

IDS 2935: Bite Me? Insects as Disease Vectors

UF Quest 2

Fall 2022

Monday: 10:40 am – 11:30 am, TUR 2328

Wednesday: 10:40 am – 12:35 pm, TUR 2318

Instructor

Dr. Tolulope Agunbiade
Office: 3212 Steinmetz Hall
Phone: 352-294-6792
E-mail: agunbiade@ufl.edu
Office Hours: Fridays at 12 PM

Teaching Assistant

Decyo McDuffie
Office: 3237 Steinmetz Hall
Phone: 706-421-8398
E-mail: mcduffie.decyo@ufl.edu
Office Hours: Thursdays at 2 PM

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 the USDA Center for Medical, Agricultural, and Veterinary Entomology, 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 USDA Center for Medical, Agricultural, and Veterinary Entomology will provide an opportunity for the students to interact with scientists at this center about 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. 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.

Course Objectives and Student Learning Outcomes

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

1. describe the pathogenesis of arthropod-borne diseases in humans
2. describe the historical and contemporary significance of insect-host interactions
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	W - 08/24	Introduction Lecture: Historical aspects of vector-borne diseases	Assignments into groups for group projects due
2	M - 08/29	Lecture: Impact of arthropods on health	
	W - 08/31	In-class review 1 and group project discussion (<i>Historical aspects of vector-borne diseases</i>)	
3	M - 09/05	Holiday	
	W - 09/07	In-class review 2 and group project discussion (<i>Impacts of arthropods on health</i>)	Group report and presentation on historical aspects and impacts of arthropod-borne diseases due
2. Disease Transmission by Arthropod Vectors			
4	M - 09/12	Lecture: Arthropod transmission of vertebrate parasites	Assignments into groups for group projects due
	W - 09/14	In-class review 3 and group project discussion (<i>Arthropod transmission of vertebrate parasites</i>)	
5	M - 09/13	Lecture: Mosquito-borne diseases	Exam 1

	W - 09/15	In-class review 4 and group project discussion (<i>Mosquito-borne diseases</i>)	
6	M - 09/19	Lecture: Tick-borne diseases	
	W - 09/21	In-class review 5 and group project discussion (<i>Tick-borne diseases</i>)	
7	M - 09/26	Lecture: Flea-borne diseases	
	W - 09/28	In-class review 6 and group project discussion (<i>Flea-borne diseases</i>)	
8	M - 10/03	Lecture: Sand-fly-transmitted diseases and other important vector-borne diseases	
	W - 10/05	In-class review 7 and group project discussion (<i>Sand-fly-transmitted diseases and other important vector-borne diseases</i>)	
9	M - 10/10	Lecture: Arthropods, diseases, and the military	Exam 2
	W - 10/12	In-class review 8 and group project discussion (<i>Arthropods, diseases, and the military</i>)	Group report and presentation on disease transmission by arthropod vectors due
3. Surveillance, Management, and Control of Arthropod-Borne Diseases			
10	M - 10/17	Lecture: Surveillance and management of arthropod-borne diseases	Assignments into groups for group projects due
	W - 10/19	In-class review 9 and group project discussion (<i>Surveillance and management of arthropod-borne diseases</i>)	
11	M - 10/24	Lecture: Insecticides and public health – benefits, costs, and resistance	
	W - 10/26	In-class review 10 and group project discussion (<i>Insecticides and public health – benefits, costs, and resistance</i>)	Field visit to USDA Center for Medical, Agricultural and Veterinary Entomology, University of Florida
12	M - 10/31	Lecture: Vaccines against arthropod-borne diseases	
	W - 11/02	In-class review 11 and group project discussion (<i>Vaccines against arthropod-borne diseases</i>)	
13	M - 11/07	Lecture: Future of GMOs in public health and disease control	Exam 3
	W - 11/09	In-class review 12 and group project discussion (<i>Future of GMOs in public health and disease control</i>)	Group report and presentation on surveillance, management, and control of arthropod-borne diseases due
4. Emerging Issues in Arthropod-Borne Diseases			
14	M - 11/14	Lecture: Drivers of the emergence of arthropod-borne diseases	Assignments into groups for group projects due
	W - 11/16	In-class review 13 and group project discussion (<i>Drivers of the emergence of arthropod-borne diseases</i>)	

15	M - 11/21	Lecture: Invasive species and emerging arthropod-borne diseases	
	W - 11/23	<i>Thanksgiving (submit review 14 in canvas – Invasive species and emerging arthropod-borne diseases)</i>	
16	M - 11/28	Lecture: Chagas disease: a public health success or an emerging threat?	
	W - 11/30	In-class review 15 and group project discussion (<i>Chagas disease: a public health success or an emerging threat?</i>)	
17	M - 12/05	Lecture: Emerging vector-borne diseases in the United States: what is next, and are we prepared?	Self-reflection report due Emerging disease report due
	W - 12/07	In-class review 16 and group project discussion (<i>Emerging vector-borne diseases in the United States: what is next, and are we prepared?</i>)	Group report and presentation on emerging issues in arthropod-borne diseases due
18	M - 12/12		Exam 4

Disclaimer: This syllabus represents current course plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected

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 an experiential learning self-reflection report and emerging disease management report. Students are required to work in groups of 5 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 be closed book and will test the students' understanding of the literature and concepts taught in the course. The exams will be a mix of multiple choice, mix and match, fill in the blank, true/false, and short essay questions. The exam will be made available in Canvas and taken in class. The first, second, third, and last exam will cover materials taught from weeks 1 to 4, weeks 5 to 8, weeks 9 to 12, and weeks 13 to 17, respectively.

In-Class Article Review and Discussions

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) before the start of classes on Wednesdays. The PDFs of the assigned readings will be made available to students in Canvas. Students' submissions will be evaluated using a rubric which will be provided in Canvas.

Group Projects

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-vector-borne diseases

Students are required to work as a team in groups of about 5 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 APA 6th style. The written reports are due by 5pm of the due date. Late submissions will be marked down by 5 points per day. Students are also required to give an in-class PowerPoint presentation on their chosen topic (15 points each). You can select one or two members of your team to give the presentation. Each member of the team must participate. The written report and the in-class presentations will be evaluated using a rubric which will be provided in Canvas. To evaluate individual contribution to the group project, each member of the team will evaluate every other student member in the group (20 points each). Team member evaluation will be done using a rubric that will be provided in Canvas.

Experiential Learning and Self-Reflection Report

Students are required to interact with scientists at the USDA Center for Medical, Agricultural and Veterinary Entomology. This 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: Students are required to submit a written report (50 points) reflecting on their experiences and interactions with the scientists. They are to reflect on what they have learnt, and how the interactions with the scientists 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. A template of the self-reflection report which is to be filled out will be provided for the students in Canvas. 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: Students are required to submit a written report on an insect-vector-borne emerging disease (15 points). Please use the NIAID Emerging Infectious Diseases/Pathogens list for potential insect-vector-borne diseases to work on. The

information presented should include the pathogen, reservoir, vector, symptoms, and management plan. Focus should be on a management plan for these emerging diseases. Students can focus on one area of the disease cycle to interrupt for control. The written report 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	31.25
In-class article review and discussion		10 each	160	25
Emerging Disease Management Report	Written report	15	15	2.34
	PowerPoint presentation	15	15	2.34
Experiential learning	Self-reflection report	50	50	7.81
Group project	Written reports	15 each	60	9.38
	In-class presentations	15 each	60	9.38
	Evaluation of individual effort to group project	20 each	80	12.5
Total			640	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.a.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>

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.