



**Institute of Botany**  
**Faculty of Life Sciences**  
**University of the Punjab, Lahore**  
**Course Outline**  
**Semester – VI**



Programme	BS Botany	Course Code	Bot-315	Credit Hours	2
Course Title	<b>Plant Pathology (Theory)</b>				
<b>Introduction</b>					
<p>The course is designed to provide an adequate knowledge about basic concepts of important plant pathogens and pathogenic diseases, pattern of disease development and disease cycle. It is generally aimed to familiarize students about the identification of major plant pathogens such as bacteria, fungi, nematodes, viruses and other microbes that cause huge economic losses to the farmers.</p>					
<b>Learning Outcomes</b>					
<p>On the completion of the course, the students will be able to:</p> <ul style="list-style-type: none"> <li>● Identify the symptoms of various diseases and their causal agents.</li> <li>● Understand the host-pathogen interactions and defense mechanisms.</li> <li>● Explain the control measures for plant diseases.</li> <li>● Describe the concepts of what constitutes disease in plants and identify major principles of plant pathology.</li> <li>● Be able to describe aspects of integrated pest management and to explain the impact of plant diseases on human affairs.</li> </ul>					
<b>Course Contents</b>					
<p><b>Introduction:</b></p> <ul style="list-style-type: none"> <li>● History and classification of plant pathogens and pathogenic diseases.</li> <li>● Symptoms, causes and patterns of their development.</li> <li>● Loss assessment and plant pathogen control and systemic resistance.</li> <li>● Epidemiology and disease forecast.</li> <li>● The effect of environmental factors on disease development.</li> </ul> <p><b>Viruses:</b></p> <ul style="list-style-type: none"> <li>● Taxonomic position and classification of economically important viral plant pathogens.</li> <li>● Symptoms, causes, disease cycle, patterns of development and management of:</li> <li>● Sugarcane mosaic virus disease.</li> <li>● Cotton leaf curl disease.</li> <li>● Tobacco Mosaic virus disease.</li> </ul> <p><b>Bacteria:</b></p> <ul style="list-style-type: none"> <li>● Economically important bacterial plant pathogens.</li> <li>● Symptoms, causes, disease cycle, patterns of development and management of:</li> <li>● Blight of cereals and grasses</li> <li>● Ring rot of Potato</li> <li>● Crown Gall disease</li> </ul> <p><b>Fungi:</b></p> <ul style="list-style-type: none"> <li>● Important Pathogenic diseases of crop plants and fruit trees caused by fungi</li> <li>● Brief Introduction and importance</li> <li>● Symptoms, causal agent, disease cycle and management strategies for:</li> <li>● Apple Scab Disease</li> <li>● Rusts (<i>Puccinia</i>, <i>Phragmidium</i>, <i>Uromyces</i> etc.).</li> <li>● Smuts (<i>Ustilago</i>, <i>Urocystis</i>, <i>Thekaphora</i> etc.).</li> <li>● Powdery Mildews (<i>Erysiphe</i>, <i>Phyllactinia</i>, <i>Microsphaera</i>, <i>Podosphaera</i> etc).</li> <li>● Downy Mildews</li> </ul>					

<ul style="list-style-type: none"> <li>• White Rust</li> </ul> <p><b>Nematodes:</b></p> <ul style="list-style-type: none"> <li>• Introduction and importance of plant parasitic nematodes</li> <li>• Taxonomy of plant parasitic nematodes; Nematode feeding habits, types of plant parasitic nematodes according to feeding habits.</li> <li>• Impact of parasitic nematodes on plant health and their management.</li> <li>• Root Knot Disease of Vegetables</li> <li>• Potato Cyst disease</li> <li>• Economic importance of plant diseases</li> <li>• Future prospects of plant pathology</li> <li>• Introduction to molecular techniques and their application in Plant pathology</li> </ul>
---

