

## **BSCI483: Insects, Pathogens, and Public Health**

**Instructor:** Megan Fritz, Ph.D., Entomology

**Graduate Teaching Assistant:** Arielle Arsenault-Benoit

### **Contact Info:**

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**Zoom Office Hours:** Mondays 8:00-8:50am or by appointment

**Course Communication:** Email communication between students and instructors should be conducted in a respectful and professional manner. For questions posed by email, students can expect an instructor response within 48 hours or less.

**Course Schedule:** Section 0101: MW 9:00-9:50am, F 9-9:50am (Discussion)  
Section 0102: MW 9:00-9:50am, F 10-10:50am (Discussion)

**Course Format:** Course content will be delivered in-person unless otherwise directed by University of Maryland administration. For the protection of *all* students and instructors, students are expected to wear masks at all times while in the classroom, regardless of vaccination status. This policy will remain in place *for all of Fall 2021*, independently of the Prince George's County indoor mask mandate. Additional conditions on in-person learning may be put in place according to University of Maryland COVID-19 safety guidelines.

Course content will be delivered in interactive lecture format on Mondays and Wednesdays. Lecture recordings covering MW materials will be posted within 24 hours of each class period on ELMS. Friday meetings will involve interactive discussions of reading materials, as well as hands-on, small group activities.

### **Broad Course Objectives:**

Upon completion of this course, students will be able to:

- 1.) Compare and contrast arthropod-caused injury versus arthropod-borne disease transmission and provide at least 3 examples/descriptions of each per in-class discussions.
- 2.) Describe the morphological, physiological and/or behavioral features of blood-feeding arthropods that contribute to their status as potential public health enemies.
- 3.) Design a series of experiments to incriminate an arthropod vector when given a novel/emerging vector-borne disease scenario.
- 4.) Recall the factors influencing vectorial capacity, and predict how changes in these factors would influence vector-borne disease transmission.
- 5.) Describe the One Health Initiative, and provide at least two examples of the relationships between human, animal, and ecosystem health as they pertain to arthropod-borne disease.
- 6.) Prescribe and justify a choice of management tactic when given a potential arthropod-borne disease transmission scenario.

**Prerequisites:** BSCI 160 & 161, BSCI 170 & 171, BSCI 207

**Examinations:** There will be 2 examinations (60 points/exam), each covering approximately half of the course material. Students are responsible for all of the material presented in lecture, discussion sections, and assigned readings. Examinations account for 40% of the final grade.

**Quizzes:** There will be 12 timed online quizzes (10 pts. each) offered throughout the semester on the course ELMS page. All quizzes will be open from Wednesdays at 9:00am through Fridays at 8:59am and will be accessible for 10 min. Students with accommodations should contact Dr. Fritz directly about their needs on or before Wednesday Sept. 1. Quizzes will cover material discussed since the previous quiz or exam. Online quizzes will be worth 40% of the final grade.

**Final Project:** Groups of students (3 per group) will choose a vector-borne disease (zoonotic or anthroponotic) that impacts human health in any part of the world from a list provided by the instructor. Students will work together to generate and present a condensed (10 min) “Case study” to their classmates, the format of which should be similar to case studies from lecture. On the day of their presentation, each student will also hand in 5 written questions along with detailed answers that may be included on the Final Exam. Students will be provided with a rubric during Week 6 to help guide their preparation for both the oral presentation and question writing. This will be worth 10% of the final grade, and will be presented during Friday discussion sections in weeks 12, 14, 15.

**Participation:** Students should attend and participate in all course meetings during the semester. Participation is worth 10% of the final course grade, and will be determined by level of engagement during the discussion. Discussions will cover course lecture materials and readings for the week. Students are expected to have read assigned papers and/or completed assigned activities prior to each meeting. Appropriate forms of engagement include: 1) respectful and positive verbal discourse with the instructor or peers, or 2) insightful questions related to course materials. Students will be allowed to miss one discussion without impacting their final grade.

