

SCHEME OF EXAMINATION

Semester	Course Code	Course Title	Class hours /Week	Exam Hrs	Maximum marks			Credits
					Internal	External	Total	
I	19PBY101	Core - 1 Phycology, Mycology, Lichenology and Bryology	5	3	25	75	100	4
	19PBY102	Core - 2 Pteridophytes, Gymnosperms and Palaeobotany	5	3	25	75	100	4
	19PBY103	Core - 3 Microbiology and plant pathology	5	3	25	75	100	4
	19PBY104	Core - 4 Core Practical-I (for core papers 1, 2, 3)	9	4	40	60	100	4
	19PBY1E1/ 19PBY1E2	Elective -1 Ecology and Phytogeography/ Elective -2 Economic Botany	5	3	25	75	100	5
II	19PBY205	Core - 5 Anatomy and Embryology	5	3	25	75	100	4
	19PBY206	Core - 6 Plant physiology	5	3	25	75	100	4
	19PBY207	Core - 7 Cytology, Genetics and Plant Breeding	5	3	25	75	100	4
	19PBY208	Core - 8 Core Practical- II (for core papers 5,6,7)	9	4	40	60	100	4
	19PBY2E3/ 19PBY2E4	Elective-3 Horticulture/ Elective-4 IPR and Bioethics	4	3	25	75	100	5
	19PBY2N1	Non- Major Elective Mushroom Cultivation & Medicinal Plant Trading	1	3	-	100	100	2
III	19PBY309	Core - 9 Plant Systematics	5	3	25	75	100	4
	19PBY310	Core -10 Plant Biochemistry and Biophysics	5	3	25	75	100	4
	19PBY311	Core -11 Research Methodology	4	3	25	75	100	4
	19PBY3E5/ 19PBY3E6	Elective -5 Forestry/ Elective -6 Herbal Technology	4	3	25	75	100	5
	19PBY312	Core - 12 Core Practical - III (for core paper 9)	6	4	40	60	100	4
	19PBY313	Core - 13 Core Practical –IV (for core papers 10 and 11)	6	4	40	60	100	4
IV	19PBY414	Core - 14 Molecular Biology and Plant Biotechnology	5	3	25	75	100	5
	19PBY415	Core - 15 Bioinformatics and Cyber Security	5	3	25	75	100	4
	19PBY416	Core - 16 Core Practical -V (for core papers 14 and 15)	6	4	40	60	100	4
	19PBY4P1	Core - 17 Project Work and Viva -Voce	14	-	40	160	200	8
Total							2200	90

Programme code	M.Sc.	Programme Title : Master of Science in Botany		
Course Code: 19PBY103	5	Title : Core - 3 Microbiology and Plant Pathology	Batch	2019-2021
			Semester	I
Hrs/Week:			Credits	4

Course Objective

To introduce the microbial techniques and its role in the plant and human welfare

Course Outcomes (CO)

K1	CO1	Students will recollect the basics of microbiology
K2	CO2	One can understand the interaction of microorganism with the environment and food
K3	CO3	Apply the microbial culture in the manufacturing of value added products
K4	CO4	Analyze the plant diseases commonly occurring in crops

Unit	Content	Hrs
Unit I	Microbiology: History, scope and branches of microbiology - a general account, classification, growth and reproduction of bacteria (Bergys manual of classification), virus and protozoa.	13
Unit II	Microbiological Media: Media types - preparation- methods of sterilization- enumeration of microorganisms in soil, water and air - isolation of microorganisms from infected plant tissue - techniques of pure culture- maintenance and preservation of microbes- staining techniques - <i>*bacterial growth curve - nutritional types of microorganisms.</i>	13
Unit III	Food Microbiology: Single cell protein- fermented foods (pickles, silage, sausages and bread) - microbial spoilage of foods - food borne infections & intoxication - preservation of foods - preservation of milk and milk products - <i>* Food adulteration- identification of adulteration in foods.</i>	13
Unit IV	Industrial Microbiology: Fermenters - batch fermentation - continuous fermentation - industrial production of enzymes (cellulase, amylase and protease), amino acids (glutamic acid and L-Lysine), organic acids (lactic and citric acid) and biofuels (ethanol) - methods of cell and enzyme immobilization - applications of immobilized cells and enzymes - medicinal plants as antimicrobial agents.	13
Unit V	Pathology: Introduction to plant pathology – disease – concept, component and causes – classification of disease, brief account on general symptoms of plant disease – modes of infection and dissemination – defense mechanisms in plants- plant diseases: symptoms, causative organisms and control measures of following diseases: Blast disease of Paddy - Red rot of Sugar cane - Late blight of Potato - Bunchy top of Banana - TMV.	13

**Self study topics*

Power point presentations, Seminar and Assignment

Text Books:

1. Bilgrami, K.S. & H.C. Dube, 2010 A text book of Modern Plant Pathology – Vikas Publishing House (P) Ltd., New Delhi
2. Dubey RC, Maheswari D.K., 2014. A text book of Microbiology, S.Chand & company, New Delhi.
3. Joanne Willey, Linda Sherwood and Chris Woolverton, 2013. Prescott's Microbiology, 9th edition, McGraw-Hill Companies.
4. Mani, A. Selvaraj A.M., Narayanan, L.M and Arumugam, 2015. N Microbiology, Saras Publication- Tamilnadu.

