

# FGM Government College, Adampur

## Lesson Plan of Year 2019-2020(Odd Semester)

### Department- BOTANY

Programme Name- B.Sc-III Year(5th sem.)		Course Name- Plant Physiology	
Teacher- HOSHIAR SINGH TAK/Asha			
Month	Week	Topic	Assignments/test
JULY	3rd	Plant-water Relations: Importance of water to plant life; physical properties of water; Imbibition	1st Assignment
	4th	Diffusion, Osmosis and Plasmolysis; absorption and transport of water	
AUGUST	1st	Transpiration-types, physiology of stomata, factors affecting transpiration, importance of transpiration	
	2nd	Mineral Nutrition: Essential macro and micro elements	
	3rd	Mineral uptake; deficiency symptoms	
	4th	Transport of Organic Substances: Mechanism of phloem transport	
SEPTEMBER	1st	Source-sink relationship; factors affecting translocation	Minor test 1st
	2nd	Photosynthesis: Significance; historical aspects	
	3rd	Photosynthetic pigments; action spectra and enhancement effects	
	4th	Concept of two photosystems; Z-scheme; photo-phosphorylation; Calvin cycle	
OCTOBER	1st	C4 pathway; CAM plants; photorespiration.	
	2nd	Respiration: ATP—the biological energy currency; aerobic	
	3rd	Anaerobic respiration; Krebs cycle	
	4th	Electron transport mechanism (chemi-osmotic theory); redox - potential	
NOVEMBER	1st	oxidative phosphorylation; pentose phosphate pathway	
	2nd	Seed dormancy; plant movements; the concept of photoperiodism	
	3rd	Physiology of flowering; florigen concept; physiology of senescence; fruit ripening	
	4th	<b>Revisions till exams</b>	
			Signature

<b>FGM Government College, Adampur</b>			
<b>Lesson Plan of Year 2019-2020(Odd Semester)</b>			
<b>Department- BOTANY</b>			
<b>Programme Name- B.Sc-III</b>		<b>Course Name- Ecology</b>	
<b>Teacher- HOSHIAR SINGH TAK/Asha</b>			
<b>Month</b>	<b>Week</b>	<b>Topic</b>	<b>Assignments/test</b>
JULY	3rd	Introduction to Ecology: Definition; scope and importance; levels of organization.	<b>1st Assignment</b>
	4th	Environment: Introduction; environmental factors- climatic (water, humidity, wind, light, temperature),	
AUGUST	1st	Environment: Introduction; environmental factors- climatic (water, humidity, wind, light, temperature),	
	2nd	edaphic (soil profile, physico-chemical properties), topographic and biotic factors (species interaction).	
	3rd	Adaptations of plants to water stress and salinity (morphological and anatomical features of hydrophytes, xerophytes and halophytes).	
	4th	Population Ecology: Basic concept; characteristics; biotic potential, growth curves; ecotypes and ecad	
SEPTEMBER	1st	Population Ecology: Basic concept; characteristics; biotic potential, growth curves; ecotypes and ecad	<b>Minor test 1st</b>
	2nd	Community Ecology: Concepts; characteristics (qualitative and quantitative-analytical and synthetic);	
	3rd	Community Ecology; characteristics ( quantitative-analytical and synthetic); methods of analysis; ecological succession.	
	4th	Ecosystem: Structure (components) and functions (trophic levels, food chains, food webs,	
OCTOBER	1st	Ecosystem: ecological pyramids and energy flow	
	2nd	Biogeochemical Cycles: carbon and nitrogen; hydrological (water) cycle	
	3rd	Phyto-geography: Phyto-geographical regions of India; vegetation types of India (forests).	
	4th	Phyto-geography: Phyto-geographical regions of India; vegetation types of India (forests).	
NOVEMBER	1st	Environmental Pollution: Sources, types and control of air and water pollution.	
	2nd	Global Change: Greenhouse effect and greenhouse gases; impacts of global warming; carbon trading	
	3rd	Global Change: Greenhouse effect and greenhouse gases; impacts of global warming; carbon trading	
	4th	<b>Revisions till exams</b>	
			<b>Signature</b>

