growth, structure and function of xylem	PPT, Online Lectures (Google meet), Youtube videos, MCQs	Explain the		

	Formation of secondary xylem. 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	-Illustrate any one type of anomalous secondary growth.	
	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			
	Periderm. Anomalous growth: primary (*Triticum, Nyctanthes*) and secondary (*Salvadora, Bignonia, Dracaena*)	Cork cambium, lenticels, cortical bundles, phloem islands	PPT, Online Lectures (Google meet), MCQs			
OCTOBER-DECEMBER	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)

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 (%)
JULY-AUGUST	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	PPT, Pdf notes, Online lectures (Google meet), Youtube videos, CEC videos, MCQs	Interpret the fundamental concepts of plant physiology and enzymology	*Knowledge Based* -Define sorce and sink. -List the types of enzymes. *Understanding Based* -Illustrate absorption spectrum. -Compare C4 and CAM pathway. *Higher Order Thinking Skills Based* -Analyze Emerson enhancement effect. -Explain nitrate reduction in	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			
	Basics of enzymology: Nomenclature, Characteristics, Concept of holoenzyme, apoenzyme, coenzyme and cofactors, Mechanism of	Catalyst, specificity, classification, coenzyme, activation energy, K_m value	PPT, Pdf notes, Online lectures (Google meet), MCQs			

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	action. Michaelis-Menten equation and its significance, Regulation of enzyme activity				plants.
SEPTEMBER-OCTOBER	UNIT II **Photosynthesis:** Pigments, Light harvesting complexes, Absorption and action spectra, Enhancement effect, Concept of two photosystems, Z-scheme, Photophosphorylation,	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	Compare photosynthesis and respiration	
	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	PPT, Pdf notes, Online lectures (Google meet), MCQs		
NOVEMBER-DECEMBER	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 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	nitrogen and lipid metabolism		
	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. 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

SESSION Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
APRIL	UNIT I Structure of Prokaryotic and Eukaryotic cell	Prokaryotes, Eukaryotes, Cell structure	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs	Illustrate structure and function of cell and cell organelles	*Knowledge Based* -What is nucleosome? -Name the layers of cell wall. *Understanding Based* -Compare cristae and cisternae. -Elaborate prophase I of meiosis. *Higher Order Thinking Skills Based* -Interpret the role of Cdk in regulation of cell cycle. -Discuss the properties of	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	Online lectures (Google meet), PPT, Pdf notes MCQs, 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	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs, Assignment			
MAY	UNIT II **Nucleus:** Structure and function of Nucleus and Nucleolus	Nuclear pore, nucleoplasm, chromatin, nuclear lamina	Pdf notes Youtube videos, MCQs	Describe chromosome organization and chromosome		

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				alterations	genetic code.	
	Chromosome organisation: Structure, Euchromatin and Heterochromatin	Chromonema, chromomere, kinetochore, chromatid, telomere	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs			
	Chromosomal alterations: Structural changes in Chromosomes (Deletion, Duplication, Translocation and Inversion), Numerical Changes in Chromosomes: [Aneuploidy (Monosomy, Nullisomy, Trisomy, and Tetrasomy), Euploidy (Monoploidy and Polyploidy)]	Deletion, Duplication, Translocation and Inversion, aneuploidy, euploidy	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs, Assignment			
JUNE-JULY	UNIT III **DNA:** Structure, Types (A, B, C and Z), Replication and DNA-protein interaction (Nucleosome Model)	Nucleoside, nucleotide, double helix, semi-consevative, histone core	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs	Correlate DNA structure, cell cycle and cell division		
	Genetic code, Satellite and Repetitive DNA	Triplet codon, properties of genetic code, repetitive DNA	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs			
	Cell cycle: Steps, Regulation and control **Cell division:** Mitosis and Meiosis, Significance.	Interphase, G_1, S, G_2, M phase, CDKs, prophase, metaphase, anaphase, telophase	Online lectures (Google meet), PPT, Pdf notes, Youtube videos, MCQs, Assignment			

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B.Sc. II (SEMESTER IV)

REPRODUCTION IN FLOWERING PLANTS (PAPER II) (BOT-402)

