

## ENTMLGY 4606 – Introduction to Forensic Entomology

### 2 Semester Credits – 7 Week Session

<b>Lectures:</b>	Tu & Th	3:00pm-4:20pm	335 Campbell Hall
<b>Laboratory:</b>	Th	8:00pm-9:50am	115 Howlett Hall

#### Instructors:

Dr. David Shetlar, Ph.D.

Professor of Urban Landscape Entomology

2 Rothenbuhler Bee Lab, 2501 Carmack Road

Office Hrs: by arrangement, generally Tu & Th 10:00-11:00am

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Ms. Devon Rogers, M.S.

Entomological Technician

13 Rothenbuhler Bee Lab, 2501 Carmack Road

Office Hrs: by arrangement

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#### Course Purpose and Learning Objectives

Though Arthropods compose the vast majority of biomass on this planet, their lives often go unnoticed by humans. Though charismatic megafauna such as butterflies and bees garner much attention, it is often the less noticeable species which impact human society the greatest. The purpose of this course is to learn how insects and associated arthropods are used in crime investigations and how they are often used in other legal cases (e.g., food contamination, public nuisance and health, destruction of buildings, etc.). Students will learn how insects found on or near dead persons are used to estimate the time of death (post-mortem interval – PMI) which is function that most people associate with forensic entomology made famous by a series of television programs. Insects and their activity can also aid investigators to determine how long termites have infested a building. Insects and their remains in food products often result in legal suits against the food manufacturer, storage facility or retail store. Infestations, bites and stings of insects and associated arthropods also often result in legal suits and forensic entomologists are often called in for expert testimony to assist legal proceedings pertaining to whether these events are common or rare, avoidable or unavoidable.

## Learning Objectives

- Students will be able to recognize the major groups of insects and arthropods that are used in crime scene investigations.
- Students will learn how to estimate time since death (minimum post mortem interval – mPMI) using fly larvae and other arthropods often associated with corpses.
- Students will achieve an understanding of how a forensic scientist must work in the context of a crime scene investigation and court appearance, including meeting Expert Witness criteria.
- Students will learn how to detect, identify, and discuss the life histories of insects that commonly attack human habitats (i.e., structural pests, etc.)
- Students will learn how to detect, identify, and discuss the life histories of common insects that infest stored foods.
- Students will learn how to detect, identify, and discuss the life histories of common insects and associated arthropods that attack humans and pets.

## Course Topic Outline

<u>Week</u>	<u>Date</u>	<u>Lecture/Lab</u>	<u>Topics</u>
1	Aug 28	Lab 1	Insect collecting, preservation and processing
		Lec 1	Introduction and course overview – What is Forensic Science? General Entomology & Forensic Entomology introduction
	Sept 2	Lec 2	Human Decomposition: Biology and chemistry
2	Sept 4	Lab 2	Maggot identification and mPMI calculations
		Lec 3	Insects of forensic importance: The Flies!!!
	Sept 9	Lec 4	Insects of forensic importance: The Beetles and other Arthropods
3	Sept 11	Lab 3	Field Exercise Day 1 (Collect your specimens)
		Lec 5	Student Presentations
	Sept 16	Lec 6	Insect Attractants: Chemical ecology and insect physiology Archaeoentomology and insects as weapons of war

4	Sept 18		
	Lab 4		MIDTERM EXAM – Field Exercise Day 2 (wrap up)
	Lec 7		Parasites: Real and Imagined; Entomologist as Expert Witness
	Sept 23		
	Lec 8		The OTHER side of Forensic Entomology – insect damage & infestation
5	Sept 25		
	Lab 5		Identification of stored product pests; Food tolerances for insect parts and infestations
	Lec 9		Biology & management of pantry pests
	Sept 30		
	Lect 10		Fiber & Hide pests; “Filth” flies – biology & management
6	Oct 2		
	Lab 6		Household Pests & Student Presentations
	Lec 11		Cockroaches and bed bugs – identification, life cycles, management
	Oct 7		
	Lec 12		Termites – biology and detections Determining how long termites have been feeding
7	Oct 9		
	Lab 7		Wood-destroying arthropods & Student Presentations
	Lec 13		Other wood-destroying arthropods & management
	Oct 14		
	Lec 14		Course review

**FINAL EXAM** (during regularly scheduled period) – Written and ID Practicum

**Grade Determination:**

Exam I = 100 points

Exam II = 100 points

Student Presentation = 30 points

Case Report = 50 points

Collection = 20 points

Participation bump! = 20 points (to be determined by instructors)

Student Presentation: Students will choose a general topic within the field of Forensic Entomology and present a report related to that topic (10-15 minutes).

Case Report: Students will draft a case report as a professional forensic entomologist would. Students will collect specimens from decomposing remains. They must determine the species of arthropods present, estimated time of death, and other relevant information. Examples of professional case reports are available for comparison. Each student may select their preferred style, however, all relevant information must be presented.

Collection: The specimens collected from the remains must be preserved and presented appropriately.

### **Textbook & Reading Materials**

Articles will be posted to Carmen prior to scheduled class periods. Required reading and recommended reading will be identified as such.

#### **Recommended Reference Texts:**

- Catts, E.P. & N.H. Haskell (Eds.) 1990. Entomology & Death: A Procedural Guide. Joyce's Print Shot Inc. Clemson, South Carolina. 182pp.
- Rivers, D.B. & G.A. Dahlem. 2013. The Science of Forensic Entomology. John Wiley & Sons, Ltd. 400pp.

#### **Other Useful Forensic Texts:**

- Byrd, J.H. & J.L. Castner. 2009 Forensic Entomology, The Utility of Arthropods in Legal Investigations, 2nd Ed. CRC Press, Boca Raton. 681pp.
- Gennard, D.E. 2006. Forensic Entomology. J. Wiley & Sons Ltd, West Sussex, England. 224pp.
- Mallis, A., S.A. Hedges (Ed. Dir.), D. Moreland (Ed.). 2011. Handbook of Pest Control, 10th ed. Mallis Handbook & Technical Training Company (GIE Media, Inc.), Cleveland, OH. 1600pp.

### **Academic Misconduct Statement**

Students will be encouraged to work on assignments together but they will still be held accountable for normally defined situations of academic misconduct (plagiarism, cheating, and other forms of misconduct as defined by the university). Such misconduct will not be tolerated in this course. According to Faculty Rule 3335 31 02, Academic Misconduct is defined as: "...Any activity which tends to compromise the academic integrity of the institution or subvert the educational process." Please see the Student Resource Guide or the instructor if you have questions about this policy.

**Disability Statement**

This course normally requires some physical dexterity to examine, dissect specimens, and to demonstrate knowledge of morphological characteristics. However, if any student feels that she/he may need accommodations based on the impact of a disability as documented through the Office for Disability Services (614-292-3307 in room 150 Pomerene Hall), we will work diligently to coordinate reasonable accommodation for students with such documented disabilities.