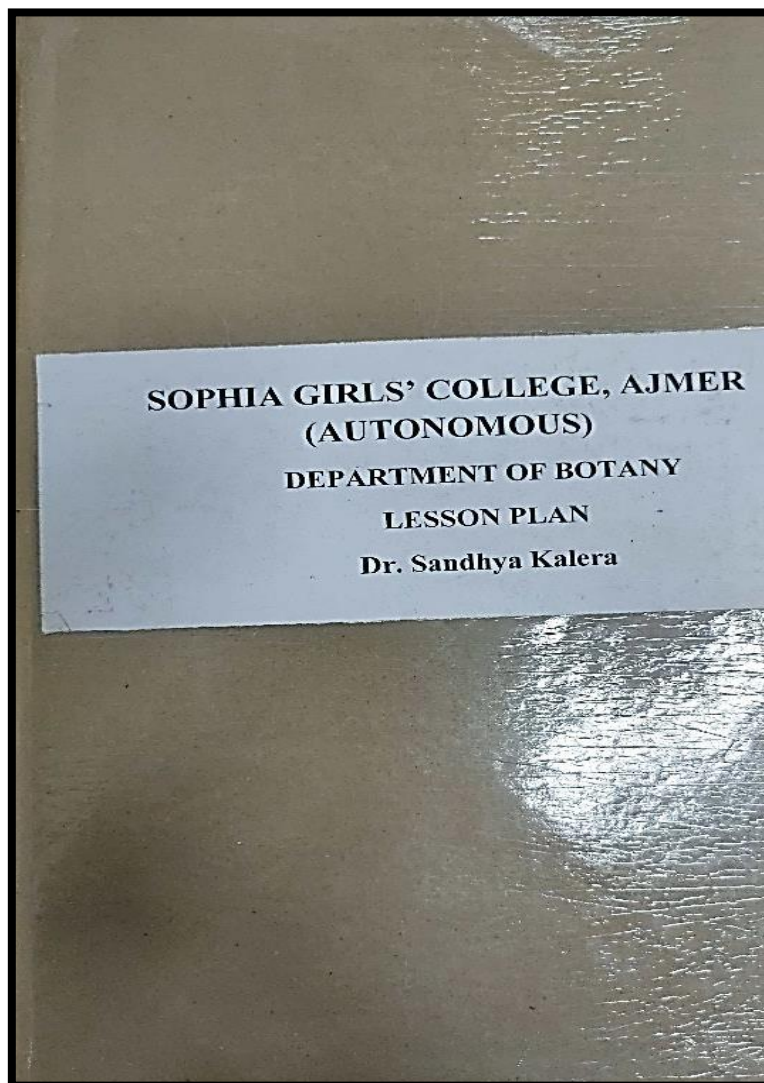
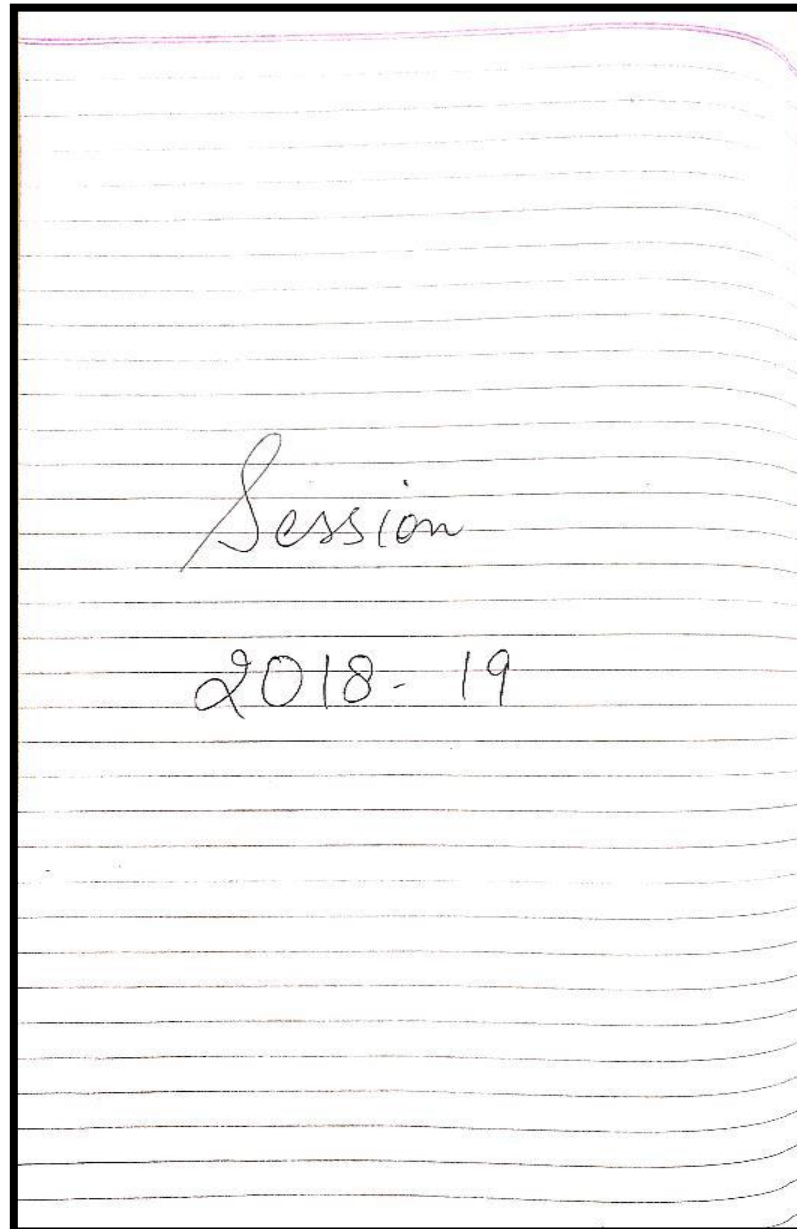