FGM Government College, Adampur			
Lesson Plan of Year 2019-2020(Odd Semester)			
Department- BOTANY			
Programme Name- B.Sc-II		Course Name- Plant Diversity and Human Welfare	
Teacher- HOSHIAR SINGH TAK/ ASHA			
Month	Week	Topic	Assignments/test
JULY	3rd	Plant diversity and its scope- Genetic diversity, Species diversity	
	4th	Agrobiodiversity and cultivated plant taxa,	
AUGUST	1st	Biodiversity:Ethical and aesthetic values, Precautionary principle	
	2nd	Uses of microbes	
	3rd	Loss of genetic diversity, Loss of species diversity	
	4th	Loss of agrobiodiversity, Projected scenario for biodiversity loss	
SEPTEMBER	1st	Management of Plant Biodiversity	1st Assignment
	2nd	IUCN, UNEP, UNESCO, WWF, NBPGR	
	3rd	Biodiversity information management and communication	
	4th	Conservation of genetic diversity, species diversity and ecosystem diversity,	
OCTOBER	1st	Social approaches to conservation	Minor test 1st
	2nd	Biodiversity awareness programmes	
	3rd	Sustainable development	
	4th	Importance of forestry their utilization and commercial aspects	
NOVEMBER	1st	Ornamental plants of India	
	2nd	Alcoholic beverages through ages. Fruits and nuts	
	3rd	Important fruit crops their commercial importance	
	4th	Wood and itsuses.	
			Signature

FGM Government College, Adampur			
Lesson Plan of Year 2019-2020(Odd Semester)			
Department- BOTANY			
Programme Name- B.Sc-II		Course Name- Plant Embryology	
Teacher- HOSHIAR SINGH TAK/ ASHA			
Month	Week	Topic	Assignments/test
JULY	3rd	Structure of anther and pollen	
	4th	Structure and types of ovules	
AUGUST	1st	Types of embryo sacs	
	2nd	Organization and ultrastructure of mature embryo sac	
	3rd	Placentation-Types.	
	4th	Pollination mechanisms and adaptations	
SEPTEMBER	1st	Double fertilization	1st Assignment
	2nd	Seed-structure appendages	
	3rd	Dispersal mechanisms	
	4th	Endosperm types	
OCTOBER	1st	Structure and functions	Minor test 1st
	2nd	Dicot and monocot embryo	
	3rd	Embryo-endosperm relationship	
	4th	Apomixis	
NOVEMBER	1st	Apomixis Definition, types	
	2nd	polyembryony	
	3rd	Practical applications.	
	4th	Apomixis Practical applications	
			Signature

FGM Government College, Adampur			
Lesson Plan of Year 2019-2020(Odd Semester)			
Department- BOTANY			
Programme Name- B.Sc-II		Course Name- Plant Anatomy	
Teacher- HOSHIAR SINGH TAK			
Month	Week	Topic	Assignments/test
JULY	3rd	Root	
	4th	Shoot apical meristems	
AUGUST	1st	Simple tissues.	
	2nd	Complex tissues.	
	3rd	Theories of shoot apex	
	4th	Monocot root	
SEPTEMBER	1st	Dicot root	1st Assignment
	2nd	Monocot stem	
	3rd	Dicot stem	
	4th	Monocot leaf	
OCTOBER	1st	Dicot leaf	Minor test 1st
	2nd	Stomata and its types, epidermal hairs, Trichomes	
	3rd	Vascular cambium – structure and function, seasonal activity.Secondary growth in root and stem	
	4th	Wood (heartwood and sapwood).Anamolous secondary growth in Boehravia and Dracaena.	
NOVEMBER	1st	Epidermis, cuticle	
	2nd	Anatomical aspects of adaptations in xerophytes	
	3rd	Hydrophytes, halophytes	
	4th	Revisions till exams	
			Signature

