ENY 4202 / 6206 ECOLOGY OF VECTOR-BORNE DISEASE

SHORT TITLE – Ecol Vect-Borne Dis   **2 credit hours**   **Fall, 2018**

INSTRUCTOR Nathan Burkett-Cadena, PhD UF Entomology and Nematology Department Email: nburkettcadena@ufl.edu Office: Florida Medical Entomology Laboratory, Vero Beach, FL 32962 (772) 226-6617 Office hours: Tue, Thu (9:00 - 10:00 a.m.) **DISTANCE DELIVERY - CANVAS** **TEXTBOOKS -** No required textbook Recommended texts: *Disease Ecology: Community Structure and Pathogen Dynamics*, by S. Collinge & C. Ray *Medical and Veterinary Entomology, 2ⁿᵈ edition* by G. Mullen & L. Durden **LECTURE MATERIAL -** Provided by instructor **PREREQUISITES:** *General Biology*	**Course Purpose and Description** Vector-borne pathogens affect humans, wildlife and agriculture more than any other group of infectious disease. Researchers, policy makers, and public health workers need a firm understanding of the ecology of vector-borne pathogens to effectively predict and interrupt epidemics. This course begins with an introduction to the components inherent to vector-borne disease systems and the basic concepts of disease ecology. The course then focuses on various pathogens and how aspects of the environment, host and vector biology influence pathogen transmission. Some of the questions that we will address include: Why do epidemics occur where and when they do? Why are some pathogens, such as dengue, re-emerging? Why do most vector-borne pathogens have limited geographic ranges?

DATES, LECTURE TOPICS, EXAMS & ASSISGNEMENTS – Fall Semester 2018

Week 1 (Aug 20 - 24) - Introduction: What is a vector? What is a parasite? What is a pathogen?

Week 2 (Aug 27 - 31) - Arthropod vectors: Biology of Insects and mites

Week 3 (Sep 3 - 7) - Non-arthropod-vectors: Biology of vertebrates

Week 4 (Sep 10 - 14) - Ecology; Pathogen environmental adaptation (guest lecture)

Week 5 (Sep 17 - 21**) -** Zoonoses and Anthroponoses

Week 6 (Sep 24 - 28) - SIR Models (with guest lecture)

Week 7 (Oct 1 - 5) - **Exam 1 (Oct. 2)**; Rabies, hantavirus and Ebola

Week 8 (Oct 8 - 12) - Dengue fever, yellow fever, and chikungunya

Week 9 (Oct 15 - 19) - Bluetongue virus (guest lecture) and eastern equine encephalitis virus

Week 10 (Oct 22 - 26) - West Nile virus

Week 11 (Oct 29 – Nov 2) - Plague and tularemia

Week 12 (Nov 5 - 9) - Huanglongbing / citrus greening (guest lecture)

Week 13 (Nov 12 - 16) - Lyme disease

Week 14 (Nov 19 - 23) - Chagas Disease (Thanksgiving week)

Week 15 (Nov 26 - 30) - Malaria & river blindness; **Review article due (ENY 6206 only)**

Week 16 (**Dec 3 -** 7) – **Exam 2 (Dec. 4)**

Critical dates: Exam 1: Oct. 2, 2018
                    Exam 2: Dec. 4, 2018
                    Review article: Nov. 30, 2018

COURSE GOALS: *By the end of this course, students will:*

1. Understand the distinctions between ecology of vector-borne and directly transmitted pathogens.
2. Have a working understanding of concepts of epidemiological models.
3. Understand the factors that limit, initiate, maintain and spread the transmission of vector-borne pathogens.
4. Gain knowledge about varied pathogens transmitted by diverse vector groups.
5. Graduate students will review, understand and synthesize *scientific literature* pertinent to the ecology of vector-borne diseases including emergent pathogens, climate change, host selection and biological diversity.

COURSE WEBSITE: Canvas login at http://lss.at.ufl.edu

GRADING: Letter grades are assigned on a ten-point scale. 90.00-100=A; 80-89.99=B; 70-79.99=C; 60-69.99=D; <59.99=E.