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

COURSE PLAN

SEM IV Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
MARCH-APRIL	UNIT I **Flower:** Structure, Types of anther and pistil	Polyandrous, Monoadelphous, syngenesious, superior, inferior, unilocular	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs, Assignment	Compare the structure and development of male and female gametophyte	*Knowledge Based* - Define syngamy. -Draw a labelled diagram of a typical ovule. *Understanding Based* -Compare micro and mega-sporogensis. -Summarize the effect of temperature and light on seed dormancy. *Higher Order Thinking Skills Based* -Justify the inability of a plant, producing	Knowledge--50 Understanding-35 Higher Order-15
	Male gametophyte: Structure of anther, Microsporogenesis, Role of tapetum, Pollen germination and growth of pollen tube.	Monothecous, dithecous, microspore, pollen tetrads	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs			
	Female gametophyte: Structure and types of ovule, Megasporogenesis, Organisation of embryo sac	Orthotropous, anatropous, megaspore, polygonum type, synergids	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs			
APRIL - MAY	UNIT II Types of pollination, Pollen-pistil interaction	Self and cross pollination, herkogamy, heterostyly, ornithophilly, exine, stigma	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs	Illustrate reproduction in plants from pollination to embryogenesis		
	Self incompatibility, Double	GSI, SSI, recognition-	Online lectures			

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	fertilization	rejection, syngamy, triple fusion	(Google meet), PPT, Pdf notes Youtube videos, MCQs		functional male and female gametes, to set seeds. -Explain the types of embryo sac.	
	Endosperm, Embryogenesis	Nuclear, cellular, helobial endosperm, proembryo	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs			
JUNE - JULY	UNIT III Methods of Vegetative propagation	Natural, artificial, cutting, layering, grafting	Pdf notes Youtube videos, MCQs	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	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs, Guest lecture			
	Parthenocarpy, Types of fruits	Caryopsis, capsule, lomentum, berry, drupe, cremocarp	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs			

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B.Sc. III (SEMESTER VI)

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

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	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs, Numericals	Deduce how genes function and how characters are inherited from one generation to the next	*Knowledge Based* -Define linkage. -List the various physical mutagens. *Understanding Based* -Illustrate dominant epistasis. -Explain transcription. *Higher Order Thinking Skills Based* -Appraise the role of *Agrobacterium* in genetic engineering. -Recommend a	Knowledge--40 Understanding-40 Higher Order-20
	Linkage and linkage mapping, Allelic and non-allelic interactions	Linked genes, test cross, back cross, genotype, phenotype	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs, Numericals			
	Gene expression: Transfer of genetic information-transcription, translation, Regulation of gene expression in prokaryotes and eukaryotes	Central dogma, initiation, elongation, termination, attenuation, anti-termination	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs, CEC videos			
APRIL-MAY	UNIT II **Genetic variations:** Mutations-spontaneous and	Mutagen, transition, transversion, base analogues, mismatch repair	Online lectures (Google meet), PPT, Pdf notes Youtube videos			

	induced. DNA repair		MCQs, Assignment	Analyze the biotechnological procedures for modifying living organisms according to human purposes	technique of obtaining virus free plants and haploid plants.	
	Genetic engineering: Tools and techniques of recombinant DNA technology. Cloning vectors. Genomic and cDNA library. Polymerase Chain Reaction	rDNA, vector, marker gene, plasmid, phage cDNA,	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs			
MAY- JUNE	UNIT III **Biotechnology:** Definition. Basic aspects of plant tissue culture. Somatic hybridization- protoplast isolation, fusion and culture	Totipotency, culture, nutrient medium, sterilization, aseptic, protoplast, somatic hybrid, cybrid	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs	Understand basic aspects of plant tissue culture		
	Biology of *Agrobacterium*, Vectors for gene delivery and vectorless gene transfer	Ti plasmid, Ri plasmid, T-DNA, opines, electroporation, particle gun delivery	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs			
	Marker and reporter genes, Salient achievements in crop biotechnology	Selectable and scorable marker, meristem culture, haploid culture,herbicide resistant	Online lectures (Google meet), PPT, Pdf notes Youtube videos, MCQs, Assignment			

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