Department of Public Health
Institute of Social & Cultural Studies
Faculty of Behavioral & Social Sciences
University of the Punjab, Lahore

Course Outline

Programme	BS Workplace Health & Safety Promotion	**Course Code**	**WHSP 403**	**Credit Hours**	3
Course Title	Toxicology and Waste Management				

WHSP 403-Toxicology and Waste Management

Course Description

- This Course introduces student to the basic principles of toxicology and the application of toxicology to the environment, food, forensics, and occupational settings. Biochemical interactions of industrial, agricultural, and household chemicals with elements of soils, plants, animals, and humans.

Course Objectives

After completion of the course, students will be able to**:**

1. Describe the chemical properties and the biological processes which modulate the toxicokinetics of chemical agents of public health importance
2. Explain the significance of biotransformation reactions as a determinant of the toxicokinetic and toxicodynamic activities of chemicals
3. Describe molecular, cellular and pathophysiological responses resulting from exposure to chemical agents relevant to human health
4. Identify underlying susceptibility factors which contribute to the ability of chemicals to elicit bio effects which contribute to human disease
5. Explain the science underlying testing for the ability of chemicals to elicit adverse human health effects
6. Put into perspective the role of toxicology in the risk assessment process
7. Discuss in depth the toxicology of selected organs and agents

Course Content

1. **Basic principles: factors that affect toxicity**
   - Toxicokinetics: absorption, distribution, excretion, and biotransformation
   - Toxicity testing, dose response and risk assessment

2. **Environmental carcinogenesis**
    - Biomarkers of exposure and susceptibility factors
    - Approaches to primary and secondary prevention
    - Hepato and renal toxicology: basic principles and specific examples
3. **Reproductive and developmental toxicology: basic principles and specific examples (e.g., endocrine disruptors, thalidomide)**
    - Immunotoxicology: basic principles, cutaneous and pulmonary hypersensitivity
    - Persistent organic pollutants (POPs) and dioxins
    - Bone marrow toxicity: benzene as a case study
    - Neurotoxicology
    - Metal toxicology: mercury, cadmium
    - Ozone, a criteria air pollutant
    - Nanoparticle toxicology
    - Effluent and emission control
4. **Waste Management**
    - Solid waste management
    - Water waste management
    - Conventional and natural ways of managing water and solid waste
    - Hospital waste management
5. **Industrial Waste Management Systems**

Practical Contents

- Visit of industry (including hospitals) to observe waste management systems
- Development of waste management systems for various industries (assignment)

Teaching-Learning Strategies

Teaching will be a combination of class lectures, class discussions, and group work. Short videos/films will be shown on occasion.

Assignments

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessments and Examination

Sessional Work: 25 marks

Midterm Exam: 35 marks

Final Exam: 40 marks

Recommended Readings

1. Casarett & Doull. (2013). *Essentials of Toxicology*, (8th Ed). .D. Klaassen and J.B. Watkins III, eds. McGraw Hill Medical, NY.
2. Hayes, W. (2008). *Principles and Methods of Toxicology.* (5th Ed) CRC Press, Boca Ratan.