

# INSECTS AS VECTORS OF PLANT PATHOGENS

ENY 5405 3 CREDITS FALL 2018

**MEETING TIME AND PLACE:** Online delivery of this course will be facilitated using Canvas: Canvas login at <http://lss.at.ufl.edu>

**INSTRUCTOR:** Dr. Jennifer Gillett-Kaufman, Associate Extension Scientist Entomology and Nematology Department. Office number 3006, Entomology and Nematology Building on Natural Area Drive. Office phone: (352) 273-3950. [gillett@ufl.edu](mailto:gillett@ufl.edu)

**OFFICE HOURS:** Dr. Gillett-Kaufman will be available to students **by appointment** on Skype, FaceTime, or phone (usernames will be provided in Canvas or via email). She can be reached on e-mail [gillett@ufl.edu](mailto:gillett@ufl.edu) at all times.

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

**COURSE COMMUNICATIONS:** General questions should be posted on the course discussion board. Private questions about grades and course difficulties should be sent to [gillett@ufl.edu](mailto:gillett@ufl.edu). **Course Twitter Hashtag- #ENY5405**

**SUGGESTED TEXT:** Agrios, G.N. 2005. Plant Pathology. Elsevier, ISBN: 978-0-12-044565-3 or a similar general plant pathology text. For a **FREE** online version visit: <http://www.UFL.ebib.com/patron/FullRecord.aspx?p=288729> and login with your Gatorlink username and password to download the textbook.

## READINGS:

1. Agrios, G.N. 2008. Transmission of plant disease by insects. *In* J.L. Capinera, ed. Encyclopedia of Entomology, 2<sup>nd</sup> edition. Dordrecht: Kluwer Academic. Pages 3853-3885.
2. Fereres, A. and A. Moreno. 2009. Behavioural aspects influencing plant virus transmission by homopteran insects. *Virus Research*. 141: 158-168.
3. Halbert, S.E. 2008. Management of Insect-Vectored Pathogens of Plants. *in* J. L. Capinera, ed. Encyclopedia of Entomology, 2<sup>nd</sup> edition. Dordrecht: Kluwer Academic. Pages 2277-2280.
4. Hunter, W.B. 2008. Plant Viruses and Insects. *In* J.L. Capinera, ed. Encyclopedia of Entomology, 2<sup>nd</sup> edition. Dordrecht: Kluwer Academic. Pages 2939-2945.
5. Jeger, M.J., Z. Chen, G. Powell, S. Hodge, and F. van den Bosch. 2011. Interactions in a host plant-virus-vector-parasitoid system: Modeling the

- consequences for virus transmission and disease dynamics. *Virus Research*. 159: 245-222.
6. Killiny, N. and R.P.P. Almeida. 2009. Host structural polysaccharide induces vector transmission of a bacterial plant pathogen. *Proceedings of the National Academy of Science*. 106: 22416-22420.
  7. Mitchell, P.L. 2004. Heteroptera as vectors of plant pathogens. *Neotropical Entomology* [online]. 33: 519-545.

**Additional readings for the course will be posted online:** Canvas login at <https://elearning.ufl.edu/>

**COURSE DESCRIPTION:** This course presents current information on insect, other arthropod and nematode vectors of plant pathogens, and the role and management of these vectors in agricultural and environmental areas. The material discussed in this course deals with the identification and morphology of important vectors and how these features affect transmission of plant pathogens.

**PREREQUISITE KNOWLEDGE AND SKILLS:** Students must have an introductory course in entomology (ENY3005, ENY5006, or equivalent) completed before beginning this course. An introductory course in plant pathology would be helpful, but is not required.

**PURPOSE OF COURSE:** The goal of this course is to provide students with an understanding of the biology of arthropods and nematodes and the role they play in the spread of different plant pathogens. This course was designed to foster your creative and critical thinking skills by directing you through an independent exploration of weekly topics. The lectures begin by providing introductory material and readings to provide you with the background necessary to understand the topic. Questions will be posed during the lectures that will direct your exploration of the literature.

Writing assignments are designed to help you improve your scientific writing skills and provide you an outlet for demonstrating your comprehension of the topic. As the semester advances lectures will become shorter and you will be asked to pose questions and provide answers. By the end of the semester you should be more comfortable with this higher-level inquiry-based learning approach (that is expected from graduate students and research scientists) and that you have a new appreciation for insects as vectors of plant pathogens.

**COURSE GOALS AND/OR OBJECTIVES:** *By the end of this course, students will:*

1. Be able to identify common insect vectors of plant pathogens and explain the mechanisms that promote vector competence.

2. Know how insect and nematode morphology contributes to their ability to transmit plant pathogens.
3. Be able to choose the best current techniques used in the study and management of insect vectors for various scenarios.
4. Produce an extension publication on the role that arthropods and nematodes play in the spread of different plant pathogens and will be encouraged to publish the work.

