

Course Information

Course Number: ENTO/VIBS 426/626
Course Title: Methods in Vector-borne Disease Ecology
Section: ENTO 426 (501); ENTO 626 (601); VIBS 426 (500); VIBS 626 (601)
Time: Monday and Wednesday, 8:20-11:10
Location: Heep Center 208
Credit Hours: 3

Instructor Details

Co-Instructor: Gabriel Hamer, MS, PhD
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Course Description

Methodological understanding of how vector-borne diseases are studied in the field and laboratory; hands-on exploration of the of ecology disease systems in a one health framework; concepts of design, execution and presentation of research projects; outdoor field work and bio-safety level 2 laboratory.

Course Prerequisites

Junior or senior classification and approval of instructor.

Special Course Designation

Cross-listed course (ENTO and VIBS)
Stacked course (undergraduates enroll in 426; graduate students in 626)

Additional learning outcomes for graduate students include:

- Critically review published studies in a research area.
- Summarize research findings in a manuscript that is suitable for peer-review and publication in a scientific journal.

Course Learning Outcomes

- Identify and compare the morphologic features and the ecology of the major vectors of disease in Texas, including mosquitoes, ticks, and triatomines.
- Demonstrate the use of field methods to study vector-borne disease by collecting biological specimens at local field sites.
- Follow protocols for serological and molecular processing of samples in a biosafety level 2 laboratory; organize experiments in a lab notebook.
- Design, conduct, and evaluate a research project from 'start to finish', including data collection in the field and lab and dissemination of results.

Textbook and/or Resource Materials

No textbook. Two notebooks are required (one for field, one for lab). Readings will be available electronically through CANVAS website.

Grading Policy

Evaluation: A=90–100%; B=80–89%; C=70–79%; D=60–69%; F=<60%

ENTO/VIBS 426: A total of 200 points are available

ENTO/VIBS 626: A total of 300 points are available

- Attendance and participation in class discussions (25 pts). Students will receive 0.5 pts for attending each session and 0.5 pts for participating in each session. An attendance clipboard will be in the front of the room for daily sign-in. Participation includes discussion, engaging with guest lecturers, asking and answering questions, and hands-on work in the field and lab.
- Exams (50 pts)
- Maintenance of field/lab notebooks (25 pts)
- Disease Detective course project (100 pts)
- ENTO/VIBS 626 only- manuscript (100 pts): The additional requirement of graduate students will be a manuscript.

Late Work Policy

Late assignments (e.g., submitting your journal after the deadline) will have a 10% deduction in points for up to 1 week, after which no credit will be issued, except in the case of a University excused absence.

Course Attributes

Disease Detectives Course Projects

Students will select one of three pre-determined research topics and engage in hypothesis generation and study design, field-based sample collection, lab-based molecular diagnostics, and data analysis throughout the semester. Projects will be conducted in small groups with a graduate student leader. Teams will prepare an oral presentation to deliver at the end of the semester. Additionally, graduate students will prepare a manuscript including literature review. In some cases, these manuscripts could be submitted for publication, pending contributions of students beyond the expectations of the semester-long course.

Field Research Experiences

A series of field-based experiences are planned to expose students to vector and host populations in their natural environments. Because these experiences will include hands-on processing of vertebrate species (wild birds, rodents, etc), all students will be required to complete animal use trainings as required by the TAMU Institutional Animal Use and Care Committee (IACUC). Due to activity patterns of vectors and hosts, and travel to various field sites, not all such experiences can be attained within the restraints of regularly-scheduled class periods. Accordingly, some experiences will require meeting at night, early morning, or during weekends. Prior to any off-campus activity, students will be required to complete travel authorization forms with emergency contact information, and instructors will attain approval of department heads. Additionally, students will register with the Biosafety and Occupational Health Program and complete Blood-borne Pathogen Training.

Photo Policy

We want you to enjoy the hands-on field and lab work we will conduct this semester, and we invite you to take photographs of your experiences to share with others. While all the work we do will uphold to strict protocols and humane treatment of animals, some photos taken out of context may be confusing to those not involved with our class. Therefore, you must obtain oral or written consent from instructors before distributing or posting to social media any photos taken of class activities.

Laboratory Research Experiences

Analysis of field-collected biological specimens in vector-borne disease ecology research often occurs within the laboratory. Students will gain proficiency with common research techniques and laboratory equipment used to study vectors and pathogens. Because the biological samples with which we will work pose health risks, all students will be required to complete Biosafety Level 2 training.

Career Opportunity Guest Lectures

Guest lectures are planned to feature different professionals who focus in vector-borne diseases. Invited speakers may include medical entomologists or zoonosis control veterinarians from the state health department, military entomologists, academic researchers with expertise in particular disease systems, or others. Each guest speaker will show the real-world application of the concepts learned in class, and asked to share their educational background and career path.

