

SEMESTER: FALL, 2023

CREDIT HOURS: 2

LOCATION: CANVAS LOGIN AT [HTTP://LSS.AT.UFL.EDU](http://lss.at.ufl.edu)

INSTRUCTOR: Nathan Burkett-Cadena, PhD; Florida Medical Entomology Laboratory, Vero Beach, FL 32962, (772) 226-6617, nburkettcadena@ufl.edu

OFFICE HOURS: Tue, Thu (9:00 - 10:00 a.m.) by email, phone, or videoconference.

COURSE TEACHING ASSISTANT: Amy Bauer, Florida Medical Entomology Laboratory, Vero Beach, FL, amelybauer@ufl.edu

Course Description: Vector-borne pathogens have enormous adverse effects on humans, wildlife, domestic animals and agriculture. Researchers, policy makers, and public health workers need a firm understanding of the ecology of vector-borne pathogens in order to manage vectors and/or interrupt transmission. This course begins with an introduction to basic concepts of ecology, the components inherent to vector-borne disease systems and common frameworks for understanding disease ecology. The course then focuses on various pathogens and how aspects of the environment, host and vector biology influence pathogen transmission.

Course Pre-Requisites:

A 2000-level (or above) course in Biology, Entomology, Ecology or related discipline.

Course Objectives: By the end of this course, students will be able to:

1. Compare and contrast between ecology of vector-borne and directly transmitted pathogens.
2. Apply the basic concepts of epidemiological models.
3. Delineate the factors that initiate, maintain, and spread the transmission of vector-borne pathogens.
4. Differentiate the varied pathogens transmitted by diverse vector groups.
5. Critique, synthesize and discuss scientific literature pertinent to the ecology of vector-borne diseases including emergent pathogens, climate change, host selection and biological diversity.

Materials and Supply Fees: None

Required Textbooks and Software: None

Course lecture materials are derived from various published sources, information on these is provided at the end of the syllabus. All required and optional readings are provided through Canvas.

Course Schedule

Week 1 - Vectors, pathogens, parasites and diseases

Week 2 - Arthropods: Diversity, biology, life cycle, morphological adaptations

Week 3 - Vertebrates: Diversity, hosts, migration, reproduction and immunity

Week 4 - Ecology, niche, energy pathways, biological interactions

Week 5 - Zoonoses, anthroponoses, diversity and disease, host and vector competence

Week 6 - Blood meal analysis, host preference, amplification fraction, vectorial capacity

Week 7 - Periodicity of populations, Lotka-Volterra models, SIR models

Week 8 - Exam 1 (October 10); Space and time | Rabies

Week 9 - Malaria | onchocerciasis

Week 10 - Plague | tularemia

Week 11 - Dengue fever, yellow fever, chikungunya and Zika | Biology of *Aedes* | Dengue ecology

Week 12 - Lyme disease

Week 13 - West Nile virus | Biology of *Culex*

Week 14 - Eastern equine encephalitis virus

Week 15 - Summary and conclusions

Week 16 - Exam 2 (December 5)

Attendance Policy, Class Expectations, and Make-Up Policy

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/>.

Students are strongly advised to stay current on lecture material. Graded quizzes for each lecture week are available for a limited period during the lecture week and the following week. Students that stay current with lectures and quizzes generally perform well in the course. Excused absences must be consistent with university policies in the [Graduate Catalog](#) and require appropriate documentation. Additional information can be found in [Attendance Policies](#).

Evaluation of Grades – ENY 4202 (undergraduate students)

Graded assessment	Number	Points each	Total points	Percentage of final grade
Exam 1	1	100	100	20%
Exam 2	1	100	100	20%
Weekly Quizzes	15	10	150	30%
On-line Discussion Participation	5	10	50	10%
Writing assignments	1	100	100	20%

Evaluation of Grades – ENY 6206 (graduate students)

Graded assessment	Number	Points each	Total points	Percentage of final grade
Exam 1	1	100	100	20%
Exam 2	1	100	100	20%
Weekly Quizzes	15	5	75	15%
On-line Discussion Participation	5	10	50	10%
Writing assignments	1	75	75	15%
Review article	1	100	100	20%

Critical dates – important graded assessments

Graded assessment	Date
Exam 1	October 10
Exam 2	December 5
Current outbreaks assignment	October 31
Review article (ENY 6206 only)	December 3

Grading Policy

Letter grades for ENY 4202 and ENY 6206 are assigned using the following scale which follows grading recommendations of the Entomology and Nematology Department.