## COURSE POLICIES:

**ATTENDANCE POLICY:** Interaction with the other attendees on Canvas Discussions will be graded as these facilitate learning. Although this course is taught entirely online, students who do not work on this class weekly or who skip online lectures and reading material do not do well in this course.

**QUIZ/EXAM POLICY:** Writing assignments and the Final Test Paper will consist of open book untimed essay questions. Additional information and instructions for the graded assignments are posted on this course site in Canvas.

**The Final Test Paper must be submitted by the date listed.** If these conditions are not met for the Final Test Paper you will be assigned a grade based on the points you have earned unless you complete a CALS Incomplete Grade Contract by the published last day of the semester. If you fill out, and we agree on terms in a CALS Incomplete Grade Contract, your final grade after completing missed assignments or tests will be reduced by a full letter grade, unless you provide a University of Florida accepted excuse (see below for examples).

### ACCEPTED EXCUSES:

1. **Required student participation in a University sponsored event:** These events will be excused with official documentation from the appropriate faculty or staff member. Documentation must be received PRIOR to the event and every attempt to complete the assignment prior to the event should be made.
2. **Religious Holidays:** Religious holidays are always excused; however, please notify the instructors, in writing, within the first two weeks of class so that appropriate accommodations may be made. Every attempt to complete the course prior to the holiday should be made.
3. **Medical Emergencies:** Medical emergencies are excused with appropriate documentation from a health care provider.
4. **Family Emergencies:** These emergencies are only excused with written documentation.

**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/ugrad/current/regulations/info/attendance.aspx>. If you know you will miss class for an excused or unexcused reason it is always a good idea to work ahead so you do not fall behind in the course.

**ASSIGNMENT POLICY:** Grading is based on a total point value of 400. **All writing assignments are due by the date posted and must be submitted using Canvas as an unlocked MS Word document (\*.doc or \*.docx).** Late submissions will be docked 10% on the individual component grade for each 24 hrs after each deadline.

**COURSE TECHNOLOGY:** A computer that can view PowerPoint 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](http://dell.techhub.ufl.edu/computer_requirement.html). In addition, Flash is needed; you will be prompted to download the most current version if it is not already on your computer. Contact the UF Computing Help Desk (352-392-4357; [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu)) with any technological problems. Campus Helping Resources

## UF POLICIES:

**UNIVERSITY POLICY ON ACCOMMODATING 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.

**UNIVERSITY POLICY ON ACADEMIC MISCONDUCT:** Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at <http://www.dso.ufl.edu/students.php>.

**NETIQUETTE: COMMUNICATION COURTESY:** All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats.

## GETTING HELP:

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

- [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu)
- (352) 392-HELP - select option 2
- <https://lss.at.ufl.edu/help.shtml>

\*\* 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 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.

## GRADING POLICIES:

This course does NOT utilize “minus” grades. Information on UF’s grading policy can be found at: <http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>

### GRADING SCALE (points):

360-400	A
352-359	B+
320-351	B
312-319	C+
280-311	C
272-279	D+
240-271	D
<239	E

<b>GRADED ASSIGNMENTS</b>	<b>POINT VALUE</b>	<b>TOTAL</b>
Writing assignments (8)	25 each	200
Weekly online discussions (15)	5 each	75
Group project (1)	50	50
Final test paper (1)	75	75
		<hr/>
		400

**EVALUATION OF WRITING ASSIGNMENTS:** Writing assignments and the Final Test Paper will be evaluated for grammar, style, content and adherence to the topic. Please be sure to read the following and ensure that you are meeting ALL deadlines. Failure to adhere to the schedule and process will result in lost points. Late submissions will be docked 10% on the individual component grade for each 24 hrs after each deadline until the assignment is completed.

1. Writing assignments and the Final Test Paper are open-book critical thinking writing exercises. Papers should be completed without assistance from others. You will earn 80% of the possible points for content and 20% of the possible points for spelling and grammar.
2. Concerns about a grade can be discussed privately after the assessment period has closed.
3. Student writings will all be scored with the Turnitin® system, this will check for plagiarism. Students will be warned of the first plagiarism infraction and asked to redo an assignment with a 20% point reduction. The second infraction will result in failing the course and will be reported to the University of Florida. See the section below on plagiarism.
4. See the UF Student Honor Code below and report suspicious behavior.
5. Grades cannot be provided over the telephone or by e-mail, but will be available on Canvas in the Gradebook feature.

## COURSE SCHEDULE:

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

**FINAL EXAM:** Final Test Paper covers all course material. Open Dec 7, due before 11:55 AM Eastern Standard Time (EST) Dec 13.

Due dates for writing assignments and the group assignment are indicated in the table below and on Canvas. Additional instructions for assignments are on Canvas.

