

**BIOLOGY OF DISEASE VECTORS**  
**BIOL 4409 -4 credits**  
**Texas A&M University San Antonio, College of Arts and Sciences**  
**Spring 2025 Syllabus**

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**“Walk-in” Office hours:** TBD  
Or **“By appointment”**

**Class Meeting Times and Location(s):**

Lecture: Tuesdays and Thursdays 2:00-3:15pm

Recitation - **On-line**

**Required Materials:**

- There is no book required for this course, your power point lectures and the scientific articles assigned will serve as the content of the course.
- On-Line Components
  - Blackboard
    - The recitation activities will take place online via Blackboard (see description below)
    - Lectures will be posted on Blackboard prior to the scheduled lecture
    - Announcements regarding lectures, labs, assignments, quizzes, and grading will be posted on Blackboard
    - Grades for individual assignments/labs etc... will be posted on Blackboard as we go along.
  - ChatGPT free version – we will be working with AI as a tool to help but understand.
  - Library Guide for this course:  
<https://libguides.tamusa.edu/c.php?g=1436215&p=10663456&preview=2472128297e6b342d7f0cb7f6525910e>

**Catalog Description and Prerequisites:**

Biology of Disease Vectors the biology and ecology of arthropods that transmit medically important diseases. Students will gain an understanding of the complex relationship between vectors and the pathogens they transmit, specifically the physiological, evolutionary, and ecological relationship. Students will also learn applied and epidemiological aspects of aspects of this complex relationship. A mandatory recitation is associated with this course. Prerequisites: BIOL 2411 and ENGL 2311 Recommended BIOL 3407 and BIOL 3402. This is a writing intentional course

**Learning objectives**

1. Students will gain an understanding of the complex relationship between vectors and the pathogens they transmit, specifically the physiological relationship and the evolutionary relationship between pathogen and vector.
2. Students will also learn the tools used to study this complex relationship, the epidemiology of the diseases carried by vectors, and methods of control.
3. Students will understand how to critically evaluate peer-reviewed journal articles and synthesize concepts and ideas into a scientific literature review.
4. Students will develop and employ writing processes that are appropriate for the types of writing they will be asked to complete in the biological sciences.
5. Students will employ context-specific expectations of grammar, sentence structure, punctuation and spelling as key facets of effective scientific writing.
6. Students will engage in discipline-specific collaborative writing practices.
7. Students will understand ethical writing principles

**Course content:**  
**Lecture Section**

**TOPICS COVERED:**

- Introduction - The arthropods
- Evolution of Arthropod Disease Vectors
- Mosquitoes
- Sandflies
- Black flies
- Tsetse flies
- Kissing bugs
- Ticks & Mites
- Lice
- Fleas
- Bedbugs
- Biting Midges
- Invasive Species & Emerging diseases
- Physiology – mosquito nutrition
- Physiology – mosquito olfaction & behavior
- Physiology – Salivary Gland & Midgut
- Physiology - Osmoregulation
- Physiology - endocrinology
- Physiology – immunity
- Surveillance of vectors of diseases
- Chemical Control
- Vector Resistance
- Biological Control of Vectors
- Sterile Insect Technique
- Genetic Control
- Integrated vector control

**3 Exams – (150 points each)**

- Exam will be in a take-home essay format and will cover lecture material and all discussion papers.
- Exams are to be completed individually using the information provided in class (power-points, scientific journal articles, notes).
- Students will receive a 0 on any exam that shows evidence of plagiarism, cheating, or working with others. The use of AI to generate answers to exam questions is not allowed as it is not your own work and thus considered plagiarism. See AI policy below.

**Scientific Literature Review with Power Point Presentation – (175 points)**

- This paper will be a scientific literature review on a topic related to vector biology. It will be written over the course of the semester, with several drafts so that when the final version is due at the end of the semester it should be in tip-top shape!
- We will schedule individual meetings to decide on a paper topic that is of interest to you.
- Additional directions will be provided.
- At the end of the semester you will be required to present your paper as a power point presentation to the class
- We will discuss how AI can be used as a tool in this process.

**Workshops – (~ 60 points but is variable)**

- As we work through the process of writing the literature review, I will be conducting workshops to help you in your writing process. Points associated with these activities are associated with attendance & participation.
- Most workshops will be on-line as part of your recitation section (see On-Line Recitation Section below), but some will be in person.
  - Workshop I – Writing Concisely
  - Workshop II – Paraphrasing and Plagiarism
  - Workshop III – Finding, Reading, and Organizing scientific articles for literature review
  - Workshop IV – Using AI as a tool in understanding themes
  - Workshop V – Theme and Thesis development for a scientific literature review
  - Workshop VI – Peer review of your introduction

**On-Line Recitation Section**

- Recitation Section is time for extra work, like the writing workshops above that would be beyond what is expected in a typical 3-credit course. Hence the extra 1 credit for this course.
- Recitation Section will be time outside of class during which you will be expected to read assigned journal articles, write up explanations of a particular figure, complete the writing workshops, and watch some recorded lectures. Doing these things during “recitation time” will allow us to do more discussion-based activities while we are in class.

- Each week you will read at least one paper from a current peer-reviewed journal that I will assign.
  - I will assign one or two of the **figures that you will need to analyze and explain**. Not only will you have to explain the data, but you will also need to explain the significance of the figure in terms of the goals of the research you are reading. **10 pts/week**
- We will discuss these articles further in class as they will be important material for your exams.

