

## Applied Entomology - Biology 4500

SPRING Semester, 2020

Instructors: Dr. Ted Evans, Office: BNR 302c, 797-2552, e-mail: [ted.evans@usu.edu](mailto:ted.evans@usu.edu)  
Dr. Diane Alston, Department of Biology  
Mr. Ryan Davis, Utah Plant Pest Diagnostic Lab, Department of Biology  
Ms. Dawn Holzer, USDA-APHIS  
Dr. Theresa Pitts-Singer and colleagues, USDA Bee Biology Laboratory  
Dr. Ricardo Ramirez, Department of Biology  
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Office Hours: Evans Thursdays 11:00-12:00 (or by appointment), BNR 201  
Holthouse by appointment

Lecture: Monday, Friday 11:30 am -12:20 pm LIB 411  
Laboratory: Tuesday or Thursday 2:30-5:20 pm LSB 219

Supporting Texts: Pedigo, L.P. and M.E. Rice. 2009. *Entomology and Pest Management*  
(*on reserve at the library*) Sixth Edition. Prentice Hall (Pearson Education, Inc.)  
Cranshaw, W. and R. Redak. 2013. *Bugs Rule! An Introduction to the World of Insects*. Princeton University Press

Course objectives: *Students will learn fundamentals of insect biology, with emphasis on insects of economic importance and principles and tactics of pest management. In the laboratory, students will learn basic classification and habits of insects, particularly those of beneficial and harmful insects affecting humans and agriculture. Field trips will introduce students to applied aspects of entomology and insect pest management (prerequisite: Introductory Biology – BIOL 1610/1615 or equivalent).*

Participation: The course consists of weekly lectures and labs. Attendance and participation in both lectures and labs are **required**. If you cannot attend a given laboratory session, discuss your necessary absence from the lab with the instructor **in advance**.

Evaluation:

Lecture midterm exam I (February 3 [Monday])	17 %
Lecture midterm exam II (March 22 [Friday])	17 %
Comprehensive final exam April 27 [Monday], 11:30 am – 1:20 pm	26 %
Participation in lecture and lab (including lab quizzes [9%], worksheets [3%], lecture [3%])	15 %
Laboratory midterm (February 18 & 20)	10 %
Laboratory final (April 7 & 9)	15 %

*Final grades for the course are based on these percentages, and are earned as per standard university policy (USU General Catalog: “For work in graded courses, A shall denote exceptional performance, B above average performance, C satisfactory performance, D poor performance, and F failing performance.”)*

Please note that the course fee is charged to cover the cost for replacement of lab materials and supplies, partial funding for TA support, and field trip charter bus transportation.

## Schedule for lectures and lab, Applied Entomology (Biol 4500) – Spring 2020

Week 1	1	M	Jan	6	Introduction to Applied Entomology and Economic Entomology
	2	F	Jan	10	Introduction to insects and other arthropods (e.g., spiders and mites)
Week 2	3	M	Jan	13	The insect body [wings, legs]
	4	Tu, Th	Jan	14, 16	<b>Lab: Orthoptera, Blattodea, Phasmatodea</b>
		F	Jan	17	Insect life cycles and development
Week 3	5	M	Jan	20	<i>Martin Luther King, Jr. Day</i>
	6	Tu, Th	Jan	21, 23	<b>Lab: Hemiptera (suborder Heteroptera)</b>
		F	Jan	24	Life processes: eating, breathing, ...
Week 4	7	M	Jan	27	Life processes: molting and metamorphosis
	8	Tu, Th	Jan	28, 30	<b>Lab: Hemiptera (suborders Auchenorrhyncha &amp; Sternorrhyncha)</b>
		F	Jan	31	Life processes: Nervous system and sensing the environment
Week 5	9	M	Feb	3	EXAM I
	10	Tu, Th	Feb	4, 6	<b>Lab: Miscellaneous Exopterygote orders, begin Coleoptera</b>
		F	Feb	7	Life processes: reproduction
Week 6	11	M	Feb	10	Insect pest management (IPM): overview
	12	Tu, Th	Feb	11, 13	<b>Lab: Finish Coleoptera</b>
		F	Feb	14	Insect ecology: seasonal cycles
Week 7	13	M	Feb	17	<i>Presidents' Day</i>
	14	Tu, Th	Feb	18, 20	<b>LAB MIDTERM</b>
		F	Feb	21	Insect Ecology ( <i>finish</i> ) and Insect Behavior ( <i>begin</i> )
Week 8	15	M	Feb	24	Insect Behavior
	16	Tu, Th	Feb	25, 27	<b>Lab: Diptera, Siphonaptera</b>
		F	Feb	28	Monitoring invasive pest insects in Utah ( <i>Spears</i> )
		<i>M and F</i>	<i>Mar 2 &amp; 6</i>		<i>Spring Break</i>
Week 9	17	M	Mar	9	Biological control: parasitoids and predators
	18	Tu, Th	Mar	10, 12	<b>Lab: Lepidoptera, Neuroptera</b>
		F	Mar	13	Insect pathogens and biological control ( <i>Roberts</i> )
Wk 10	19	M	Mar	16	Biological control: strategies
	20	Tu, Th	Mar	17, 19	<b>Lab: Hymenoptera, Isoptera</b>
		F	Mar	20	EXAM II
Wk 11	21	M	Mar	23	USDA APHIS programs for invasive pest insects ( <i>Holzer</i> )
	22	Tu, Th	Mar	24, 26	<b>Lab: Collembola, Thysanura and Arachnids</b>
		F	Mar	27	Plant-insect interactions and Host Plant Resistance
Wk 12	23	M	Mar	30	Conventional insecticides I
	24	Tu, Th	Mar 31, Apr 2		<b>Lab: Review</b>
		F	Apr	3	Conventional insecticides II, IGRs
Wk 13	25	M	Apr	6	Insecticide Resistance – Causes ( <i>Ramirez</i> )
	26	Tu, Th	Apr	7, 9	<b>LAB FINAL</b>
		F	Apr	10	Insecticide Resistance Management ( <i>Ramirez</i> )
Wk 14	27	M	Apr	13	Case study of major urban pests: bed bugs ( <i>Davis</i> )
	28	Tu, Th	Apr	14, 16	<b>Lab: Pollination biology (at Bee Lab; with Dr. Pitts-Singer and colleagues)</b>
		F	Apr	17	IPM programs in Utah ( <i>Alston</i> )
Wk 15	29	M	Apr	20	IGRs and Review
		TU	Apr	21	<b>Lab: Collecting field trip (Green Canyon) &amp; Making an insect collection</b>