FGM Government College, Adampur			
Lesson Plan of Year 2019-2020(Odd Semester)			
Department- BOTANY			
Programme Name- B.Sc-I		Course Name- Biodiversity of Archegoniate	
Teacher- HOSHIAR SINGH TAK			
Month	Week	Topic	Assignments/test
JULY	3rd	Unifying features of archegoniates, Transition to land habit	
	4th	Alternation of generations, General account of Paleobotany; Types of fossils and process of fossilization	
AUGUST	1st	Study of fossil plants: Rhynia and Lyginopteris	
	2nd	Bryophytes General characteristics, Range of habitat and thallus organization. Classification up to classes (Smith)	
	3rd	Morphology, anatomy and reproduction of Marchantia, Anthoceros	
	4th	Funaria. (Developmental details not to be included). Ecology and Economic importance of Bryophytes	
SEPTEMBER	1st	Pteridophytes General characteristics, Classification up to Classes (Smith)	1st Assignment
	2nd	Morphology, anatomy and reproduction of Selaginella, Equisetum and Pteris	
	3rd	Heterospory and seed habit. Economic importance of Pteridophytes (	
	4th	Gymnosperms General characteristics	
OCTOBER	1st	Classification up to Classes (Pilger and Melchior, 1954)	Minor test 1st
	2nd	Morphology, anatomy and reproduction	
	3rd	Cycas	
	4th	Pinus	
NOVEMBER	1st	Ecological and Economic importance of Gymnosperms.	
	2nd	Revisions till exams	
	3rd		
	4th		
			Signature

<b>FGM Government College, Adampur</b>			
<b>Lesson Plan of Year 2019-2020(Odd Semester)</b>			
<b>Department- BOTANY</b>			
<b>Programme Name- B.Sc-I</b>		<b>Course Name- Biodiversity of Microbes, Algae and fungi</b>	
<b>Teacher- HOSHIAR SINGH TAK</b>			
<b>Month</b>	<b>Week</b>	<b>Topic</b>	<b>Assignments/test</b>
JULY	3rd	Viruses – Discovery, general characteristics, replication	
	4th	DNA virus (T-phage); Lytic and lysogenic cycle	
AUGUST	1st	RNA virus (TMV), Economic Importance of Viruses	
	2nd	Bacteria – Discovery, General characteristics and cell structure; Reproduction – vegetative, asexual	
	3rd	Recombination (conjugation, transformation and transduction); Economic importance of bacteria.	
	4th	General characteristics; Range of thallus organization and reproduction	
SEPTEMBER	1st	Classification of algae upto classes (Lee, 1980); Morphology and life-cycles of the following: Nostoc	<b>1st Assignment</b>
	2nd	Volvox, Oedogonium, Ectocarpus	
	3rd	Polysiphonia; Economic importance of algae.	
	4th	Introduction- General characteristics, economic importance	
OCTOBER	1st	classification upto Classes (Ainsworth, 1966)	<b>Minor test 1st</b>
	2nd	Morphology and life cycles of Rhizopus, Penicillium	
	3rd	Puccinia, Agaricus	
	4th	Colletotrichum. Causal organism, symptoms and control of following plant diseases	
NOVEMBER	1st	Rust of wheat, white rust of crucifers	
	2nd	late blight of potato, and red rot of sugarcane.	
	3rd	Lichens: General account and significance.	
	4th	<b>Revisions till exams</b>	
			<b>Signature</b>

FGM Government College, Adampur			
Lesson Plan of Year 2019-2020(Even Semester)			
Department- BOTANY			
Programme Name- B.Sc-I		Course Name- Plant Taxonomy	
Teacher- HOSHIAR SINGH TAK/ ASHA			
Month	Week	Topic	Assignments/test
JANUARY	1st	Plant Taxonomy Identification, Classification, Nomenclature.Ranks, categories and taxonomic groups	
	2nd	Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations	
	3rd	Types of classification- artificial, natural and phylogenetic. Bentham and Hooker system of classification (upto series), Angiosperm Phylogeny Group (APG)- general introduction	
	4th	Herbarium: general introduction and importance	
Feburary	1st	Botanical gardens of the world (Royal Botanic Garden, Kew)and India (AcharyaJagdish Chandra Bose Indian Botanical Garden, Kolkata)	1st Assignment
	2nd	Introduction to Botanical Survey of India (BSI Dehradun); Documentation	
	3rd	Floras,monograph and journals, Keys: single access and multi-access	
	4th	Taxonomic evidences from cytology, phytochemistry and molecular	
March	1st	DataBiometrics: Characters; variations; OTUs, character weighting and coding	Minor test 1st
	2nd	differences)	
	3rd	Ranunculace, Brassicaceae	
	4th	Leguminosae, Asteraceae	
April	1st	Solanaceae	
	2nd	Lamiaceae	
	3rd	Liliaceae	
	4th	Poaceae	
May	1st	Revisions till exams	
Signature			



