

Govt. College, Ropar
Syllabus Plan
Class: - BSc. (Medical) Botany
Session: - 2019-2020 (Semester-5)

Month	Paper 9 <u>PLANT PHYSIOLOGY</u>	Paper 10 <u>PLANT GROWTH, DEVELOPMENT AND BIOTECHNOLOGY</u>	<u>PRACTICALS</u>
<u>JULY</u>			
3 rd week	1.(a) Plant-water relations: Importance of water to plant life; diffusion and osmosis;absorption, transport of water and transpiration;	1.(a)Growth, phases of growth, growth kinetics; plant hormones: discovery, bioassay, physiological effects and application of auxins, gibberellins.	1. To study the permeability of plasma membrane using different concentrations of organic solvents.
4 th week	1.(b) Mechanism of stomatal opening and closing. #TEST	1.(b)Physiological effects and application of cytokinins, abscisic acid and ethylene.	2. To study the effect of temperature on permeability of plasma membrane. 3. To study the enzyme activity of catalase and peroxidase. 4. To demonstrate of the rate of respiration of various plants.
<u>AUGUST</u>			
1 st week	2. Mineral nutrition: Essential macro- and micro- elements and their role; mineral uptake; deficiency and toxicity symptoms.	2.Photomorphogenesis, discovery, structure, physiological role and mechanism of action of phytochrome and cryptochrome. #TEST	1.Separation of chloroplast pigments by solvent method. 2. Demonstration of the osmotic potential of vacuolar sap by plasmolytic method.
2 nd week	3. (a)Transport of organic substances: Mechanism of phloem transport;	3. Photoperiodism, vernalization, biological clocks, physiology of senescence and abscission.	3. Demonstration of the water potential of any tuber. 4. Separation of amino acids in the mixture by paper chromatography and their identification by comparison with standard.
3 rd week	3.(b) source-sink relationship; factors affecting translocation. #TEST	4. Physiology of seed dormancy and seed germination; plant movements.	5. Demonstration of the technique of micropropagation by using different explants e.g.auxiliary buds, shoot meristems.
4 th week	4. Basics of enzymology: Discovery	5. (a)Tools and techniques of recombinant DNA technology with special	

	and nomenclature; characteristics of enzymes; concepts of holoenzyme, apoenzyme, coenzyme and cofactors; regulation of enzyme activity; mechanism of action	reference to restriction enzymes	
SEPTEMBER			
1 st week	5.(a) Photosynthesis: Significance; historical aspects; photosynthetic pigments; action spectra and enhancement effect; concept of two photosystems;	5. (b) Techniques of recombinant DNA technology W.R.T. gel electrophoresis, Southern blotting, cloning vectors and PCR.	<ol style="list-style-type: none"> 1. Demonstration of the techniques of anther culture. 2. Isolation of protoplasts from different tissues using commercially available enzymes (Demonstration only). 3. Demonstration of root and shoot formation from the apical and basal portion of stem segments in liquid medium containing different hormones 4. Preparation of synthetic seeds in potato and sugarcane.
2 nd week	5.(b)Photosynthesis: Z-scheme; photophosphorylation; Calvin cycle; C ₄ pathway; CAM plants; photorespiration.	5.(c) Genomic and cDNA library. 6. Techniques of gene mapping and chromosome walking; methods of gene transfer in plants.	
3 rd week	MST	MST	
4 th week	6.(a)Respiration: ATP- the biological energy currency	7.(a) Basic concept of plant tissue, culture, totipotency, micropropagation	
OCTOBER			
1 st week	6(b). Respiration; aerobic and anaerobic respiration; Krebs's cycle; electron transport mechanism (chemi-osmotic theory) redox potential; oxidative phosphorylation; pentose phosphate pathway.	7.(b) Basic concept and mechanism of ,antherculture,embryo culture, synthetic seeds and somatic hybridization. #TEST	<ol style="list-style-type: none"> 1. Separation of proteins of a given sample through Gel Electrophoresis. 2. Demonstration of necessity of light, CO₂, and Chlorophyll for photosynthesis. 3. Demonstration of rate of transpiration by Ganong's apparatus. 4. Comparison of loss of water from two surfaces of leaf by 4 leaf method. 5. Demonstration of path of Ascent of sap by eocin ringing experiment
2 nd week		8.(a) Biotechnology and its application in human welfare with particular reference to industry	
3 rd week	#TEST 7. Nitrogen metabolism: Biology of nitrogen fixation; importance of	8.(b) Biotechnology and its application in	

4 th week	nitrate reductase and its regulation; ammonium assimilation.	human welfare with particular reference to plant breeding, agriculture and molecular farming. #REVISION	
<u>NOVEMBER</u> 1 st week 2 nd week	8. Lipid metabolism: Structure and function of lipids; fatty acid biosynthesis; beta-oxidation; saturated and unsaturated fatty acids. #TEST-REVISION	#TEST	<ol style="list-style-type: none"> 1. Demonstration of phototropism and geotropism. 2. Demonstration of the presence of reducing sugars, fats and proteins in plant tissue by micro-chemical tests. 3. To determine the seed viability through Triphenyl Tetrazolium chloride and actual germination tests.

