**Faculty of Agriculture**

**Department of Plant Protection**

**Course Title: Toxicology of Pesticides (606954)**

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| --- | --- | --- | --- | --- | --- |
| **Credit hours** | **3** | **Level** | **Ph. D.** | **Pre-requisite** | Pesticides (606351) |
| **Coordinator/ Lecturer** | Prof. Tawfiq Al-Antary | **Office number** | 223 | **Office phone** | 22518 |
| **Course website** | **-**  | **E-mail** | **t.antary@ju.edu.jo** | **Place** |  |

**Course Description**

This course will cover several topics, these will be pesticides regulations, toxicity, toxicity classifications and evaluations, pest resistance, metabolism and movements in environment components, in additions, hazards of pesticide in animals and human being will be covered.

**Learning Objectives**

The main objectives of the course are:

1. To know pesticide regulations in Jordan.
2. To understand pesticide toxicology and their modes of action.
3. To follow metabolism of pesticides in plants, animals and environment.
4. To understand hazards on man and wildlife.

**Intended Learning Outcomes**

**A. Knowledge and Understanding:** Students are expected

A1.Be able to know pesticides status in Jordan particularly the toxicity.

A2. Be able to know toxicology aspects of pesticides particularly modes of action, pest resistance, metabolism, fate, movement in the environment.

A3. Be able to know hazards on man, animal and wildlife.

**B. Intellectual Analytical and Cognitive Skills:** Students are expected:

B1. To understand toxicological parameters.

B2. To predict pesticides effects and fates.

B3. To avoid hazards of pesticides.

**C. Subject- Specific Skills:** Students are expected:

C1. To determine LC50 and LD50 and the other toxicology parameters.

C2. To evaluate pesticides toxicity.

C3. To screen pesticides according to their effectiveness on pests.

C4. To test pesticides residual effects on pests.

C5.To work independently in governmental and private sectors dealing with pesticides.

C6.To avoid pesticides contaminations in environment.

C7. To minimize hazards of pesticides on man, animal, wildlife, plants and environment.

**D. Transferable Key Skills:** Students are expected:

D1- To find parameters of pesticides toxicology

D2- To compare between different pesticides toxicities on pests and experimental animals

D3- To follow degradation of pesticides environment, human beings and animals

D4- To be able to measure the residual effect of pesticides on pests

**Learning/Teaching Methods**

Lectures and seminars by individual students to encourage developing skills and self expression. Teaching tools include transparences, slides, handouts, and case study analysis.

**Assignments**

Each student is assigned for topic which he/she explores literature and the internet and then writes and submits a report which he/she will present and discuss it with his/her colleagues via seminars.

**Assessment**

First Exam: 20%

Mid Term Exam: 20%

Assignments and activities: 20%

Final Exam: 40%

Total: 100%

**Syllabus Plan**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Topic** | **Reference(s)** | **ILO’s** |
| 1 | Introduction | 1,2 | A1 |
| 1 | Pesticides regulations in Jordan | 3 | A1, C5 |
| 2 | Pesticides classification according to toxicity | 4 | A2, C5, D1, D2 |
| 2 | Evaluation of Pesticides toxicity | 3 | A2, B1, C1, C2, C3, C4, D1, D2 |
| 3-5 | Modes of action of pesticides | 5 | A2 |
|  | **First Exam** |  | A2 |
| 6-8 | Metabolism of insecticides by animal and plants | 2,5 | A2, B2, D3, D4 |
| 9-10 | Pest resistance to insecticides | 2,5 | A2, D3 |
| 11 | Pesticides movement in animal body | 2,5 | A2, C5 |
|  | **Second Mid Term Exam** |  | A2, C5 |
| 12 | Pesticides movement in the environment | 2,5 | A2, C5 |
| 13 | Pesticides residues in the environment | 2,5 | A2, C5 |
| 14 | Effects of pesticides on wildlife | 2,5 | A3, C5 |
| 15 | Hazards of pesticides on man and animals | 2,5 | A3, B3, C6, C7 |
|  | **Final Exam** |  |  |

**Indicative Basic Reading List/ Related Websites**

1. Hayes, W. J. and Laws, E. R. (1991). Handbook of Pesticides Toxicology, vol. I and vol. II. Academic Press, San Diego, California. pp. 1123.
2. Mastumura, F. (1985). Toxicology of Insecticides. Plenum Press, New York. pp. 503.
3. Al-Antary-Mustafa, T. M. (1996). Pesticides and Toxicology. University of Al-Quds Al-Maftoha. Amman. pp. 443 (In Arabic).
4. World Health Organization (1990). Public Health Impact of Pesticides Used in Agriculture. WHO, Geneva. pp. 128.
5. Hassal, L. A. (1990). The Biochemistry and Uses of Pesticides Structure Metabolism, Mode of Action and Uses in Crop Protection. John Wiley and Sons, New York.
6. Related websites.