<b>FGM Government College, Adampur</b>			
<b>Lesson Plan of Year 2019-2020(Even Semester)</b>			
<b>Department- BOTANY</b>			
<b>Programme Name- B.Sc-I</b>		<b>Course Name- Plant Ecology</b>	
<b>Teacher- HOSHIAR SINGH TAK/ ASHA</b>			
<b>Month</b>	<b>Week</b>	<b>Topic</b>	<b>Assignments/test</b>
JANUARY	1st	Introduction to Ecology: Basic concepts	
	2nd	Types and Scope of Ecology. Soil: Origin, formation	
	3rd	Composition, soil profile. Water: States of water in the environment, precipitation types.	
	4th	Effect of light and temperature on plants.	
Feburary	1st	Morphological and anatomical adaptation of hydrophytes and xerophytes.	<b>1st Assignment</b>
	2nd	Ecosystem Structure; energy flow trophic levels; Food chains	<b>2nd Assignment</b>
	3rd	Food webs, Ecological pyramids	
	4th	Biogeochemical cycles; Hydrological, Carbon, Nitrogen and Phosphorous	
March	1st	Plant Communities and Phytogeography Qualitative and quantitative characters	<b>Minor test 1st</b>
	2nd	Ecotone and edge effect; Succession	<b>Minor test 2nd</b>
	3rd	Process and types (Hydrosere and Xerosere).	
	4th	Phytogeographical regions of India, Endemism.	
April	1st	Pollution and Environmental Laws Definition, Types, Sources, Control	
	2nd	Air, Water	
	3rd	Soil Pollution	
	4th	A basic knowledge of Environment Protection Act, 1986.	
May	1st	<b>Revisions till exams</b>	
			<b>Signature</b>

<b>FGM Government College, Adampur</b>			
<b>Lesson Plan of Year 2019-2020(Even Semester)</b>			
<b>Department- BOTANY</b>			
<b>Programme Name- B.Sc-III</b>		<b>Course Name- Biochemistry and Plant Biotechnology</b>	
<b>Teacher- HOSHIAR SINGH TAK</b>			
<b>Month</b>	<b>Week</b>	<b>Topic</b>	<b>Assignments/test</b>
JANUARY	1st	Basics of Enzymology: Discovery and nomenclature; characteristics of enzymes	
	2nd	Concept of holoenzyme, apoenzyme, coenzyme and co-factors	
	3rd	Regulation of enzyme activity; mechanism of action.	
	4th	Growth and development: Definitions; phases of growth and development	
Feburary	1st	Plant hormones- auxins, gibberellins, cytokinins	<b>1st Assignment</b>
	2nd	Abscissic acid and ethylene, history of their discovery, mechanism of action	<b>2nd Assignment</b>
	3rd	Photo-morphogenesis; phytochromes and their discovery	
	4th	Physiological role and mechanism of action	
March	1st	Lipid metabolism: Structure and functions of lipids	<b>Minor test 1st</b>
	2nd	Fatty acid biosynthesis; B-oxidation; saturated	<b>Minor test 2nd</b>
	3rd	Unsaturated fatty acids; storage and mobilization of fatty acids	
	4th	Nitrogen metabolism: Biology of nitrogen fixation; importance of nitrate reductase	
April	1st	Regulation; ammonium assimilation.	
	2nd	Genetic engineering and Biotechnology: Tools and techniques of recombinant DNA technology; cloning vectors; genomic	
	3rd	cDNA library; transposable elements; aspects of plant tissue culture; cellular totipotency	
	4th	Differentiation and morphogenesis; biology of Agro-bacterium; vectors for gene delivery and marker genes.	
May	1st	<b>Revisions till exams</b>	
			<b>Signature</b>