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Class: - BSc. (Medical) Botany
Session: - 2019-2020 (Semester-6)

Month	Paper 11 <u>PLANT ECOLOGY</u>	Paper 12 <u>PLANT UTILIZATION</u>	<u>PRACTICALS</u>
January 4 th week	<ul style="list-style-type: none"> • Concept of ecology and its scope. Environmental factors: climatic, edapic, topographic • and biotic, Shelfords law oftolerance. 	<ul style="list-style-type: none"> • The importance and nature of plant products- fibres: surface fibres (cotton), soft fibres(Jute), hard fibres (Coir). Forest products: Wood, properties, seasoning and importance, important timber plants of India. 	<ul style="list-style-type: none"> • To determine minimum number of quadrats requiredfor study of a grassland. • To study the frequency of herbaceous species in grassland and to compare the frequency distribution with Raunkiaer's Standard Frequency Diagram.
<u>February</u> 1 st week 2 nd week	<ul style="list-style-type: none"> • Population ecology: Characteristics, positive and negative interaction, growth forms, • Carrying capacity, ecotypes and ecads. • Community ecology: Community characteristics, frequency, density and 	<ul style="list-style-type: none"> • Brief history of origin of food plants;cultivation practice and recommended varieties of wheat, rice, maize and sugarcane with particular reference to Punjab. <p style="text-align: center;">#TEST</p>	<ul style="list-style-type: none"> • To estimate ImportanceValue Index (IVI) for grassland species on the basis of • relative frequency, relative density and relative biomassin protected and grazed grassland. • To measure the above ground plant biomass in agrassland. • To determine Kemp'sconstant for dicot and monocot leaves and to estimate the • leaf area index of a grasslandcommunity.

3 rd week	<ul style="list-style-type: none"> cover, life forms. ecological succession (Hydrosere, Xerosere). Gause principle of competitive exclusion. Structure and concept of ecosystem, ecological pyramids, food chain, food web, ecological energetics, ecological productivity. #TEST 	<ul style="list-style-type: none"> Cultivation practices and use of soyabean, sunflower, mustard, groundnut and coconut. Vegetables and Fruits: Botanical name, family, season and area of cultivation of Potato, tomato, brinjal, carrot, ladyfinger, pea, mango, apple, banana, guava, kinnow and grapes. 	<ul style="list-style-type: none"> To determine diversity indices (Richness, Simpson, Shannon Wiener) in grazed and protected grassland. To estimate bulk density and porosity of grassland and woodland soil. To determine moisture content and water holding capacity of grassland and woodland soil. To study the vegetation structure through profile diagram.
3 rd week 4 th week		<ul style="list-style-type: none"> Active ingredients of tea and coffee. Cannabis, tobacco and opium. 	<ul style="list-style-type: none"> Food Plants: Study of the morphology, structure and simple micro chemical tests of the food storing tissues in rice, wheat, maize, potato and sugarcane. Microscopic examination of starch in these plants (excepting sugarcane). Beverages: Section of boiled coffee beans and tea leaves to study the characteristic structural features. Preparation of an illustrated inventory of 10 medicinal plants and use their in indigenous systems of medicine of allopathy: Write their botanical and common names, parts used and diseases/disorders for which they are prescribed.

<p>April</p> <p>1st week</p> <p>2nd week</p>	<ul style="list-style-type: none"> • Biodiversity: Introduction and Importance of Biodiversity; Elements of Biodiversity; • Genetic, species and ecological diversity. Conservation strategies, concept of hot spots, • Biomes, phytogeographic regions of India, vegetation types (Forests, Grasslands, Deserts and Wetlands). 	<ul style="list-style-type: none"> • Rubber: Major sources, cultivation, processing and uses of Para rubber. • #TEST 	<ul style="list-style-type: none"> • Fibres: Study of cottonflower, sectioning of the cotton ovules/developing seeds to • trace the origin and development of cotton fibres. Microscopic study of cotton and test for cellulose. • Sectioning and staining of jute stem showing the location and • development of fibres. Microscopic structure. Tests for ligno-cellulose • Vegetable Oils: study of hand sections of groundnut, mustard and coconut and staining of oil droplets with Sudan III and Sudan Black. • Spices: Examine Blackpepper, cloves, cinnamon (hand sections) and open fruits of cardamom and describe them briefly.
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