

**Department of Entomology  
Faculty of Agricultural Sciences  
University of the Punjab, Lahore  
Course Outline**



<b>Programme</b>	B.Sc. (Hons) Agriculture (Major: Entomology)	<b>Course Code</b>	ENT-412	<b>Credit Hours</b>	3 (2-1)
<b>Course Title</b>	<b>AGRICULTURE AND ENVIRONMENTAL POLLUTION</b>				
<b>Course Introduction</b>					
<p>This graduate level course basically aims to provide the concepts of environmental pollution and deterioration with their effects on agriculture, forest and living organisms. It provides the students with basic knowledge of different sources of pollutants, environmental deterioration factors and their effects on agricultural sector, greenhouse effects and different types of pollution with reference of agriculture and forest, pesticide and fertilizers' pollution incurred in soil, air and water resources etc. Students will learn about determining and managing agricultural and environmental pollution.</p>					
<b>Learning Outcomes</b>					
<p>On the completion of the course, the students will have gained the ability to:</p> <ol style="list-style-type: none"> <li>Promote student knowledge of the role of agriculture in environmental processes both historically and as part of the solution to current environmental issues.</li> <li>Provide students with a scientific basis for understanding the movement of water and nutrients through the environment and evaluating water availability and water quality issues.</li> <li>Provide a fundamental understanding of best management practices and the role that they play in minimizing water, nutrient and pesticide usage.</li> <li>Provide a basic understanding of major nutrient cycling and the role of organic matter and microorganisms in these cycles.</li> </ol>					
<b>Course Content (Theory)</b>					<b>Assignments/Readings</b>
<b>Week 1</b>	<b>Unit-I</b> 1.1. Introduction 1.1.1. Pollution 1.1.2. Types of pollution 1.1.2.1. Water pollution 1.1.2.2. Sources and water pollutants				
	1.2. Water pollution (cont....) 1.2.1. Category and composition of waste water 1.2.2. Water quality index				
<b>Week 2</b>	<b>Unit-II</b> 2.1. Water pollution (cont....)				

	<p>2.1.1. Ground water pollution 2.1.2. Aquifers 2.1.3. Hydraulic gradient</p>	
	<p>2.2. Water pollution (cont....) 2.2.1. Darcy's Law 2.2.2. Contaminants in ground water waste water remediation technologies for surface and ground water. 2.2.3. Effect of Water pollution on ecosystem and biota</p>	
<b>Week 3</b>	<p><b>Unit-III</b> 3.1. Water Quality Control 3.1.1. Introduction 3.1.2. Standard qualities for Drinking Water, 3.1.3. Water quality standards for irrigation,</p>	
	<p>3.2. Water Quality Control (cont....) 3.2.1. Water quality standards for Industry, 3.2.2. Water quality standards for fishery and other ventures.</p>	
<b>Week 4</b>	<p><b>Unit-IV</b> 4.1. Water treatment systems and waste water treatments technologies 4.2. Hazardous waste in Pakistan water bodies, solid wastes, sewerage, sewage disposal and treatment</p>	
	<p>4.3. Air Pollution 4.3.1. Introduction, 4.3.2. Pollutant sources, 4.3.3. Primary and secondary pollutants and toxic air pollutants.</p>	
<b>Week 5</b>	<p><b>Unit-V</b> 5.1. Air Pollution (cont.....) 5.1.1. Air quality standards motor vehicle emissions and stationary emissions- composition and control.</p>	
	<p>5.1.2. Air Pollution (cont.....) 5.1.3. Formation of aerosol and its effects and indoor air quality standards. 5.1.4. Air pollution technologies and its effect on biota</p>	
<b>Week 6</b>	<p><b>Unit-VI</b> 6.1. Soil Pollution and Solid Waste 6.1.1. Introduction 6.1.2. Sources of soil pollutants-municipal, agriculture, aquaculture, poultry and industrial sources of soil pollutants.</p>	
	<p>6.2. Soil Pollution and Solid Waste (cont.....) 6.2.1. Classification 6.2.2. Characterization of solid waste 6.2.3. Hazardous solid waste and biomedical waste.</p>	