Course Schedule

Day	Lecture/Lab Topics	Outside of classroom activities
Wed, Jan. 18	<ul style="list-style-type: none"> • Introductions • Course overview • Presentation of group project topics • Compliance 	BSL2 training and Blood-borne pathogen training (see e-mail for details). Animal Use training: 'Working with the IACUC' course in CITI website; see Canvas for registration details
Mon, Jan. 23	<ul style="list-style-type: none"> • Vertebrate host sampling • Chemical immobilization of wildlife 	
Wed, Jan. 25	Field Trip to Biodiversity Research and Teaching Collections (BRTC) for mammal trapping, blood and tissue collections Meet at BRTC at 8:20am instead of coming to class. Car pool arrangements can be made.	*Optional* Evening (Jan 24, 4-6:30pm)- set mammal traps at BRTC- coordinate this with Jordan. Bring a head lamp!
Mon, Jan. 30	<ul style="list-style-type: none"> • Vector sampling methods Orient students to the Tick Drag Sampling project: all students are required to pick a site and day (or more than 1 day) and drag sample for ticks. Data sheet and sampling kit (drag cloth, forceps, vials) will be available in class.	Across the semester, students responsible for drag sampling various properties to collect and submit questing ticks and data
Wed, Feb. 1	Contemporary TAMU research on kissing bugs and ticks of Texas- lecture by TA Jordan Salomon	
Mon, Feb. 6	TBD	
Wed, Feb. 8	<ul style="list-style-type: none"> • Epidemiology in general • Spatial Epidemiology Submit Disease Detective project preference	
Mon, Feb. 13	<ul style="list-style-type: none"> • Vector-borne disease diagnostics: molecular, virology, parasitology and serological diagnostics 	
Wed, Feb. 15	Guest Lecture: Dr. Norm Beatty MD, Infectious Disease Clinician, University of Florida Topic: Career paths- medical. Kissing bug field research in Florida. Chagas disease screening programs abroad.	
Mon, Feb. 20	Field Trip to Sam Houston National Forest for tick dragging, mammal trapping (1 hour from campus)	*Optional* Go to Sam Houston Sunday Feb 19 to set traps and camp overnight
Wed., Feb 22	Exam 1	
Mon, Feb. 27	Guest Lecture: Dr. Carolyn Hodo, Veterinary Pathologist Topic: Scientific writing- preparation for your Disease Detectives project	
Wed, Mar 1	<ul style="list-style-type: none"> • Arthropod Identification 	
Mon, Mar 6	<ul style="list-style-type: none"> • Arthropod bloodmeal identification 	
Wed, Mar. 8	<ul style="list-style-type: none"> • Epidemiological/Ecological modeling • Vectorial capacity 	
Mar. 13-17	SPRING BREAK No class	
Mon, Mar. 20	Guest Lecture: Dr. Rafael do Nascimento Ramos, Universidade Federal Rural de Pernambuco Topic: Leishmania research in Brazil	

Wed, Mar. 22	EXAM 2	
Mon, Mar. 27	<ul style="list-style-type: none"> Group planning/writing time. Draft Introduction section of manuscript due via email by end of class 	FIELD AND LAB NOTEBOOKS INITIAL CHECK (12.5 points)
Wed, Mar. 29	Guest Lecture: Dr. Rachel Curtis-Robles PhD, Public Health Education and Outreach Officer, San Mateo County Mosquito & Vector Control District, California. Topic: County Vector Control and careers in medical entomology outreach	
Mon, Apr. 3	Guest Lecture (9:30 start time): Dr. Sonia Swiger, Professor & Veterinary/Medical Extension Entomologist, Texas A&M AgriLife Extension, Stephenville, TX Topic: Career opportunities in extension entomology	
Wed, Apr 5	<ul style="list-style-type: none"> Interactive Vector-borne Outbreak Investigation Role-Play Activity! 	
<i>Weekend of April 7-9</i>	Optional Field Trip to Laguna Atascosca National Wildlife Area (6 hours south along border). Leave Friday, come back Sunday. Transportation TBD. Pending Approval.	
Mon, Apr. 10	<ul style="list-style-type: none"> Demonstration of mosquito traps in lab. Students deploy traps to areas around campus and bring the contents to class for identification later. 	
Wed, Apr. 12	<ul style="list-style-type: none"> Bring in mosquitoes from traps on campus to ID Mosquito dissections 	
Mon, Apr. 17	Guest Lecture: Mr. Erik Foster, Medical Entomologist, Centers for Disease Control and Prevention, Ft. Collins, CO. Topic: Government/CDC careers in medical entomology Due: Revised Introduction, Draft Methods, outline of Results and Discussion of manuscript due via email by end of day	*Optional* AFTER CLASS- sub group to Sam Houston National Forest for dragging with Erik.
Wed, Apr. 19	<ul style="list-style-type: none"> Insect Radio-telemetry! **Bring large bugs to class as candidates for transmitters!*** Glue on radio-transmitters; release around Teaching Gardens	Students and instructors will attempt to relocate the insects using telemetry over the next 7 days: sign out sheet for antenna/receiver in classroom
<i>Weekend April 21-23</i>	Optional Field Trip to Mad Island Marsh Preserve for avian fieldwork-camping! (pending permissions)	At Mad Island, assessment of exotic ticks arriving on spring migratory birds
Mon, Apr. 24	EXAM 3	Small student groups continue to track insects FIELD AND LAB NOTEBOOKS FINAL CHECK (12.5 points)
Mon, May 1	LAST CLASS: Course Evaluations; Presentation of Disease Detective Research Projects; Food Party 😊	

****There will be NO FINAL EXAM during finals week for ENTO/VIBS 426/626****

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to [Student Rule 7](#) in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to [Student Rule 7](#) in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" ([Student Rule 7, Section 7.4.1](#)).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" ([Student Rule 7, Section 7.4.2](#)).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See [Student Rule 24](#).)

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" ([Section 20.1.2.3, Student Rule 20](#)). You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact the Disability Resources office on your campus (resources listed below) Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with

Disability Resources and their instructors as soon as possible. Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see [University Rule 08.01.01.M1](#)):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with [Counseling and Psychological Services](#) (CAPS). Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's [Title IX webpage](#).

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing available resources and services on your campus

Students who need someone to talk to can contact Counseling & Psychological Services (CAPS) or call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.