Percent	93.0 - 100	90.0 - 92.99	87.0 - 89.99	83.0 - 86.99	80.0 - 82.99	77.0 - 79.99	73.0 - 76.99	70.0 - 72.99	60.0 - 69.99	<60.0
Grade:	A	A-	B+	B	B-	C+	C	C-	D	E

More information on UF grading policy may be found at: [UF Graduate Catalog, Grades and Grading Policies](#)

Academic Honesty

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: “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.”

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). 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 <https://disability.ufl.edu/>

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. 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 feedback in a professional and respectful manner is available at: <https://gatorevals.aa.ufl.edu>. 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/>. Summaries of course evaluation results are available to students at: <https://gatorevals.aa.ufl.edu/public-results/>.

Software Use

All UF faculty, staff and students 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.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see the [Notification to Students of FERPA Rights](#).

Campus Resources:

Health and Wellness

U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS) Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or police.ufl.edu.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling.

Library Support, Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.

On-Line Students Complaints

Class Demeanor or Netiquette: All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions, and chats. 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 log out when you are finished using the system.

GENERAL GUIDELINES

When communicating online, you should always:

- Treat your instructor and classmates with respect in email or any other communication.
- Always use your professors' proper title: Dr. or Prof., or if in doubt use Mr. or Ms.
- Unless specifically invited, don't refer to your instructor by first name.
- Use clear and concise language.
- Remember that all college level communication should have correct spelling and grammar (this includes discussion boards).
- Avoid slang terms such as "wassup?" and texting abbreviations such as "u" instead of "you."
- Use standard fonts such as Arial, Calibri or Times new Roman and use a size 10 or 12 point font
- Avoid using the caps lock feature AS IT CAN BE INTERPRETTED AS YELLING.
- Limit and possibly avoid the use of emoticons like :) or 9.
- 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 sound offensive.
- Be careful with personal information (both yours and other's).
- Do not send confidential information via e-mail.

EMAIL NETIQUETTE

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 sending the e-mail to more than one person.
- 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 reply.

MESSAGE BOARD NETIQUETTE AND GUIDELINES

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.

Getting Help:

For issues with technical difficulties for Canvas, please contact the UF Help Desk at:

***Ecology of Vector-Borne Disease, ENY 4202 and ENY 6206
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- <http://helpdesk.ufl.edu>
- (352) 392-HELP (4357)
- Walk-in: HUB 132

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

Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

- Counseling and Wellness resources
- Disability resources
- Resources for handling student concerns and complaints
- Library Help Desk support

Should you have any complaints with your experience in this course please visit <http://www.distance.ufl.edu/student-complaints> to submit a complaint.

REQUIRED READING LIST (PROVIDED BY INSTRUCTOR)

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

Burkett-Cadena, ND (2019) Morphological adaptations of parasitic arthropods, in *Medical and Veterinary Entomology* (Mullen GR and Durden L, eds.), Elsevier, Inc. 3rd ed.

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

Gage KL, 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, 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.

Hoyer IJ, et al. (2017) Mammal decline, linked to invasive Burmese python, shifts host use of vector mosquito towards reservoir hosts of a zoonotic disease. *Biology letters*. 31;13(10):20170353.

Jackson RR, Nelson XJ, Sune GO. (2005) A spider that feeds indirectly on vertebrate blood by choosing female mosquitoes as prey. *Proceedings of the National Academy of Sciences*. 18;102(42):15155-60.

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

Ogden NH. (2017) Climate change and vector-borne diseases of public health significance. *FEMS microbiology letters*.

Ostfeld RS, Keesing F. Biodiversity and disease risk: the case of Lyme disease. *Conservation biology*. 2000;14(3):722-8.

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

Raffel TR, et al. (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.

Disclaimer: This syllabus represents my current 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.

Filename: Fall2023_ENY4202-ENY6206-Syllabus.docx
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docs/Teaching/DISEASE ECOLOGY/syllabus/fall 2023
Template: /Users/nathanburkett-cadena/Library/Group
Containers/UBF8T346G9.Office/User
Content.localized/Templates.localized/Normal.dotm
Title: Standardized Syllabus for the College of Engineering
Subject:
Author: Paul A. Chadik
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