**COVID-19 Missed Discussion Policy:** If you are ill or have been exposed to COVID-19, *PLEASE* do not attend lecture or your scheduled Discussion section. While we expect participation in all Discussion sections for healthy students, a two page writing assignment can be provided as a substitute to earn participation points for students who are unwell (see Attendance Policy below).

**Grading Scale:**

93–100: A	77–79.9: C+
90–92.9: A-	73–76.9: C
87–89.9: B+	70 –72.9: C-
83–86.9: B	67 –69.9: D+
80–82.9: B-	60 –66.9: D
	Below 60: E

**Extra Credit:** Extra credit assignments are not available for this course.

**Text (optional):**

Mullen, G. and L. Durden. 2009. **Medical and Veterinary Entomology**. 3rd ed. Academic Press. Estimated cost is \$80.00 for paperback. Available at Amazon.com or University Book Center.

This text is an excellent resource for further reading. Copies of all required course readings will be posted on ELMS.

**Course-relevant websites:**

Centers for Disease Control	<a href="http://www.cdc.gov">http://www.cdc.gov</a>
Morbidity Mortality Weekly Report	<a href="http://www2.cdc.gov/mmwr/">http://www2.cdc.gov/mmwr/</a>
Journal of Emerging and Infectious Disease	<a href="http://www.cdc.gov/ncidod/eid/">http://www.cdc.gov/ncidod/eid/</a>
One Health Initiative	<a href="http://www.onehealthinitiative.com/">http://www.onehealthinitiative.com/</a>

**Attendance:** Attendance is not required for most lectures, but is strongly encouraged. Attendance for the smaller group discussion on Fridays is not required but incentivized with a participation grade. Students *must* be present on exam dates and for final project presentations. You must follow the university policy on excused or pre-arranged absences, including to earn Friday discussion participation points.

University absence policy can be found here: <https://www.ugst.umd.edu/courserelatedpolicies.html>

Pre-arrangements for religious observances and planned, excusable absences must be made by email during the schedule adjustment period at the beginning of the semester. If an illness prevents participation in Discussion sections, a note from a physician or evidence of a COVID-19 test must be provided within 72 hours of the missed discussion period.

**Make-Up Policy:** Make-up exams and assignments will be given only to students who have university-excused absences with appropriate documentation.

**WARNING:** This course covers medical conditions whose manifestation/transmission is associated with arthropods. As such, some images or videos presented in lecture slides may be disturbing to some individuals. These images come from reputable sources, and may include open wounds, rashes, and other visible manifestations of disease in humans and animals. If you have concerns about this, please see the instructor.

## 2021 Course Schedule

\*A complete course schedule with links to all relevant readings and other course materials is available on the course ELMS page.

### Week 1 Module (Dates: 8/30-9/3) - Introduction to the Arthropods

- Online Quiz 1 - *Due 9/3 at 8:59am*
  - *This online quiz will cover material from the syllabus.*
- Discussion section - Arthropod zoo hands-on activity
  - Print and bring the student activity handout to your Discussion section. It is provided in the Week 1 module directory on ELMS.

### Week 2 Module (Dates: 9/7-9/10) - Arthropods and Humans: the good, the bad, and the ugly.

- No Class Monday 9/6
- Online Quiz 2 - *Due 9/10 at 8:59am*
  - This online quiz will cover material from Wednesday's lecture and BOTH readings.
- Discussion section - Shipley and Bixler paper discussion
  - Bring a COMPLETED student activity handout to your Discussion section. A blank copy of the activity is provided in the Week 2 module directory on ELMS.

### Week 3 Module (Dates: 9/13-9/17) - Physical injury and emotional impacts of arthropods.

- Online Quiz 3 - *Due 9/17 at 8:59am*
  - Covers Monday and Wednesday lectures, as well as BOTH readings by Day.
- Discussion section - Bellanger et al. 2009 paper discussion.
  - There is no formal assignment for this Discussion section, but please come prepared by having read Bellanger et al. All students will be asked to answer questions about the reading during class.

