

Department of Plant Pathology
Faculty of Agricultural Sciences
University of the Punjab, Lahore
Course Outline



Programme	B.Sc. (Hons.) Agriculture (Plant Pathology) 4 Year program	Course Code	PP-411	Credit Hours	3(2-1)
Course Title	Pesticides, their action and applications				
Course Introduction					
This course, provides an overview of pesticides including their classification, qualities of an effective pesticide, examining pesticide labels, and equipment and methods for pesticide application. Pesticides are classified based on their target pest, toxicity, mode of entry or action, and chemical structure. The course provide information about effective pesticides which are potent, fast-acting, broad spectrum, affordable, and cause minimal environmental pollution. Proper pesticide application requires protective equipment, calibrated equipment like knapsack or boom sprayers, and following precautions to avoid hazards.					
Learning Outcomes					
On the completion of the course, the students will:					
<ol style="list-style-type: none"> 1. To understand the pesticides, their application and mode of action in plants 2. To acquire information about the risks associated with the use of pesticides. 3. Familiarity with pesticide safe handling. 4. Interpret pesticide labels and images. 					
Course Content				Assignments/Readings	
Week 1	<u>THEORY</u> Unit-I: 1.1 Course introduction 1.2 Introduction of the students, teacher, course and books recommended 1.3 General discussion			1. Mendes, K. F. (Ed.). (2024). <i>Pesticides- Agronomic Application and Environmental Impact: Agronomic Application and Environmental Impact</i> . BoD–Books on Demand.	
	<u>PRACTICAL</u> ○ Introduction to the course and lab safety protocols				
Week 2	<u>THEORY</u> Unit-II: 2.1 Concept, history and development of Pesticides 2.2 Definition, history, and use of Pesticides in agriculture			1. Thompson, W.T. 1993. Agricultural Chemicals. Book IV. Fungicide. California, USA 2. Tomlin, C. 2003. The Pesticide Manual. 13th Edition. BCPC – UK.	
	<u>PRACTICAL</u> Introduction to standard techniques and instruments used in Pesticide Application;				
Week 3	<u>THEORY</u>			1. Parmar, B.S. and	

	<p>Unit-III: 3.1. Pesticides its application in controlling the plant diseases</p> <hr/> <p><u>RACTICAL</u> Demonstration of different equipment used for pesticide application</p>	<p>S.S. Tomar. 2003. Pesticides Formulation. Theory and Practices. CBS Publ. Co. India.</p> <p>2. Jorgen, S. 2004. Chemical Pesticide. Mode of Action and Toxicology. CRC Press, London.</p>
Week 4	<p>Unit-IV: 4.1 Major groups of pesticides <u>PRACTICAL</u> Study of the working principle of different pesticides application equipment's.</p>	<p>Field Visit, Practical demos of use of equipment</p>
Week 5	<p><u>THEORY</u> Unit-V: 4.1. Classification of Major pesticides groups 4.2 Their classification and importance in Agriculture</p> <hr/> <p><u>PRACTICAL</u> Use of various equipment's and study of calibration Methods used.</p>	<p><u>Reading</u> Internet PowerPoint slides And research articles</p>
Week 6	<p><u>THEORY</u> Quiz test Unit-VI: 5.1 Pesticide equipment (old and modern) and different methods of application 5.2 Application methods of pesticides, working of different equipment's</p> <hr/> <p><u>PRACTICAL</u> Handling Practices, pesticide bottle label reading</p>	<p>1. Thompson, W.T. 1993. Agricultural Chemicals. Book IV. Fungicide. California, USA</p> <p>2. Tomlin, C. 2003. The Pesticide Manual. 13th Edition. BCPC – UK.</p> <hr/> <p><u>Assignment (Practical)</u> Making list of commercially available pesticides in Pakistan, their active ingredients and target species</p>

Week 7	<p><u>THEORY</u> Unit-VII: 7.1 FAO code of conduct for pesticide use and handling 7.2 Handling of pesticides and study different code of conduct for pesticides by FAO.</p>	<p><u>Assignment (Theory):</u> Topics will be assigned to individual or group of students.</p> <p><u>Books for reading</u></p> <p>1. Harris, J. 2000. Chemical Pesticide Markets, Health Risks and Residues. CABI, UK.</p>
	<p><u>PRACTICAL</u></p> <ul style="list-style-type: none"> ○ Demonstration of pesticide toxicity and their symptoms in plants 	
Week 8	<p><u>THEORY</u> Unit-VIII: 8.1. Formulation of Pesticides 8.2 Pesticide formulation methods.</p>	<p>1. Parmar, B.S. and S.S. Tomar. 2003. Pesticides Formulation. Theory and Practices. CBS Publ. Co. India.</p> <p>2. Tomlin, C. 2003. The Pesticide Manual. 13th Edition. BCPC – UK.</p>
	<p><u>PRACTICAL</u></p> <ul style="list-style-type: none"> ○ Preparation, formulation and doses of pesticide 	
Week 9	MID-TERM	
Week 10	<p><u>THEORY</u> Unit-IX: 9.1 Pesticides mode of action; 9.2 Mode of action of pesticides to control pest</p>	<p><u>Assignment (Theory):</u> Modern pesticides in the perspective of environment protection Task: Investigate recent literature to assess the hazards of pesticides and case studies</p>
	<p><u>PRACTICAL</u> Preparation of doses of pesticides of different formulations and <i>In vitro</i> toxicity assays</p>	
Week 11	<p><u>THEORY</u> Unit-X: 10.1 Major hazards of pesticides</p> <p><u>PRACTICAL</u></p> <ul style="list-style-type: none"> ○ In vitro comparison of systemic pesticides 	<p><u>Reading</u></p> <p>1. Robert, T. 2000. Metabolism of Agro-chemicals in Plants. John Willey & Sons.</p>

