

IDS 2935: Bite Me? Insects as Disease Vectors

UF Quest 2, Fall 2020

Time: Monday, Wednesday, and Friday 4th Period (10:40 am – 11:30 am)

Location: Course will be delivered online using Zoom video conferencing in Canvas

Instructor

Dr. Tolulope Agunbiade

Office: 3212 Steinmetz Hall

Phone: 352-294-6792

E-mail: agunbiade@ufl.edu

Office Hours: by phone or e-mail

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, and 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 insects 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 interact with scientists at these centers about research on arthropod-vectored pathogens that are of major concern to the United States and the rest of the world. The course will be delivered 3 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. On Fridays, students will work in groups on broad topics taught in the class. Towards the end of the class, students will present 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 into arthropod-borne diseases using oral and written skills

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 required to download and read the assigned readings before the in-class article discussion and review on Wednesdays.

Course Schedule

| Week | Date | Topic/Activity | Assessments |
|--|-------|---|--|
| 1. Historical Aspects and Impacts of Arthropod-borne Diseases | | | |
| 1 | | Arthropod as disease vectors - history and impact | |
| | 08/31 | M: Lecture | |
| | 09/02 | W: in-class review | Article summary/review due Assignments into groups for group projects due |
| | 09/04 | F: Group project | Group report on historical aspects and impacts of arthropod-borne diseases due |
| 2. Disease Transmission by Arthropod Vectors | | | |
| 2 | | Are mosquitoes man's deadliest foes? | |
| | 09/07 | M: Lecture | |
| | 09/09 | W: in-class review | Article summary/review due |
| | 09/11 | F: Group project | |
| 3 | | Ticks and Lyme | |
| | 09/14 | M: Lecture | Quiz 1 |
| | 09/16 | W: in-class review | Article summary/review due |
| | 09/18 | F: Group project | |
| 4 | | Wildlife and domestic animals as reservoir hosts of diseases | |
| | 09/21 | M: Lecture | |
| | 09/23 | W: in-class review | Article summary/review due |
| | 09/25 | F: Group project | |

| | | | |
|---|-------|---|---|
| 5 | | Arthropods, disease, and the military | |
| | 09/28 | M: Lecture | |
| | 09/30 | W: in-class review | Article summary/review due |
| | 10/02 | F: Group project | Group report on disease transmission by arthropod vectors due |
| 3. Surveillance, Management, and Control of Arthropod-Borne Diseases | | | |
| 6 | | Insecticides and public health: benefits, costs, and resistance | |
| | 10/05 | M: Lecture | |
| | 10/07 | W: in-class review | Article summary/review due |
| | 10/09 | F: Group project | |
| 7 | | The DDT dilemma: costs and benefits | |
| | 10/12 | M: Lecture | Quiz 2 |
| | 10/14 | W: in-class review | Article summary/review due |
| | 10/16 | F: Group project | |
| 8 | | What's behind a bite? Arthropod saliva in vector-host interactions | |
| | 10/19 | M: Lecture | |
| | 10/21 | W: in-class review | Article summary/review due |
| | 10/23 | F: Group project | |
| 9 | | Vaccines against arthropod-borne diseases | |
| | 10/26 | M: Lecture | |
| | 10/28 | W: in-class review | Article summary/review due |
| | 10/30 | F: Group project | |
| 10 | | Future of GMOs in public health and disease control | |
| | 11/02 | M: Lecture (R) | Field visit to USDA Center for Medical, Agricultural and Veterinary Entomology, University of Florida (R) |
| | 11/04 | W: in-class review | Article summary/review due |
| | 11/06 | F: Group project | |
| 11 | | Drivers of the emergence of arthropod-borne diseases | |
| | 11/09 | M: Lecture | Quiz 3 |
| | 11/11 | W: in-class review | Article summary/review due |
| | 11/13 | F: Group project | Group report on surveillance, management, and control of arthropod-borne diseases due |
| 4. Emerging Issues in Arthropod-Vectored Diseases | | | |
| 12 | | Invasive species and emerging arthropod-borne diseases | |
| | 11/16 | M: Lecture | |
| | 11/18 | W: in-class review | Article summary/review due |
| | 11/20 | F: Group project | |

| | | | |
|----|-------|---|--|
| 13 | | Chagas disease: a public health success or an emerging threat? | |
| | 11/23 | M: Lecture | |
| | 11/25 | W: in-class review | Article summary/review due |
| | 11/27 | F: Group project | Topic of group project in-class PowerPoint presentation due |
| 14 | | Emerging vector-borne diseases in the United States: what is next and are we prepared? | |
| | 11/30 | M: Lecture (R) | Quiz 4 |
| | 12/02 | W: in-class review | Field visit to Emerging Pathogens Institute, University of Florida (R) Article summary/review due |
| | 12/04 | F: Group project | Group report on emerging issues in arthropod-borne diseases due Field research report due |
| 15 | 12/07 | M: In-class group PowerPoint presentations | |
| | | Grades | |

Student Assessments

Student assessments will be based on performance in quizzes, 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.

Quizzes

There will be four quizzes throughout the semester (50 points each). The quizzes will be open-book and will test the students' understanding of the literature and concepts taught in the course. The first quiz will cover materials taught from weeks 1 to 3, the second quiz will cover materials taught from weeks 4 to 7, and the third quiz will cover materials taught from weeks 8 to 11. The fourth and last quiz will cover the materials taught in the class from weeks 12 to 14.

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 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 Project

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 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 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 (60 points). 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 (30 points). 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 via Zoom video conferencing 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: Students are required to submit a written report 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 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 6th style. The written reports are due by 5pm of the due date. Late submissions will be marked down by 5 points per day.

Grades and Grade Points

| Course Requirement | | Point Value | Total Points | Percentages |
|--|--|--------------------|---------------------|--------------------|
| Quizzes | | 50 each | 200 | 33.33 |
| In-class article review and discussion | | 10 each | 150 | 25 |
| Group project | Written reports | 15 each | 60 | 10 |
| | In-class presentation | 60 | 60 | 10 |
| | Evaluation of individual effort to group project | 30 | 30 | 5 |
| Self-reflection report | | 100 | 100 | 16.67 |
| Total | | | 600 | 100% |

| Grading Scale | Points Required | Percentage |
|----------------------|------------------------|-------------------|
| A | 558 – 600 | 93 - 100 |
| A- | 540 – 557.4 | 90 - 92.9 |
| B+ | 522 – 539.4 | 87 - 89.9 |
| B | 498 – 521.4 | 83 - 86.9 |
| B- | 480 – 497.4 | 80 - 82.9 |
| C+ | 462 – 479.4 | 77 - 79.9 |
| C | 438 – 461.4 | 73 - 76.9 |
| C- | 420 – 437.4 | 70 - 72.9 |
| D+ | 402 – 419.4 | 67 - 69.9 |
| D | 378 – 401.4 | 63 - 66.9 |
| D- | 360 – 377.4 | 60 - 62.9 |
| E | 359.4 and below | 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

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>

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.

As a result of completing the registration form at the University of Florida, every student has signed the following statement:

"I understand the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University. "Furthermore, on work submitted for credit by University of Florida students, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

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>

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.

- The University Counseling and Wellness Center, 3190 Radio Road, 352-392-1575
www.counseling.ufl.edu
 - Counseling Services
 - Groups and Workshops
 - Outreach and Consultation
 - Self-Help Library
 - Wellness Coaching

- U Matter We Care, www.umatter.ufl.edu/
- Career Resource Center, First Floor JWRU, 392-1601, <https://career.ufl.edu/>