

IDS 2935: Bite Me? Insects as Disease Vectors

UF Quest 2, Fall 2021

Time: Monday (10:40 am – 11:30 am) and Wednesday (10:40 am – 12:35 pm)

Location: MAT 0005

Instructor

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Course Description

Arthropod-borne diseases represent some of the most dangerous and major challenges facing human health. They have shaped the course of history and have remained a threat. Everyone has, at one point or the other, been exposed to the nuisance and bites of arthropods and, therefore, potentially to the diseases they may carry. The effects of these arthropod-borne diseases on human health are increasing and spreading. Factors such as the development of resistant parasite strains to the currently available drugs, and the evolution of insecticide resistance to the currently available insecticides account for this increase and spread. Other factors such as constantly changing climate, trade, unplanned urbanization, changes in agricultural practices, and human travel also aid the establishment of these diseases thereby intensifying disease transmission or causing disease emergence in areas where they were previously unknown. This is a multidisciplinary course that covers concepts and topics from the fields of entomology, medicine, public health, biology, parasitology, microbiology, and veterinary medicine. The course will address the interactions of arthropods to humans and the environment. It will present pressing issues relating to the impact of arthropods in public health and will also explore challenging questions such as “what are the emerging issues in vector biology and disease epidemiology”? and “what can be done to manage or prevent the occurrence of arthropod-borne diseases”?

Course Delivery

This course will explore content through lectures, in-class article discussions and review, group projects, and interactions with scientists at two research centers at the University of Florida. The in-class discussions will allow students to ask questions and discuss meaningful and thought-provoking topics about arthropods and human health. The group projects will foster student interaction and will further aid their understanding of public health issues. The interactions with scientists at the research centers will provide an opportunity for the students to gain more understanding of the research on arthropod-vector pathogens that are of major concern to the United States and the rest of the world.

The course will be delivered 2 times in a week. On Mondays, there will be lectures that will deliver content on insects and public health issues. On Wednesdays, there will be in-class article discussions and review, and each week, a student will lead the in-class article discussion. Students will also work in groups on broad topics taught in the class. Students will submit a written report and a PowerPoint presentation of their group work on emerging disease management.

Course Objectives and Student Learning Outcomes

At the end of the course, the students will be able to:

1. describe the historical and contemporary significance of insect-host interactions
2. describe the pathogenesis of arthropod-borne diseases in humans
3. explain the global health impact of arthropod-borne diseases on human health
4. evaluate the drivers of disease transmission on a global perspective
5. demonstrate a knowledge of disease control strategies, and the inherent challenges
6. describe emergent arthropod-borne infectious diseases, and strategies for their control
7. formulate and develop a plan for research into the impact and control of arthropod-borne diseases
8. communicate research on arthropod-borne diseases using oral and written skills

Course Schedule

Week	Date	Topic/Activity	Assessments
1. Historical Aspects and Impacts of Arthropod-Borne Diseases			
1	08/23	Lecture: Historical aspects of vector-borne diseases	
	08/25	<ul style="list-style-type: none"> • In-class article review 1 • Group project discussion 	<ul style="list-style-type: none"> • Assignments into groups for group projects due
2	08/30	Lecture: Impact of arthropods on health	
	09/01	<ul style="list-style-type: none"> • In-class article review 2 • Group project discussion 	<ul style="list-style-type: none"> • Group written report on historical aspects and impacts of arthropod-borne diseases due
2. Disease Transmission by Arthropod Vectors			
3	09/06	Lecture: Arthropod transmission of parasites	
	09/08	<ul style="list-style-type: none"> • In-class article review 3 • Group project discussion 	
4	09/13	Lecture: Mosquito-borne diseases	
	09/15	<ul style="list-style-type: none"> • In-class article review 4 • Group project discussion 	<ul style="list-style-type: none"> • Exam 1
5	09/20	Lecture: Tick-borne diseases	