FGM Government College, Adampur			
Lesson Plan of Year 2019-2020(Even Semester)			
Department- BOTANY			
Programme Name- B.Sc-III		Course Name- Economic Botany	
Teacher- Dr. ASHA / HOSHIAR SINGH TAK			
Month	Week	Topic	Assignments/test
JANUARY	1st	Origin, distribution, botanical description, brief idea of cultivation and uses of the following;Food plants- Cereals (Rice,)	
	2nd	Food plants- Cereals ( Wheat and Maize)	
	3rd	Pulses- (Gram, Arhar and Pea).	
	4th	Vegetables- (Potato, Tomato and Onion).	
Feburary	1st	Fibers- Cotton, Jute and Flax	1st Assignment
	2nd	Fibers- Cotton, Jute and Flax	
	3rd	Oils- Groundnut, Mustard and Coconut	
	4th	Oils- Groundnut, Mustard and Coconut	
March	1st	Morphology of plant part used, brief idea of cultivation and uses of the following;Spices- Coriander, Ferula,	
	2nd	Morphology of plant part used, brief idea of cultivation and uses of the following;Spices- Ginger, Turmeric, Cloves.	
	3rd	Medicinal Plants- Cinchona, Rauwolfia, Atropa,	Unit test
	4th	Medicinal Plants- , Opium, Cannabis, Neem.	
April	1st	Botanical description and processing of: Beverages- Tea and Coffee.	
	2nd	Rubber- Hevea	
	3rd	Sugar- Sugarcane.	
	4th	General account and sources of timber; energy plantations and bio-fuels.	
May	1st	Revisions till exams	
Signature			

<b>FGM Government College, Adampur</b>			
<b>Lesson Plan of Year 2019-2020(Even Semester)</b>			
<b>Department- BOTANY</b>			
<b>Programme Name- B.Sc-II</b>		<b>Course Name-Plant Physiology</b>	
<b>Teacher- HOSHIAR SINGH TAK/ ASHA</b>			
<b>Month</b>	<b>Week</b>	<b>Topic</b>	<b>Assignments/test</b>
JANUARY	1st	Importance of water	
	2nd	Osmosis, Imbibition	
	3rd	Plasmolysis , Water potential and its components	
	4th	Transpiration and its significance; Factors affecting transpiration; Root pressure and guttation	
Febuary	1st	Essential elements, macro and micronutrients	<b>1st Assignment</b>
	2nd	Criteria of essentiality of elements	<b>2nd Assignment</b>
	3rd	Role of essential elements; Transport of ions across cell membrane	
	4th	Active and passive transport, carriers, channels and pumps	
March	1st	Composition of phloem sap	<b>Minor test 1st</b>
	2nd	Girdling experiment	<b>Minor test 2nd</b>
	3rd	Pressure flow model	
	4th	Phloem loading and unloading, Factors affecting translocation	
April	1st	Discovery and physiological roles of auxins	
	2nd	Gibberellins, cytokinins	
	3rd	ABA and ethylene.Photoperiodism (SDP, LDP, Day Neutral Plants	
	4th	Phytochrome (Discovery & Structure); Vernalization.	
May	1st	<b>Revisions till exams</b>	
			<b>Signature</b>

FGM Government College, Adampur			
Lesson Plan of Year 2019-2020(Even Semester)			
Department- BOTANY			
Programme Name- B.Sc-II		Course Name-Plant Metabolism	
Teacher- HOSHIAR SINGH TAK			
Month	Week	Topic	Assignments/test
JANUARY	1st	Photosynthetic Pigments (Chl a, b, xanthophylls, carotene)	
	2nd	Photosystem I and II, reaction center, antenna molecules	
	3rd	Electron transport and mechanism of ATP synthesis; C3, C4 and CAM pathways of carbon fixation	
	4th	Cranzanatomy, Factors affecting rate of photosynthesis, Photorespiration	
Feburary	1st	Glycolysis, Anaerobic respiration	1st Assignment
	2nd	TCA cycle	2nd Assignment
	3rd	Electron Transport Chain Oxidative phosphorylation	
	4th	Glyoxylate Cycle, Oxidative Pentose Phosphate Pathway	
March	1st	Structure and properties	Minor test 1st
	2nd	Enzyme vs Chemical catalyst	Minor test 2nd
	3rd	Enzyme vs Chemical catalyst	
	4th	Mechanism of enzyme action and enzyme inhibition	
April	1st	Biological nitrogen fixation	
	2nd	Biological nitrogen fixation	
	3rd	Structure and functions of Fatty acids lipids	
	4th	Fatty acids biosynthesis and degradation	
May	1st	Revisions till exams	
Signature			