<p>Week 12</p>	<p>Unit-XI: 11.1 Different safety measures while working with pesticides 11.2 Emergency measures to prevent toxicity by pesticides <u>PRACTICAL</u> ○ Comparison study of systemic pesticides (petri dishes and plant bioassays)</p>	<p>USA. 2. Mendes, K. F. (Ed.). (2024). <i>Pesticides-Agronomic Application and Environmental Impact: Agronomic Application and Environmental Impact</i>. BoD–Books on Demand.</p>
<p>Week 13</p>	<p><u>THEORY</u> Group Discussion Unit XII: 12.1 pesticides compatibility and selectivity <u>PRACTICAL</u> ○ <i>in vitro</i> comparison of protectant pesticides</p>	<p>1. Parmar, B.S. and S.S. Tomar. 2003. Pesticides Formulation. Theory and Practices. CBS Publ. Co. India.</p>
<p>Week 14</p>	<p style="text-align: center;">REVISION/TEST</p> <p><u>THEORY</u> Group Discussion/ class presentations <u>PRACTICAL</u> ○ Measurement of droplet size/ working of different nozzles</p>	<p><u>Assignment (Practical)</u> Estimation of ETLs and EILs of important insect pests of region</p>
<p>Week 15</p>	<p><u>THEORY</u> Unit XIII: 13.1 Residues and resistance problems of pesticides 13.2 Phytotoxicity problems of pesticides (fungicides, bactericides, and nematicides etc.) <u>PRACTICAL</u> ○ protective measures and first aid</p>	<p>1. Harris, J. 2000. Chemical Pesticide Markets, Health Risks and Residues. CABI, UK. 2. Jorgen, S. 2004. Chemical Pesticide. Mode of Action and Toxicology. CRC Press, London. 3. Mathews, G.A. and M.A. Meladen. 2000. Pesticides Application Methods. 3rd ed. Blackwell Science Publication, New York.</p>

<p>Week 16</p>	<p><u>THEORY</u> Unit XIV: 14.1 Pesticide regulation, registration Pakistan 14.2 Pesticide distribution in Pakistan 14.3 Course review <u>PRACTICAL</u> <ul style="list-style-type: none"> ○ Pesticide testing facility/lab visits </p>	<p>1. Jorgen, S. 2004. Chemical Pesticide. Mode of Action and Toxicology. CRC Press, London. 2. Research articles</p>
<p>FINAL-TERM</p>		
<p>Textbooks and Reading Material</p>		
<p>Suggested Readings</p> <p>BOOKS</p> <ol style="list-style-type: none"> 1. Biddle, A. 2001. Seed Treatment, Challenges and Opportunities. The BCPC Publications, UK. 2. Harris, J. 2000. Chemical Pesticide Markets, Health Risks and Residues. CABI, UK. 3. Jorgen, S. 2004. Chemical Pesticide. Mode of Action and Toxicology. CRC Press, London. 4. Mathews, G.A. and M.A. Meladen. 2000. Pesticides Application Methods. 3rd ed. Blackwell Science Publication, New York. 5. Parmar, B.S. and S.S. Tomar. 2003. Pesticides Formulation. Theory and Practices. CBS Publ. Co. India. 6. Robert, T. 2000. Metabolism of Agro-chemicals in Plants. John Willey & Sons. USA. 7. Thompson, W.T. 1993. Agricultural Chemicals. Book IV. Fungicide. California, USA. 8. Tomlin, C. 2003. The Pesticide Manual. 13th Edition. BCPC – UK. 9. Mendes, K. F. (Ed.). (2024). <i>Pesticides-Agronomic Application and Environmental Impact: Agronomic Application and Environmental Impact</i>. BoD–Books on Demand. <p>Journal Articles/ Reports Resources will be shared during class</p>		
<p>Teaching Learning Strategies</p>		
<ol style="list-style-type: none"> 1. Class lectures 2. Discussions 		

3. Practical demonstrations
4. Hands on training where applicable

Assignments: Types and Number with Calendar

Assignments

Types and Number with calendar

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.