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SOPHIA GIRL'S COLLEGE, AJMER (AUTONOMOUS)

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

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DEPT. OF BOTANY.
Session 2018-19

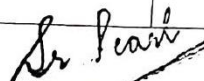
COURSE PLAN


SEM I Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
JULY	UNIT I Classification of living world (Whittaker's five kingdom classification)	Classification, Prokaryotes, Eukaryotes, Cell structure	Group discussion, Lecture	Relate the structure and nature of micro- organisms	<u>Knowledge Based</u> -What is the need of classification? -Explain Whittaker's five kingdom classification?	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, Lecture, Diagrams, Quiz, Demonstration		<u>Understanding Based</u> -Identify the types of bacteria on the basis of gram staining. -Relate the role of bacteria in agriculture and industry?	
	General features of: Rickettsias, Archaeobacteria and Actinomycetes	Comparison of different groups of bacteria	Group discussion, Lecture, Quiz		<u>Higher Order Thinking Skills Based</u> -Suggest control measures for plant diseases caused by fungi.	
AUGUST	UNIT II Virus- Structure, multiplication and transmission of virus (TMV)	Capsid, Lysis, Lysogeny, Bacteriophage	Diagrams, Pictures, Lecture	Understand the etiology and epidemiology of plant		

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	& Bacteriophage)			diseases	-Compare the methods of parasexual reproduction in bacteria.	
	Mycoplasma - structure and economic importance. Phytoplasma, Little leaf of brinjal	Pleomorphic, Disease symptoms, Pathogenic aspect of mycoplasma	Diagrams, Pictures, Lecture, quiz			
	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	Group discussion, Diagrams, Pictures, Specimens, Lecture			
SEPTEMBER-NOVEMBER	UNIT III Host parasite interaction, Important symptoms of plant diseases caused by fungi	Host, Parasite, Necrosis, Hypertrophy, Rust, Mildew	Assignment Diagrams, Pictures, Specimens, Lecture	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	Diagrams, Pictures, Specimens, Lecture			


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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	Diagrams, Group discussion, Demonstration, Lecture, Quiz		<u>Knowledge Based</u> -What is a metamer? -Explain secondary growth in a dicot shoot.	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	Diagrams, Section cutting, Lecture, Self practice	Anticipate plant structure at microscopic level with the major goals of understanding the structure common to all vascular plants	<u>Understanding Based</u> -Compare the structure of sunflower and cucurbita stem. -Illustrate the development of leaf.	
	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	Diagrams, Section cutting, Lecture, Assignment		<u>Higher Order Thinking Skills Based</u> -Relate the structure and function of elements of xylem.	
AUGUST	UNIT II Cambium and its functions, Formation of secondary xylem, A general account of wood in relation to conduction of water	Secondary growth, structure and function of xylem	Diagrams, Section cutting, Lecture	Explain the developmental		

