

UNIVERSITY OF MADRAS
M.Sc. DEGREE PROGRAMME IN BOTANY
SYLLABUS WITH EFFECT FROM 2023-2024

Title of the Course	PLANT PATHOLOGY						
Paper Number	ELECTIVE-I						
Category	ELECTIVE	Year	I	Credits	3	Course Code	423E1A
		Semester	I				
Instructional Hours per week	Lecture	Tutorial		Lab Practice	Total		
	3	2		-	5		
Pre-requisite	The goal of the course is to provide students with basic understanding of plant pathology and the etiology of specific plant diseases.						
Learning Objectives:							
C1	To illustrate the theoretical under pinnings of the tools, inventions, and methodologies often used in plant pathology.						
C2	To develop practical expertise in pathological equipment and procedures.						
C3	To educate people about the types of diseases that affect crop plants.						
C4	To list the types of plant pathogens.						
C5	To recognize and identify diseases with the using systems and learn ways to adopt control measures.						
UNIT	CONTENTS						
I	UNIT I PRINCIPLES OF PLANT PATHOLOGY History of plant pathology, Classification of plant diseases, Symptomology (important symptoms of plant pathogens). Principles of plant infection – Inoculum, inoculum potential, Pathogenicity. Disease triangle. Epidemiology and forecasting of plant diseases - Host parasite interrelationship and interaction.						
II	UNIT II DISEASE DEVELOPMENT Pathogenesis or Disease development: Disease development of pathogen (colonization) and dissemination of pathogens. Environment and nutrition in relation to disease development – Defence mechanism. Role of enzymes and toxins in disease development.						
III	UNIT III DISEASES AND DISEASE CYCLE Diseases and disease cycle - Important diseases of crop plants in India (Sheath blight of rice, Black arm of cotton, Late blight of potato, Tomato Yellow Leaf Curl Virus (TYLCV), Mycoplasma (Little leaf of brinjal). Root knot of Brinjal, Red rust of tea.						

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IV	UNIT IV GENETICS OF PLANT DISEASE	
	Disease Resistance – Genetics of virulence and resistance, Gene-for-gene concept, Techniques adopted in plant breeding for disease resistance. Genetics of host-parasite interaction – mutation, parasexual recombination.	
V	UNIT V PLANT DISEASE CONTROL	
	Principles of disease management – Cultural practices, physical, chemical and biological methods. Plant quarantine and legislation. Integrated Pest Management system. Plant protection organization in India. Diagnostic technique to detect pest/pathogen infection - Immunofluorescence (IF).	
Course outcomes: CO	On completion of this course the student will be able to	Programme outcomes
CO1	Remember to identify microbes, fungi and demonstrate the principles and application of plant pathology in the control of plant disease.	K1
CO2	Interpret the stages in disease development and various defense mechanisms in plants and suggest suitable combat measures.	K2
CO3	Identify the common plant diseases according to geographical locations and devise control measures.	K3
CO4	Recognize the inbuilt mechanism of defense in plants and role of environment in disease development.	K4
CO5	Evaluate the detection of pathogens and appreciate their adaptive strategies.	K5
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)	
Skills acquired from this Course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill	
Recommended Text:		
<ol style="list-style-type: none"> 1. Agrios, G.N. 1998. Plant pathology. IV Edition, Academic Press. 2. Bilgrami, K.S and H.C. Dube. 2010 A text book of Modern Plant Pathology – Vikas Publishing House (P) Ltd., New Delhi 3. Vidhyasekaran, P. 2008. Fungal Pathogenesis in Plants and Crops: Molecular biology and host defense mechanisms. CRC Press. 4. Rangasamy, G. 2006. Disease of crop plants in India (4th edition). Tata Mc Graw Hill New Delhi. 5. Mishra, A., A. Bohra and A. Mishra. 2011. Plant Pathology-Disease and Management. Agro Bios, Jodhpur. 6. Mehrotra, R.S and Aggarwal, A. 2017. Plant Pathology. McGraw Hill Publisher Co. Ltd., New Delhi. 		

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7. Singh, R.S. 2018. Introduction to Principles of Plant Pathology, 4th ed. Scientific International, Bengaluru, India.
8. Dubey, H.C. 2018. Modern Plant Pathology, AGROBIOS, India.
9. Bilgrami, K.S and H.C. Dube. 2010. A text book of Modern Plant Pathology – Vikas Publishing House (P) Ltd., New Delhi.
10. Luke, S.P. Moore, James, C. Hatcher. 2019. Infectious Diseases, Microbiology and Virology A Q&A Approach for Specialist Medical Trainees. Cambridge University Press.
11. Dubey, R.C., and Maheswari, D.K. 2014. A text book of Microbiology, S.Chand & company, New Delhi.

Reference Books:

1. Pathak, Khatri and Pathak. 1996. Fundamentals of Plant Pathology. AgroBios, Jodhpur.
2. Singh, R.S. 2018. Introduction to Principles of Plant Pathology, 4th ed. Scientific International, Bengaluru, India.
3. Harlow, E and Lane, D. 1988. Antibodies – A Laboratory Manual; Cold Spring Harbor Laboratory, USA.
4. Agrios G.N. 2006. Plant Pathology. Elsevier Publication, Academic Press.
5. Richard, N.S. 2014. Introduction to Plant Pathology, Wiley Publication Press.
6. Burns R. (editor). 2009. Plant Pathology- Techniques and Protocols. Humana Press, LLC.
7. Dickinson, M. 2003. Signal transduction; Molecular diagnostics; Transgenic approaches for crop protection -Molecular Plant Pathology, Bios Scientific Publishers, London.
8. Husain, A., B.P Singh, K. Singh and V.P. Agnihotri. 1989. Recent Advances in Plant Pathology. CBS Publishers and Distributors, New Delhi.
9. [Gullino, M.L., Bonants, P.J.M.](#) 2014. Detection and diagnosis of plant diseases. Dordrecht, The Netherlands: Springer (Plant pathology in the 21st Century volume 5) - ISBN 9789401790192 – 200.

Web resources:

1. <https://www.wileyindia.com/a-textbook-of-plant-pathology.html>
2. <https://www.britannica.com/science/plant-disease>.
3. <https://www.planetatural.com/pest-problem-solver/plant-disease/>
4. <https://www.elsevier.com/books/plant-pathology/agrios/978-0-08-047378-9>
5. <https://www.cabi.org/bookshop/book/9781789243178/>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	2	3	2
CO2	3	3	2	2	3	3	2	1	2	1
CO3	3	3	3	3	3	3	1	3	1	3
CO4	3	3	2	2	3	3	2	1	2	1
CO5	3	3	3	3	3	3	3	2	3	2

S-Strong (3) M-Medium (2) L-Low(1)