	09/22	<ul style="list-style-type: none"> In-class article review 5 Group project discussion 	
6	09/27	Lecture: Flea-borne diseases	
	09/29	<ul style="list-style-type: none"> In-class article review 6 Group project discussion 	
7	10/04	Lecture: Sand-fly-transmitted diseases and other important vector-borne diseases	
	10/06	<ul style="list-style-type: none"> In-class article review 7 Group project discussion 	
8	10/11	Lecture: Arthropods, diseases, and the military	
	10/13	<ul style="list-style-type: none"> In-class article review 8 Group project discussion 	<ul style="list-style-type: none"> Group written report on disease transmission by arthropod vectors due Exam 2
3. Surveillance, Management, and Control of Arthropod-Borne Diseases			
9	10/18	Lecture: Surveillance and management of arthropod-borne diseases	
	10/20	<ul style="list-style-type: none"> In-class article review 9 Group project discussion 	
10	10/25	Lecture: Insecticides and public health – benefits, costs, and resistance	
	10/27	<ul style="list-style-type: none"> In-class article review 10 Group project discussion 	<ul style="list-style-type: none"> Field visit to USDA Center for Medical, Agricultural and Veterinary Entomology, University of Florida
11	11/01	Lecture: Vaccines against arthropod-borne diseases	
	11/03	<ul style="list-style-type: none"> In-class article review 11 Group project discussion 	
12	11/08	Lecture: Future of GMOs in public health and disease control	
	11/10	<ul style="list-style-type: none"> In-class article review 12 Group project discussion 	<ul style="list-style-type: none"> Exam 3 Group written report on surveillance, management, and control of arthropod-borne diseases due
4. Emerging Issues in Arthropod-Borne Diseases			
13	11/15	Lecture: Drivers of the emergence of arthropod-borne diseases	

	11/17	<ul style="list-style-type: none"> In-class article review 13 Group project discussion 	<ul style="list-style-type: none"> Field visit to Emerging Pathogens Institute, University of Florida
14	11/22	Lecture: Invasive species and emerging arthropod-borne diseases	
	11/24	Thanksgiving	
15	11/29	Lecture: Chagas disease: a public health success or an emerging threat?	<ul style="list-style-type: none"> Group written report on emerging issues in arthropod-borne diseases due Self-reflection report due
	12/01	<ul style="list-style-type: none"> In-class article review 14 Group project discussion 	
16	12/06	Lecture: Emerging vector-borne diseases in the United States: what is next, and are we prepared?	
	12/08	<ul style="list-style-type: none"> Emerging disease presentation 	<ul style="list-style-type: none"> Emerging disease management written report due Emerging disease management in-class PowerPoint presentation Evaluation of individual contribution to group project due Exam 4

Textbooks/Required Readings

There are no required textbooks for this course. However, a list of required readings which are intended to aid the student's understanding of the topics will be made available to the students in Canvas. Students are also required to download and read the assigned readings before the in-class article discussion and review on Wednesdays.

Student Assessments

Student assessments will be based on performance in exams, article reviews, group projects, and submission of a self-reflection report. At the beginning of the semester, students are to join groups consisting of 4 members maximum. The groups will work together on the broad topics under which the course content in the class will be delivered.

Exams

There will be four exams throughout the semester (50 points each). The exams will test the students' understanding of the literature and concepts taught in the course. The exams will consist of 25 questions that will be a mix of multiple choice, mix and match, fill in the blank, true/false, and short essay questions. Each exam will be made available and accessible in Canvas on Wednesday of the exam week. The exam will be taken in class. The first exam will cover materials taught from weeks 1 to 3, the second exam will cover materials taught from weeks 4 to 7, and the third exam will cover materials taught from weeks 8 to 11. The fourth and last exam will cover the materials taught in the class from weeks 12 to 16.

In-Class Article Review and Discussion

Each student is required to download and review the assigned reading(s) for each week prior to the in-class article review and discussion on Wednesdays. Each student is required to then submit a 1-page summary and their review of the assigned reading(s) (10 points each) at the start of classes on Wednesdays. The review should be about the scientific content of the article and not about the writing format, font, margin, or editing issues of the paper. The PDFs of the assigned readings to be reviewed will be made available to students in Canvas. Students' submissions will be evaluated using a rubric which will be provided in Canvas.

Experiential Learning

Students are required to interact with scientists at two research facilities at the University of Florida - USDA Center for Medical, Agricultural and Veterinary Entomology, and Emerging Pathogens Institute. Both facilities will provide an opportunity for the students to learn more about arthropod-vector-borne diseases that are of major concern to both the United States and the rest of the world.

Self-Reflection Report: Students are required to submit a written report (50 points each) reflecting on their experiences at the research centers. They are to reflect on what they have learnt, and how the visit to the research centers, and the interactions with the scientists and researchers are relevant to their intellectual and personal development. For example, if given the opportunity, the kind of arthropod vector research they would like to do, and how the outcome of their proposed research will reflect on public health issues in Florida, the United States, and the rest of the world. The report should not exceed 5 pages in length, double-spaced, size 12 Times New Roman with 1 inch-margin. The references, if any, should be from primary literature. The references must be APA 7th style. The written reports are due by 5pm of the due date. Late submissions will be marked down by 5 points per day

Group Project

To evaluate individual contribution to the group project, each member of the team will evaluate every other student member in the group (20 points). Team member evaluation will be done using a rubric that will be provided in Canvas.