<b>Week 7</b>	<b>Unit-VII</b> 7.1. Soil Pollution and Solid Waste (cont.....) 7.1.1. Leachate of solid waste 7.1.2. Trans boundary movement of wastes 7.1.3. Physical, chemical and biological treatment of wasted.	
	7.2. Disposal recycling of solid waste 7.3. Effect of soil pollution on ecosystem and biota	
<b>Week 8</b>	<b>Unit-VIII</b> 8.1. Status of Environmental Pollutions in Pakistan 8.1.1. Prevention and control of wastes and National program to control wastes	
	8.2. Reuse and recycle of waste, Acts and regulation to control pollution.	
<b>Week 9</b>	<b>MIDTERM EXAM</b>	
<b>Week 10</b>	<b>Unit-IX</b> 9.1. Environmental deterioration, its effect on agriculture	
	9.2. Greenhouse effect	
<b>Week 11</b>	<b>Unit-X</b> 10.1.Types of pollution with reference to agriculture and forest	
	10.2.Types of pollution with reference to agriculture and forest	
<b>Week 12</b>	<b>Unit-XI</b> 11.1. Pesticide and fertilizer pollution	
	11.2. Agriculture and Environmental Sustainability	
<b>Week 13</b>	<b>Unit-XII</b> 12.1. Effect of pollution on soil	
	12.2. Effect of pollution water,	
<b>Week 14</b>	<b>Unit-XIII</b> 13.1. Effect of pollution air	
	13.2. Effect of pollution plants	
<b>Week 15</b>	<b>Unit-XIV</b> 14.1. Effect of pollution living organisms	
	14.2. Effect of pollution living organisms (cont.....)	
<b>Week 16</b>	<b>Unit-XV</b> 15.1. Management of pollution	
	15.2. Management of pollution (cont.....)	
<b>Course Content (Practical)</b>		<b>Assignments/Readings</b>
<b>Week 1</b>	Identification and determination of sources of pollution	

<b>Week 2</b>	Identification and determination of sources of pollution in fruit	
<b>Week 3</b>	Identification and determination of sources of pollution in vegetables	
<b>Week 4</b>	Identification and determination of sources of pollution in environment	
<b>Week 5</b>	Identification and determination of sources of pollution in air	
<b>Week 6</b>	Identification and determination of sources of pollution in water	
<b>Week 7</b>	Pesticides Residues detection in fruits	
<b>Week 8</b>	Pesticides Residues detection in vegetables	
<b>Week 9</b>	<b>MIDTERM EXAM</b>	
<b>Week 10</b>	Determination of Impact of Pesticides on the Environment	
<b>Week 11</b>	Mitigation Strategies and Sustainable Practices	
<b>Week 12</b>	Mitigation Strategies and Sustainable Practices	
<b>Week 13</b>	Mitigation Strategies and Sustainable Practices	
<b>Week 14</b>	Mitigation Strategies and Sustainable Practices	
<b>Week 15</b>	Mitigation Strategies and Sustainable Practices	
<b>Week 16</b>	Case Studies and Practical Applications	
<b>Textbooks and Reading Material</b>		
<ol style="list-style-type: none"> <li>1. Misra, S.G. and Mani, D. 1994. Agricultural Pollution. Vols. 1 &amp; 2, Ashih Publishing House, New Delhi.</li> <li>2. Parkash, R and Choubey, S. M. 1990. Environmental Pollution and Health Hazards. Publication of Society of Biochemistry of India.</li> <li>3. Rizvi, S.M.H. 1994. Fundamentals of Environmental Pollution. CBS Publishers and Distributers. 485, Jain Bhawan, Bhola Nath Nagar, Shahdara, Delhi.</li> <li>4. Ashfaq M. and Saleem, M.A. 2010. Environmental Pollution and Agriculture. Pak Book Empire, Lahore.</li> <li>5. Suhail, A and Ahmad, S. 2003. A Workbook of Agriculture &amp; Environmental Pollution. Deptt. of Agri. Entomology, University of Agriculture, Faisalabad</li> </ol>		
<b>Note:</b>		

1. It is preferable to use latest available editions of books. Mention the publisher & year of publication.
2. The References/ bibliography may be in accordance with the typing manual of the concerned faculty/subject. Preferably follow APA 7<sup>th</sup> Edition publication manual.

**Teaching Learning Strategies**

1. Multimedia
2. White Board
3. Group discussion
4. Quiz/Assignments
5. Demonstration/Activity

**Assignments: Types and Number with Calendar**

**Assessment**

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.