### **Policies & Suggestions for Success:**

- Come to class regularly and on time
- Take notes directly on the PowerPoints (hard copies or smart tablet) – this will be imperative to doing well on the take-home exams
- Ask questions in class
- Be an active participant
- Display mutual respect for all in the classroom, including me.

### **Lecture Attendance:**

- **Attendance is expected** and points for attendance will be assessed for any in-class workshops/writing assignments/peer-review days/presentation days

### **Make-up Policies:**

- Exams are take-home over the course of 3-4 days and they are submitted through blackboard, therefore make-up accommodations are limited (see below).
- In-class activities and paper discussions require participation on specific days and thus cannot be made up. However, see make-up policies below.
- Due dates for anything assigned will be strictly enforced and for every day it is late 10% will be docked.
- Due to the nature of most assignments and exams as described in the course content, the acceptable situations for make-up accommodations are:
  - Hospitalization
  - Hospitalization of an immediate family for which you are the primary caretaker.
  - Incapacitating illness, such as COVID
  - Any others – please contact me and we can discuss, I can be flexible up to a point, but reserve the right to deny.

### **Grading**

**Your final grade will be based on the total number of points earned divided by the total number of points available.**

**If the class average at the end of the semester is less than 70%, I will institute a course scale.** Therefore, I will not be scaling exams or assignments during the course of the semester. However, throughout the course of the semester, you will be informed of your standing. A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = below 60%

### **AI Policies**

#### **Use of Generative AI Permitted Under Some Circumstances or With Explicit Permission**

There are situations and contexts within this course where you may be asked to use artificial intelligence (AI) tools to explore how they can be used. Outside of those circumstances, you should not use AI tools to generate content (text, video, audio, images) that will end up in any student work (exams, assignments, activities, discussion responses, etc.) that is part of your evaluation in this course. Any student work submitted using AI tools should clearly indicate with attribution what work is the student's work and what part is generated by the AI. In such cases, no more than 25% of the student work should be generated by AI. If any part of this is confusing or uncertain, students should reach out to their instructor for clarification before submitting work for grading. Use of AI-generated content without the instructor's permission and/or proper attribution in this course qualifies as academic dishonesty and violates Texas A&M-San Antonio's standards of academic integrity.

Week	Dates	Lecture Topics	Assigned	DUE DATES
1	1/21 - 1/23	Introduction	Paper 1 assigned	
2	1/28 - 1/30	Mosquitoes	Paper 2 assigned	Tuesday – paper 1 summary due + in-class discussion
3	2/4-2/6	<ul style="list-style-type: none"> <li>• basic biology &amp; vector importance</li> <li>• mosquito nutrition</li> <li>• mosquito olfaction &amp; behavior</li> <li>• Osmoregulation</li> <li>• endocrinology</li> </ul>	Paper 3 assigned	Tuesday– paper 2 summary due + in-class discussion <b>Workshop I</b> on-line, complete activity by deadline posted on-line.
4	2/11-2/13	<ul style="list-style-type: none"> <li>• Salivary Gland &amp; Midgut</li> </ul>	Paper 4 assigned	Tuesday – paper 3 summary due + in-class discussion
5	2/18 – 2/20	Other Dipteran Vectors		Tuesday – paper 3 summary due + in-class discussion <b>Workshop II</b> on-line, complete activity by deadline posted on-line.
<b>EXAM I</b> assigned Friday. 2/21 – Due Monday 2/24 by midnight				
6	2/25 – 2/27	Kissing bugs Ticks & Mites Lice	Paper 5 assigned	<b>Workshop III</b> - on-line, complete activity by deadline posted on-line. Thursday – <b>Workshop IV in class</b>
7	3/4 - 3/6	Fleas Bedbugs Invasive Species & Emerging diseases Vector Surveillance	Paper 6 assigned	Tuesday – paper 5 summary due + in-class discussion <b>Have topic chosen by Thursday &amp; Schedule a meeting with me for the week of 3/18</b>
8	SPRING BREAK		SPRING BREAK	SPRING BREAK
9	3/18 – 3/20		Paper 7 assigned	Tuesday – paper 6 summary due + in-class discussion
10	3/25 – 3/27			Tuesday – paper 7 summary due + in-class discussion Thursday Bring at least <b>6 papers</b> for <b>Workshop V</b>
<b>EXAM II</b> assigned Friday 3/28 – Due Monday 3/31 by midnight				
11	4/1 – 4/3	Integrated Vector Control	Paper 8 assigned	
12	4/8 – 4/9	<ul style="list-style-type: none"> <li>• Chemical Control &amp; Insecticide Resistance</li> <li>• Biological Control</li> <li>• Sterile Insect Technique</li> </ul>	Paper 9 assigned	Tuesday – paper 8 summary due + in-class discussion Thursday – no class, working day to write first draft
13	4/15 – 4/17	<ul style="list-style-type: none"> <li>• Genetic Control</li> </ul>	Paper 10 assigned	Tuesday – FIRST DRAFT DUE Thursday - paper 9 summary due + in-class discussion
14	4/22 – 4/24			Tuesday – paper 10 summary due + in-class discussion.
15	4/29 – 5/1			Tuesday – FINAL DRAFT DUE + <b>Student Presentations</b> Thursday – <b>Student Presentations</b>
16	<b>5/13 2:00-3:50</b>			<b>Student presentations</b>
<b>EXAM III</b> assigned Friday 5/2 – Due Friday 5/9 by midnight				