Broad Topic Written Report: The course content will be discussed under four broad headings in class. These are:

1. historical aspects and impacts of arthropod-borne diseases
2. disease transmission by arthropod vectors
3. surveillance, management, and control of arthropod-borne diseases
4. emerging issues in arthropod-vectored diseases

Students are required to work as a team in groups of about 3 to 4 on topics pertaining to these broad topics. Students are required to submit their written report (15 points each) before the due date. The reports should include the title and the names of the group members. The report should not exceed 10 pages in length (including references, tables or figures), double-spaced, size 12 Times New Roman with 1 inch-margin. The references should be from primary literature. The references must be cited according to the APA 7th referencing style. The written reports are due by 5pm of the due date. Late submissions will be marked down by 5 points per day.

Emerging Disease Management Report and Presentation: Towards the end of the semester, students are also required to work in groups to submit a written report and also give a 15-20 minute in-class PowerPoint presentation on an insect-vectored emerging disease (15 points). Each member of the team must participate. Please use the NIAID Emerging Infectious Diseases/Pathogens list for potential insect-vectored diseases to work on. The information presented should include the pathogen, reservoir, vector, symptoms, and management plan. The students can focus on one area of the disease cycle to focus on and interrupt. The written report and the in-class presentations will be evaluated using a rubric which will be provided in Canvas.

Grades and Grade Points

Course requirements		Point value	Total points	Percentage
Exams		50 each	200	40
In-class article review and discussion		10 each	140	28
Group project	Broad topic written reports	15 each	60	12
	Emerging disease management written report	15	15	3
	Emerging disease management in-class PowerPoint presentation	15	15	3
	Evaluation of individual effort to group project	20	20	4
Experiential learning self-reflection report		50	50	10
Total			500	100%

Grading Scale

Grade	Percentages
A	93 - 100
A-	90 - 92.9
B+	87 - 89.9
B	83 - 86.9
B-	80 - 82.9
C+	77 - 79.9
C	73 - 76.9
C-	70 - 72.9
D+	67 - 69.9
D	63 - 66.9
D-	60 - 62.9
E	<59.9 and below

University of Florida Policies and Assistance

Grades and Grade Points - A minimum grade of C is required for Gen Ed credit. For information on current University of Florida policies for assigning grade points, see <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Attendance and Make-Up Work

Students are expected to attend classes. Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Online Course Evaluation Process

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>.

Academic Honesty

The University requires all members of its community to be honest in all endeavors. Cheating, plagiarism, and other acts diminish the process of learning. When students enroll at University of Florida, they commit themselves to honesty and integrity. Your instructor fully expects you to adhere to the academic honesty guidelines you signed when you were admitted to University of Florida.

Plagiarism is the use of ideas or writings produced by someone else. You should not use the

writings of another person, including material from the internet (WWW), without putting the ideas in your own words, or placing the copied material in quotes and attributing authorship. In the scientific literature, quotations are rarely used. You should use your own words for answering questions on exams, and in your class project.

UF students are bound by The Honor Pledge which states, *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code"*. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."* The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. If you have any questions or concerns, please consult with the instructor in this class.

It is to be assumed that all work will be completed independently unless the assignment is defined as a group project, in writing by the professor. This policy will always be vigorously upheld in this course.

Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action.

For more information regarding the Student Honor Code, please see:

<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are:

1. for personal educational use,
2. in connection with a complaint to the university, or
3. as evidence in, or in preparation for, a criminal or civil proceeding.

All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor. A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session. Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but

not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Policy on Course Syllabi 3 UF, Academic Affairs, Honor Code and Student Conduct Code.

Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation 0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general wellbeing are encouraged to utilize the university's counseling resources. The Counseling Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal or lacking clear career and academic goals, which interfere with their academic performance.

- *Health and Wellness*
 - U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.
 - Counseling and Wellness Center: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.
 - Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need or visit the Student Health Care Center website.
 - University Police Department: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).
 - UF Health Shands Emergency Room/Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

- *Academic Resources*
 - E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.
 - Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.
 - Library Support: Various ways to receive assistance with respect to using the libraries or finding resources.
 - Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.
 - Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.
 - Student Complaints On-Campus: Visit the Student Honor Code and Student Conduct Code webpage for more information.
 - On-Line Students Complaints: View the Distance Learning Student Complaint Process.