For students enrolled in 4202, the overall grade is based upon 2 exams, on-line discussion participation, and 15 quizzes (one quiz per lecture week). Each exam constitutes 30% of the final grade. Quiz scores are averaged across all quizzes and constitute 20% of the total grade. **Exam 1=30%; Exam 2=30%; On-line Discussion Participation=20%; Quizzes=20%.**

For students enrolled in 6206, the overall grade is based upon 2 exams, on-line discussion participation, a review paper and 15 quizzes (one quiz per lecture week). **Exam 1=20%; Exam 2=20%; On-line Discussion Participation=20%; Review paper=20%; Quizzes=20%.**

Review article (ENY 6206 only)
Students enrolled in the graduate course, ENY 6206, are expected to submit a review article on the ecology of a vector-borne disease of their choosing. The topic must be approved by the instructor. The format is flexible, although **the article must focus on Ecolog**y. The review should summarize relevant scientific literature (not books or websites), must include appropriate citations, and use scientific writing. The article should be between 2,500-3,500 words (not including literature cited).

COURSE COMMUNICATIONS: General questions should be posted on the course discussion board. Private questions about grades and course difficulties should be sent to nburkettcadena@ufl.edu.

Requirements for class attendance and make-up exams in this course are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

** Any requests for make-ups due to technical issues MUST be accompanied by the ticket number received from LSS when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail nburkettcadena@ufl.edu within 24 hours of the technical difficulty if you wish to request a make-up.

Grades cannot be provided over the telephone or by email, but will be available on Canvas in the Gradebook tab.

Very important information on UF grading policies, including Withdrawal, Incomplete grades, and assigning grade points may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

FEEDBACK:
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 10 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.

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 honesty and integrity. On all work submitted for credit by students at the university, the following pledge is either required or implied: On my honor, I have neither given nor received unauthorized aid in doing this assignment.*" The Honor Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class. https://archive.catalog.ufl.edu/ugrad/1617//advising/info/student-honor-code.aspx

LECTURES:
Lectures can be accessed in Canvas, by going to the Canvas login- **https://lss.at.ufl.edu**. The student's UF Gatorlink username and password are necessary to log into the system. Tutorials are available in Canvas under "Help," if needed.

TECHNOLOGY REQUIREMENTS:
Students must have access to a computer that can view PowerPoint, Flash, and .pdf files, has adequate memory and speed, and meets the minimum standards for UF computer use is needed. The following website explains the University of Florida computer hardware and software policy: http://dell.techhub.ufl.edu/computer_requirement.html. Contact the UF Computing Help Desk (352-392-4357; helpdesk@ufl.edu) with any technology problems.

COMPLAINTS
The instructor will work with you to resolve complaints, however each online distance learning program has a process for, and will make every attempt to resolve, student complaints within its academic and administrative departments at the program level.
See http://www.distance.ufl.edu/student-complaint-process for more details.

STUDENTS WITH DISABILITIES:
Students requesting accommodation for disabilities must first register with the Dean of Students Office (http://www.dso.ufl.edu/drc/). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

GETTING HELP:
For issues with technical difficulties for Canvas, please contact the UF Help Desk at: Learning-support@ufl.edu, (352) 392-HELP - select option 2, or https://lss.at.ufl.edu/help.shtml
Other resources are available at http://www.distance.ufl.edu/getting-help for:
- Counseling and Wellness resources (352) 392-1575
- Disability resources
- Resources for handling student concerns and complaints
- Library Help Desk support

In case of emergency, contact University Police (352) 392-1111 or dial 911

NETIQUETTE:

It is important to recognize that the online classroom is in fact a classroom, and certain behaviors are expected when you communicate with both your peers and your instructors. These guidelines for online behavior and interaction are known as netiquette.

SECURITY

Remember that your password is the only thing protecting you from pranks or more serious harm.

