

Syllabus: ENTO 820

Insecticide Toxicology

College of Agricultural Science and Natural Resources/IANR
University of Nebraska-Lincoln

Fall 2016

Tuesday – Thursday, 11:00 am - 12:15 pm
202 Entomology Hall, East Campus

I. INSTRUCTOR

Dr. Ana María Vélez, Assistant Professor

Email: avelezarango2@unl.edu

Office: 312 Entomology Hall

Phone: (402) 472-2152

Office Hours: No formal hours, drop in or by appointment

Mailing Address:

Department of Entomology
103 Entomology Hall
University of Nebraska-Lincoln
Lincoln, NE 68583-0816

II. TEACHING ASSISTANT

Darlane Souza, Entomology Ph.D. Student

Email: dsouza3@unl.edu

Office: 312F Entomology Hall

Office hours: Thursdays 1:15 - 2:15 pm

III. COURSE OBJECTIVES

The overall course objective is to increase the understanding of processes involved in the toxic response in insects to insecticides, insecticide classification, and consequences of insecticide use.

At the end of the course the student is expected to:

- Outline the history of insecticides
- Recognize the major classes of insecticide and understand their mode of action
- List and describe processes involved in toxicodynamics of insecticides
- Become aware of the limitations of insecticide use such as resistance and environmental contamination
- Develop a basic understanding on performing insect bioassays

IV. OUTLINE AND LECTURE TOPICS

PRINCIPLES OF TOXICOLOGY

1. Introduction to Toxicology and Pesticides
2. Exposure and evaluation of Toxicity

3. Physicochemical Properties
4. Chemical Classification of Insecticides
5. Toxicodynamics I: Penetration through Biological Membranes
6. Toxicodynamics II: Phase 1 Metabolism
7. Toxicodynamics II: Extramicrosomal Phase 1 Metabolism
8. Toxicodynamics III: Phase 2 Metabolism

INSECTICIDES CLASSIFICATION AND MODE OF ACTION

9. Neurophysiology
10. Insecticides Affecting GABA Receptors
11. Anticholinesterases
12. Insecticides Affecting the Voltage Gated Sodium Channel
13. Other Insecticides
14. Metabolic Inhibitors and Synergists
15. Microbials
16. Biotechnology
17. Growth Regulators
18. Evaluation of Toxicity

ENVIRONMENTAL EFFECTS OF INSECTICIDES

19. Insecticide Resistance
20. Environmental Toxicology of Insecticides
21. Pesticides Laws and Regulations

V. RECOMMENDED TEXT: There are no required text books for this course. However, the following text book might be of interest.

Yu, S. J. 2014. The Toxicology and Biochemistry of Insecticides, Second Edition. CRC Press, New York

Note: Available at C.Y. Thompson Library and available from Amazon and other online retailers.

VI. GRADING: Grades will be based upon percentages of total points

Exam 1	100 points	
	Exam 2	100
	Exam 3	100
	Term Project	100
	Assignments	50
Total		450 points

Letter grades will be assigned based on straight percentages:

100 - 98	A+	89 - 87	B+	79 - 77	C+	69 - 67	D+	59 - Below	F
97 - 94	A	86 - 83	B	76 - 73	C	66 - 63	D		
93 - 90	A-	82 - 80	B-	72 - 70	C-	62 - 60	D-		

VII. EXAMS: All exams are cumulative, although each exam will emphasize the material covered since the last exam. The exams will be primarily comprised of short answer essay questions. Questions are designed to solve problems based on material presented in class.

For distance students, the exams will be provided to you on Blackboard during the week on the schedule. You will be given a predetermined amount of time to complete the exam, so once you start be prepared to not be interrupted.

VIII. TERM PROJECT: The term project involves a case study that should be solved based on literature search. A list of the case studies will be provided later in the semester; students will be allowed to select their preferred topic. The document should be equivalent to about 5 pages double-spaced without references. Grading of the review paper will consist of 25 points for outline and reference list (Due on October 13), 25 points for writing style and 50 points for content and problem solving. The document is due December 1.

IX. ASSIGNMENTS: All assignments are intended to support the material learned in class. Submit assignments no later than the end of the due date.

X. READINGS: Most lecture material will be available weekly on the UNL Blackboard site as both lecture notes and PowerPoint outlines. Suggested readings will be posted online for students to gain more information on areas of particular interest or concepts not completely understood from lecture notes. I will be glad to respond to individual questions, but expect that the student will have consulted the suggested readings prior to contacting me.

XI. OTHER POLICIES

Academic Dishonesty: *Cheating and plagiarism will not be tolerated. The University of Nebraska-Lincoln has a policy about Academic Dishonesty (see section 4.2 Academic Dishonesty of the Student Code of Conduct in the Graduate Studies Bulletin).*

As the Student Code of Conduct indicates, academic sanctions for misconduct (subject to appeal) are at the discretion of the instructor, and may include giving the student a failing grade for the course. In this course, the least penalty we will impose for misconduct is a one letter grade reduction in the course grade, however, in most instances (particularly for graduate students) the penalty for cheating in this class will be a failing grade in the course.

XII. LECTURE SCHEDULE (Tentative)

Dates are approximate, some topics will take more and some will take less than a lecture. Schedule will be continually updated online.

Week	Date	Description
1	August 23	Class introduction Lecture 1: Introduction to Toxicology and Pesticides
1	August 25	Lecture 2: Exposure and evaluation of Toxicity
2	August 30	Lecture 3: Physicochemical Properties and Residue Analysis
2	September 1	Lecture 4: Chemical Classification of Insecticides
3	September 6	Lecture 5: Toxicodynamics I: Penetration through Biological Membranes

3	September 8	Lecture 6: Toxicodynamics II: Phase 1 Metabolism
4	September 13	Lecture 7: Toxicodynamics II: Extramicrosomal Phase 1 Metabolism
4	September 15	Lecture 8: Toxicodynamics III: Phase 2 Metabolism
5	September 20	Lecture 9: Neurophysiology 1
5	September 22	Lecture 9: Neurophysiology 2 Exam review
6	September 27	Exam 1
6	September 29	Lecture 10: Insecticides Affecting GABA Receptors
7	October 4	Lecture 11: Anticholinesterases
7	October 6	Lecture 12: Insecticides Affecting the Voltage Gated Sodium Channel
8	October 11	Lecture 13: Other Insecticides 1
8	October 13	Lecture 13: Other Insecticides 2 Term Project Outline and Reference List
9	October 18	Fall Break
9	October 20	Lecture 14: Inorganic Insecticides and Synergists
10	October 25	Lecture 15: Microbials
10	October 27	Lecture 16: Biotechnology
11	November 1	Lecture 17: Growth Regulators
11	November 3	Lecture 18: Evaluation of Toxicity - Methods
12	November 8	Lecture 18: Evaluation of Toxicity - Insect Bioassays Activity Exam review
12	November 10	Exam 2
13	November 15	Lecture 18: Evaluation of Toxicity - Analysis
13	November 17	Lecture 18: Evaluation of Toxicity – Analysis and Interpretation of Insect Bioassays Activity
14	November 22	Lecture 19: Insecticide Resistance 1
14	November 24	Thanksgiving
15	November 29	Lecture 19: Insecticide Resistance 2
15	December 1	Lecture 20: Environmental Toxicology of Insecticides 1 Term Project
16	December 6	Lecture 20: Environmental Toxicology of Insecticides 2
16	December 8	Lecture 21: Pesticides Laws and Regulations Exam review
17	December 13	Exam 3