Reference Books:

1. Prescott, Harley and Klein' S. 2008. Microbiology 7th edition, McGraw hill International Edition, New York.
2. Power, C.B. and H.F. Dagainawala. 1982, General Microbiology.
3. Michael, J. Pelczar, Jr. E.C.S. chan and N.R. Krief. 1995. Microbiology. Tata McGraw-Hill (Ed), New Delhi.
4. Alexopoulos, C.J. and Mims, C.W. 1979. Introductory Mycology. Wiley Eastern Ltd, New Delhi.
5. Steindraus, K.H. (ed.) 1983. Hand Book of Indigenous Fermented Food, Parcel Dekker Inc., New York.
6. Sharma, P.D. 2006. Plant Pathology. Narso Publishing House, New Delhi.
7. Das Gupta M.K. 1958. Principles of Plant Pathology
8. Webster, J. 1970. Introduction to Fungi. Cambridge University Press, UK.
9. Smith, K.M. 1974. Viruses, Cambridge University Press.

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	M	S	M
CO2	M	S	M	H	H
CO3	M	M	S	H	S
CO4	M	M	L	S	M

S-Strong; H-High; M-Medium; L-Low

Programme code	M.Sc.	Programme Title : Master of Science in Botany		
Course Code: 19PBY206		Title: Core - 6 Plant Physiology	Batch	2019 - 21
			Semester	II
Hrs/Week:	6		Credits	4

Course Objective

To understand the metabolic components involved in the functioning of plants.

Course Outcomes (CO)

K1	CO1	Remember the basic metabolism in plants
K2	CO2	Deduce the biological pathways
K3	CO3	Execute the molecular based modification of metabolism in plants
K4	CO4	Interpret the physiological processes and apply in agriculture.

Unit	Content	Hrs
Unit I	Plant- water relations: diffusion and osmosis - water potential and chemical potential - absorption of water - water transport through xylem - transpiration and its significance - factors affecting transpiration - physiology of stomatal movement - transport of photosynthate - source-sink relationship - the mechanism of translocation in the phloem, assimilate partitioning.	16
Unit II	Signal transduction: overview - receptors and G-proteins - jasmonic acid signaling - Cadmium and cellular signaling cascades. Mineral nutrition: Criteria of essentiality of elements; macro and micro- nutrients; <i>*role of essential elements; mineral deficiency symptoms and plant disorders</i> - nutrient uptake and transport mechanism - role of cell membrane, ion pump carrier.	16
Unit III	Photosynthesis: Historical background and significance - photosynthetic pigments - accessory pigments and photoprotective carotenoids - reaction center complexes - photochemical reactions - electron transport pathways in chloroplast membrane - photo phosphorylations - C3 and C4 cycle - Crassulacean Acid Metabolism- photorespiration.	15
Unit IV	Respiration: Glycolysis - TCA cycle and its regulation - aerobic and anaerobic respiration - electron transport in mitochondria - redox potential - oxidative phosphorylations - pentose phosphate pathway. Nitrogen metabolism: Importance of Nitrogen to plants - Nitrogen cycle - biological nitrogen fixation - nif gene - nitrate assimilation GDH and GS/GOGAT pathway - Biosynthesis of Nitrogen, Carbohydrate and amino acids.	15
Unit V	Growth and development: Kinetics of growth - seed dormancy - seed germination and influencing factors of their regulation - the concept of photoperiodism - physiology of flowering - florigen concept - vernalization - biological clocks - physiology of senescence - fruit ripening. Plant hormones - auxins, gibberellins, cytokinins, abscisic acid ethylene, history of their discovery - biosynthesis - role and mechanism of action. Photomorphogenesis: phytochromes and cytochromes, their discovery - physiological role and mechanism of action - <i>*Stress physiology: Plant responses to biotic and abiotic stress, mechanism of biotic and abiotic stress tolerance.</i>	16

**Self study topics*

Power point Presentations, Group discussions, Seminar, Quiz and Assignment.

Text Books

1. Jain, V.K. 2000. Fundamentals of Plant Physiology (5th ed.), S. Chand & Co Ltd; New Delhi.
2. Pandey, S.N. and Sinha, B.K. 2010. Plant Physiology, Vikas Publishing, New Delhi.
3. Steward, F.C. 2012 Plant Physiology Academic Press, US

Reference Books

1. Devlin, R.M. and Baker, N.R. 1973. Photosynthesis, Reinhold Affiliated East-West Press Pvt. Ltd, New Delhi.
2. Moore, T.C. 1979. Biochemistry and physiology of plant hormones. Narosa book Distributors, New Delhi.
3. Roberts, E.A. 1987. Plant growth regulators. Kluwer Academic publishers, London.

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	L	H	S
CO2	H	S	M	S	H
CO3	S	H	M	S	H
CO4	H	S	M	S	H

S-Strong; H-High; M-Medium; L-Low