- Don't share your password with anyone
- Change your password if you think someone else might know it
- Always logout when you are finished using the system

GENERAL GUIDELINES

When communicating online, you should always:

- Treat instructor with respect, even in email or in any other online communication
- Always use your professors' proper title: Dr. or Prof., or if you in doubt use Mr. or Ms.
- Unless specifically invited, don't refer to them by first name.
- Use clear and concise language
- Remember that all college level communication should have correct spelling and grammar
- Avoid slang terms such as "wassup?" and texting abbreviations such as "u" instead of "you"
- Use standard fonts such as Times New Roman and use a size 12 or 14 pt. font
- Avoid using the caps lock feature AS IT CAN BE INTERPRETTED AS YELLING
- Limit and possibly avoid the use of emoticons like :) or ☺
- Be cautious when using humor or sarcasm as tone is sometimes lost in an email or discussion post and your message might be taken seriously or offensive
- Be careful with personal information (both yours and other's)
- Do not send confidential patient information via e-mail

EMAIL

When you send an email to your instructor, teaching assistant, or classmates, you should:

- Use a descriptive subject line
- Be brief
- Avoid attachments unless you are sure your recipients can open them
- Avoid HTML in favor of plain text
- Sign your message with your name and return e-mail address
- Think before you send the e-mail to more than one person. Does everyone really need to see your message?
- Be sure you REALLY want everyone to receive your response when you click, "reply all"
- Be sure that the message author intended for the information to be passed along before you click the "forward" button

MESSAGE BOARD

When posting on the Discussion Board in your online class, you should:

- Make posts that are on topic and within the scope of the course material
- Take your posts seriously and review and edit your posts before sending
- Be as brief as possible while still making a thorough comment
- Always give proper credit when referencing or quoting another source
- Be sure to read all messages in a thread before replying
- Don't repeat someone else's post without adding something of your own to it
- Avoid short, generic replies such as, "I agree." You should include why you agree or add to the previous point
- Always be respectful of others' opinions even when they differ from your own

- When you disagree with someone, you should express your differing opinion in a respectful, non-critical way
- Do not make personal or insulting remarks
- Be open-minded

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1

ENY6206 REQUIRED READINGS (PROVIDED)

Altizer S, Bartel R, and BA Han (2011) Animal migration and infectious disease risk. Science. 331, 296.

Burkett-Cadena, ND (2009) Morphological adaptations of parasitic arthropods, in Medical and Veterinary Entomology (Mullen GR and Durden L, eds.), Elsevier, Inc.

Dobson A, Cattadori I, et al. (2006) Sacred cows and sympathetic squirrels: the importance of biological diversity to human health. PLoS Medicine. 3(6): e231.

Gage KL, Burkot TR et al. (2008) Climate and vectorborne diseases. American Journal of Preventative Medicine. 35(5): 436-450.

Gubler DJ (1998) Resurgent vector-borne diseases as a global health problem. Emerging Infectious Diseases. 442(3): 442-450.

Hamer GL, Walker E et al. (2008) Rapid amplification of West Nile virus: the role of hatch-year birds. Vector-Borne and Zoonotic Diseases. 8(1):57-67.

Hamer GL, Kitron UD, et al. (2009) Host selection by *Culex pipiens* mosquitoes and West Nile Virus Amplification. American Journal of Tropical Medicine and Hygiene. 80(2): 268–278.

Kilpatrick AM, Kramer LD et al. 2006. West Nile virus epidemics in North America are driven by shifts in mosquito feeding behavior. PLoS Biol, 4(4), p.e82.

Pedersen AB and A Fenton (2006) Emphasizing the ecology in parasite community ecology. Trends in Ecology and Evolution. 22(6).

Raffel TR, Martin LB and JR Rohr (2008) Parasites as predators: unifying natural enemy ecology. Trends in Ecology and Evolution. 23(11).

Tabachnick WJ (2013) Nature, nurture and evolution of intra-species variation in mosquito arbovirus transmission competence. International Journal of Environmental Research and Public Health. 10: 249-277