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	and minerals			processes that leads to mature anatomy and anomalous growth in plants	-With a suitable example explain phloem wedge.
	Characteristics of growth rings, Sap wood and heart wood, Secondary phloem: structure and function,	Annual rings, elements of phloem	Diagrams, Section cutting, Lecture		
	Periderm. Anomalous growth: primary (<i>Triticum</i> , <i>Nyctanthes</i>) and secondary (<i>Salvadora</i> , <i>Bignonia</i> , <i>Dracaena</i>)	Cork cambium, lenticels, cortical bundles, phloem islands	Diagrams, Section cutting, Lecture		
SEPTEMBER-NOVEMBER	UNIT III Leaf: Origin and development	Primordium, meristem,	Diagrams, Lecture	Relate the internal structure and adaptations to water stress	
	Internal structure in relation to photosynthesis and water loss	Mesophyll, stomata, monocot and dicot leaf	Diagrams, Section cutting, Lecture		
	Adaptations to water stress, Senescence and abscission	Xerophytes, abscission zone	Diagrams, Lecture		

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2018-19

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	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	Diagrams, Lecture, Demonstration, group discussion	Interpret the fundamental concepts of plant physiology and enzymology	<u>Knowledge Based</u> -What is a osmosis? -Write a note on source-sink relationship.	Knowledge--40 Understanding--40 Higher Order-20
	Transport of organic substances: Mechanism of phloem transport, Source-sink relationship	Girdling, source, sink, hydrostatic pressure	Diagrams, Lecture, group discussion		<u>Understanding Based</u> -Compare diffusion and osmosis. -Relate action and absorption spectrum.	
	Basics of enzymology: Nomenclature, Characteristics, Concept of holoenzyme, apoenzyme, coenzyme and cofactors, Mechanism of action, Michaelis-Menten	Catalyst, specificity, classification, coenzyme, activation energy, K_m value	Diagrams, Lecture, Demonstration		<u>Higher Order Thinking Skills Based</u> -Asses the significance of K_m value. -Apply chemosmotic	

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	equation and its significance, Regulation of enzyme activity				coupling hypothesis to photophosphorylation.	
AUGUST	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, Diagrams, Lecture, Demonstration			
	Calvin cycle, C ₄ pathway, CAM plants, Photorespiration	Dark reaction, reduction of CO ₂ , C ₂ cycle	PPT, Diagrams, Lecture,	Compare photosynthesis and respiration		
	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	Diagrams, Lecture, group discussion			
SEPTEMBER-NOVEMBER	UNIT III Mineral nutrition: Essential macro- and micro-elements, their role, Deficiency and toxicity symptoms	Macro- and micro-elements, role in plants	Assignment, quiz			
	Nitrogen metabolism: Biology of nitrogen fixation, Importance of nitrate reductase and its regulation, Ammonia	Nitrate reduction, symbiotic N ₂ fixation, diazotrophs, leghaemoglobin, GOGAT pathway	Diagrams, Lecture	Explain the process of nitrogen and lipid metabolism		

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	assimilation.					
	Lipid metabolism: Structure and function of lipids, Fatty acid biosynthesis, β -oxidation, Storage and mobilization of fatty acids.	Lipids, fats, glyoxylate cycle	Diagrams, Lecture, PPT			

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SOPHIA GIRL'S COLLEGE, AJMER (AUTONOMOUS)

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 I Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
DECEMBER- JANUARY	UNIT I Structure of Prokaryotic and Eukaryotic cell	Prokaryotes, Eukaryotes, Cell structure	Group discussion, Lecture	Illustrate structure and function of cell and cell organelles	<u>Knowledge Based</u> -Define nucleoid. -What is the function of vacuole?	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	Lecture, Diagrams, Quiz,		<u>Understanding Based</u> -Summarize the function of ER. -Classify chromatin on the basis of staining.	
	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	Group discussion, Lecture, Quiz		<u>Higher Order Thinking Skills Based</u> -Analyse numerical changes in chromosomes. -Do you agree that DNA replication is semi-discontinuous? Explain.	
FEBRUARY	UNIT II Nucleus: Structure and function of Nucleus and Nucleolus	Nuclear pore, nucleoplasm, chromatin, nuclear lamina	Diagrams, Pictures, Lecture	Describe chromosome organization and chromosome alterations		

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	Chromosome organisation: Structure, Euchromatin and Heterochromatin	Chromonema, chromomere, kinetochore, chromatid, telomere	Diagrams, Pictures, Lecture			
	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	Diagrams, Lecture, Assignment			
MARCH	UNIT III DNA: Structure, Types (A, B, C and Z), Replication and DNA-protein interaction (Nucleosome Model)	Nucleoside, nucleotide, double helix, semi-conservative, histone core	PPT, Diagrams, Lecture	Correlate DNA structure, cell cycle and cell division		
	Genetic code, Satellite and Repetitive DNA	Triplet codon, properties of genetic code, repetitive DNA	Group discussion, Lecture, Quiz			
	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	Group discussion, Lecture, smear preparation			