<b>Programme</b>	<b>BS Botany</b>	<b>Course Code</b>	<b>Bot-316</b>	<b>Credit Hours</b>	<b>1</b>
<b>Course Title</b>	<b>Plant Pathology (Lab)</b>				
<b>Lab Course Contents</b>					
<ul style="list-style-type: none"> <li>• Collection, preservation and identification of infected plant specimens based on symptoms</li> <li>• Study of important taxonomic characteristics of various plant pathogens</li> <li>• Basic pathological cultural techniques for isolation and inoculation. Preparation of media and isolation of different plant pathogens</li> <li>• Macroscopic and Microscopic examination of diseased specimens of the type studied</li> <li>• Molecular techniques for identification of plant pathogens</li> <li>• Field trips for collection of different plant samples infected with fungal, viral and bacterial pathogens</li> </ul>					
<b>Textbooks and Reading Material</b>					
<ol style="list-style-type: none"> <li>1. Agrios, G. N. (2011). <i>Plant Pathology</i>, 6<sup>th</sup> edition. Academic Press, New York, USA.</li> <li>2. Ahmad, I., &amp; Bhutta, A. R. (2005). <i>Textbook of Introductory Plant Pathology</i>. National Book Foundation, Islamabad.</li> <li>3. Ahmad, S., Iqbal, S. H., &amp; Khalid, A. N. (1997). <i>Fungi of Pakistan</i>. Sultan Ahmad Mycological Society of Pakistan, Department of Botany, University of Punjab, Lahore, Pakistan.</li> <li>4. Braun, U., &amp; Cook, R. T. A. (2012). <i>Taxonomic Manual of the Erysiphales (Powdery Mildews)</i>. CBS-KNAW Fungal Biodiversity Centre, Utrecht, the Netherlands.</li> <li>5. Cummins, G.B., &amp; Hiratsuka, Y. (2003). <i>Illustrated Genera of Rust Fungi</i>. Third ed., The American Phytopathological Society. APS Press, St. Paul, MN.</li> <li>6. Hafiz, A. (1986). <i>Plant Diseases</i>. Pakistan Agricultural Research Council, Islamabad, Pakistan.</li> <li>7. Mathew, J. D. (2003). <i>Molecular Plant Pathology</i>. Bios Scientific Publishers Ltd. UK.</li> <li>8. Mehrotra, R. S., &amp; Agarwal, A. (2003). <i>Plant Pathology</i>. 2<sup>nd</sup> Edition. TATA McGraw-Hill. Pub. Company Ltd. New Delhi.</li> <li>9. Sambamurty, A. V. S. S. (2006). <i>A Text Book of Plant Pathology</i>. I.K. International Pvt. Ltd.</li> <li>10. Schumann, G. L., &amp; D'Arcy, C. J. (2010). <i>Essential Plant Pathology</i>. APS Press. 369 PP.</li> <li>11. Strange, R. N. (2003). <i>Introduction to Plant Pathology</i>. John Willey &amp; Sons, New York.</li> <li>12. Ravichandra, N. G. (2013). <i>Fundamentals of Plant Pathology</i>. Prentice Hall of India Pvt. Ltd.</li> <li>13. Prell, H. H., &amp; Day, P. (2001). <i>Plant – Fungal Pathogen Interaction – A Classical and Milecular View</i>. Springer Verlage.</li> <li>14. Vánky, K. (2011[“2012”]). <i>Smut fungi of the World</i>. APS Press, St. Paul, Minnesota, USA.</li> <li>15. Vánky, K. (2013). <i>Illustrated Genera of Smut Fungi</i>, 3<sup>rd</sup>edn. St. Paul, MN, USA, APS Press.</li> </ol>					
<b>Teaching Learning Strategies</b>					
<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Laboratory work</li> </ul> <p style="text-align: right;">Group Discussion Seminar/ Workshop</p>					
<b>Assignments: Types and Number with Calendar</b>					
<ul style="list-style-type: none"> <li>• Lecture Based Examination (Objective and Subjective)</li> <li>• Assignments</li> <li>• Quiz</li> </ul> <p style="text-align: right;">Class discussion Tests</p>					