### Week 4 Module (Dates: 9/20-9/24) - Arthropod transmission of pathogens and parasites.

- In-person demonstrations of mosquito collection techniques will be offered during Friday (9/24) Discussion section, weather dependent.
- Online Quiz 4 - *Due 9/24 at 8:59am*
  - Covers Mon. & Wed. lectures, BOTH readings, and in-class activity (Wed).

### Week 5 Module (Dates: 9/27-10/1) - Arthropod transmission of pathogens and parasites (continued).

- Reading for this week is Edman - Routes of transmission (same as last week).
- In-person demonstrations of tick collection techniques will be offered during Friday Discussion section (10/1), weather dependent.
- Online Quiz 5 - *Due 10/1 at 8:59am*

Week 6 Module (Dates: 10/4-10/8) - Adaptations for a blood-sucking lifestyle.

- Readings for this week's quiz will be by Lehane and Burkett-Cadena.
- Discussion Section - Takken et al. 2001 paper discussion.
- Online Quiz 6 - *Due 10/8 at 8:59am*

Week 7 Module (Dates: 10/11-10/15) - On knowing your enemy: Vector-borne disease surveillance.

- Midterm Exam covering modules 1 through 7 (10/13)
- Discussion Section - Williams and Gingrich 2008 paper discussion.

Week 8 Module (Dates: 10/18-10/22) - This is no level playing field: qualities of a good vector.

- Readings for this week are Takken and Verhulst, Garrett-Jones.
- Discussion section will be an interactive activity requiring use of spreadsheets. Please bring a device with a keyboard that you can use to view and input information into spreadsheets.
- Online Quiz 7 - *Due 10/22 at 8:59am*

Week 9 Module (Dates: 10/25-10/29) - Case studies in vector-mediated pathogen transmission & Vector incrimination.

- Discussion Section - Guedes et al. 2017 paper discussion.
  - Fill out this document before Discussion.
- Online Quiz 8 - *Due 10/29 at 8:59am*

Week 10 Module (Dates: 11/1-11/5) - Case studies in vector-mediated pathogen transmission (continued).

- No reading assignments for this week
- Reminder: Final project presentations start Friday 11/19 (Week 12)
- Discussion Section - Hands-on with mosquito ID in Discussion section (part I).
- Online Quiz 9 - *Due 11/5 at 8:59am*

Week 11 Module (Dates: 11/8-11/12) - One Health and human dimensions of vector-borne disease ecology.

- Reading assignments for this week are from “Preventing the next pandemic”
- Reminder: Final project presentations start Friday 11/19 (Week 12)
- Discussion Section - Hands-on with mosquito ID in Discussion section (part II).
- Online Quiz 10 - *Due 11/12 at 8:59am*

Week 12 Module (Dates: 11/15-11/19) - Case studies in One Health.

- Reminder: Final project presentations start this Friday (11/19).
- All Final project presentations will be conducted by Zoom (see course ELMS for link).
- Online Quiz 11 - *Due 11/19 at 8:59am*

Week 13 Module (Dates: 11/22-11/23) - Case studies in One Health.

- No class 11/24 & 11/26.
- No quiz due to the holiday weekend.

Week 14 Module (Dates: 11/29-12/3) - Management Solutions (I & II).

- No in-person class on Monday 11/29.
- In person lecture will resume on 12/1.
- Friday's final project presentations will be conducted by Zoom.
- Online Quiz 12 - *Due 12/3 at 8:59am*

Week 15 Module (Dates: 12/6-12/10) - Management Solutions (II) cont. & Forensic Entomology.

- No online quiz.
- Friday's final project presentations will be conducted by Zoom.

Week 16 Module (Dates: 12/13)

- Optional review session on Monday 12/13 from 9-10am.
- Final Exam - *Saturday 12/18, 8-10am.*