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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 III Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
DECEMBER- JANUARY	UNIT I Flower: Structure, Types of anther and pistil	Polyandrous, Monoadelphous, syngenesious, superior, inferior, unilocular	Diagrams, Group discussion, Demonstration, Lecture, Quiz	Compare the structure and development of male and female gametophyte	<u>Knowledge Based</u> -List the types of anther. -What is sporopollenin? <u>Understanding Based</u> -Compare micro and mega-sporogenesis. <u>Higher Order Thinking Skills Based</u> -Justify the inability of a plant, producing functional male and female gametes, to set seeds. -Explain the types of embryo sac.	Knowledge--50 Understanding--35 Higher Order--15
	Male gametophyte: Structure of anther, Microsporogenesis, Role of tapetum, Pollen germination and growth of pollen tube.	Monothealous, dithealous, microspore, pollen tetrads	Diagrams, Permanent slide Lecture, quiz			
	Female gametophyte: Structure and types of ovule, Megasporeogenesis, Organisation of embryo sac	Orthotropous, anatropous, megaspore, polygonum type, synergids	Group discussion, Diagrams, Permanent slide, Lecture			
FEBRUARY	UNIT II Types of pollination, Pollen-pistil interaction	Self and cross pollination, herkogamy, heterostyly, ornithophilous, exine, stigma	Assignment, Diagrams, Lecture, Quiz	Illustrate reproduction in plants from pollination to embryogenesis		
	Self incompatibility, Double fertilization	GSI, SSI, recognition-rejection, syngamy, triple fusion	Diagrams, Lecture, group discussion			

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	Endosperm, Embryogenesis	Nuclear, cellular, helobial endosperm, proembryo	Diagrams, Lecture, quiz			
MARCH	UNIT III Methods of Vegetative propagation	Natural, artificial, cutting, layering, grafting	Assignment, group discussion	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	Demonstration, Lecture, quiz			
	Parthenocarpy, Types of fruits	Caryopsis, capsule, lomentum, berry, drupe, cremocarp	Diagrams, Lecture, specimens			

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2018-19

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 (%)
DECEMBER- JANUARY	UNIT I Genetic inheritance: Mendelism, Laws of segregation and independent assortment	Gene, dominant, recessive, allele, inheritance	Lecture, numerical, group discussion	Deduce how genes function and how characters are inherited from one generation to the next	<u>Knowledge Based</u> -Define linkage. -List the various physical mutagens.	Knowledge--40 Understanding--40 Higher Order--20
	Linkage and linkage mapping, Allelic and non-allelic interactions	Linked genes, test cross, back cross, genotype, phenotype	Lecture, numerical		<u>Understanding Based</u> -Illustrate dominant epistasis. -Explain transcription.	
	Gene expression: Transfer of genetic information-transcription, translation, Regulation of gene expression in prokaryotes and eukaryotes	Central dogma, initiation, elongation, termination, attenuation, anti-termination	Diagrams, Lecture, group discussion		<u>Higher Order Thinking Skills Based</u> -Appraise the role of <i>Agrobacterium</i> in genetic engineering. -Recommend a technique of obtaining virus	
FEBRUARY	UNIT II Genetic variations: Mutations-spontaneous and induced, DNA repair	Mutagen, transition, transversion, base analogues, mismatch repair	Lecture, diagrams, quiz	Analyze the biotechnological procedures for		
	Genetic engineering: Tools	rDNA, vector, marker	Lecture,			


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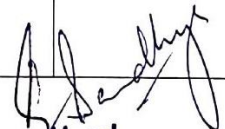


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	and techniques of recombinant DNA technology, Cloning vectors, Genomic and cDNA library, Polymerase Chain Reaction	gene, plasmid, phage cDNA,	diagrams, quiz, group discussion	modifying living organisms according to human purposes	free plants and haploid plants.
MARCH	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	Diagrams, Lecture, group discussion	Understand basic aspects of plant tissue culture	
	Biology of <i>Agrobacterium</i> , Vectors for gene delivery and vectorless gene transfer	Ti plasmid, Ri plasmid, T-DNA, opines, electroporation, particle gun delivery	Diagrams, Lecture, group discussion		
	Marker and reporter genes, Salient achievements in crop biotechnology	Selectable and scorable marker, meristem culture, haploid culture, herbicide resistant	Lecture, assignment		


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