\*A post in the discussion section is due for every week marked with an asterisk (\*). The discussion topic will be linked on Canvas in the Module section. To earn points discussion posts must be made before the Monday of the following course week.

MODULE	DATE	TOPIC
Week 1*	Aug 22	Introduction to class Guest lecture: Historical background of vector-borne plant disease By Dr. Nabil Killiny-Mansour
Week 2*	Aug 29	Guest lecture: Mechanisms of insect transmission of plant pathogens By Dr. Nabil Killiny-Mansour <b>Writing Assignments 1 due before 11:55 AM (EST) Sep 10.</b>
Week 3*	Sep 6 (Sep 6- Holiday)	Ecological aspects of insect transmission of plant pathogens
Week 4*	Sep 12	Guest lecture: Classification and biology of vectors (aphids, leafhoppers, whiteflies, nematodes, others) By Morgan Conn <b>Writing Assignment 2 due before 11:55 AM (EST) Sep 24.</b>
Week 5*	Sep 19	Guest lecture: Psyllids, vectors of citrus greening By Dr. Sandy Allan
Week 6*	Sep 26	Case studies: A. Sharpshooter leafhoppers, vectors of <i>Xylella fastidiosa</i> B. Leafhoppers, vector of Phytoplasmas and Spiroplasmas <b>Writing Assignment 3 due before 11:55 AM (EST) Oct 8.</b>
Week 7*	Oct 3	Mechanisms of nematode transmission of plant pathogens <b>Writing Assignment 4 due before 11:55 AM (EST) Oct 15.</b>
Week 8*	Oct 10	I- Non persistent viruses Case study: The majority of potyviruses (aphids)

Week 9*	Oct 17	II- Semi-persistent viruses Case study: Citrus tristeza virus III- Persistent viruses. Case study: Geminiviruses such as Tomato yellow leaf curl virus <b>Writing Assignment 5 due before 11:55 AM (EST) Oct 29.</b>
Week 10*	Oct 24	Guest lecture: Rose rosette disease and mites as vectors By Dr. Marjorie Hoy <b>Writing Assignment 6 due before 11:55 AM (EST) Nov 5.</b>
Week 11*	Oct 31	Introduction to fungal plant pathogens: Classification
Week 12*	Nov 7 (Nov 12- Holiday)	Fungal/insect symbiosis and commensalism <b>Writing Assignment 7 due before 11:55 AM (EST) Nov 19.</b>
Week 13*	Nov 14	Insects that vector fungal organisms Case studies: Chestnut blight, Dutch elm disease and Laurel wilt <b>Writing Assignment 8 due before 11:55 AM (EST) Nov 26.</b>
Week 14*	Nov 21 (Nov 22-23 Holiday)	Bioterrorism intro. Wednesday-Friday UF Students Thanksgiving Holiday
Week 15*	Nov 28	Border patrol, and the use of insect vectored plant pathogens
Week 16	Dec 5	<b>Group project due by noon on Wednesday December 5.</b>
<b>Final Test Paper covers all course material. Open Dec 7, due before 11:55 AM Eastern Standard Time (EST) Dec 13.</b>		
<p>This timeline is a suggestion for completing the course by the end of the semester without rushing. Be advised that the dates for submitting assignments are static; if you are late you will lose points for that component of your grade. The date listed for the Final Test Paper is the last date that the test will be available. The Final Test Paper must be turned in on time or after completion of the final your final grade will be reduced by a full letter grade (unless an excuse that is recognized by the University of Florida is provided).</p> <p><b>*A post in the discussion section is due for every week marked with an asterisk (*). The discussion section will be linked on Canvas. To earn points discussion posts must be made before the Monday of the following course week.</b></p>		

#### **PLAGIARISM:**

Plagiarism is a serious problem in academia today, especially with the ease of obtaining information from the World Wide Web. Plagiarism is defined as representing the words or ideas of another person as one's own, without attribution to the source. All words and ideas must be attributed to a source unless they are considered common knowledge (i.e., widely known by many people and found in many different sources).



There are many kinds of plagiarism, as you will read on the Guide to Plagiarism website referenced below.

Plagiarism is unethical, unacceptable in science, and prohibited by the UF Student Honor Code (<http://www.dso.ufl.edu/sccr/honorcodes/honorcode.php>). The consequences for plagiarism while at the University of Florida range from receiving a grade of zero for the plagiarized assignment or a failing grade for the course, to, for repeated offenses, expulsion from the university. Plagiarism after graduate training calls into question one's scientific integrity and can lead to banning of publication in journals and the loss of jobs/careers.

Students who plagiarize will be caught and consequences will be applied. I check all written assignments using an anti-plagiarism software called Turnitin® (<http://www.at.ufl.edu/~turnitin/about.html>). Students will be warned of the first plagiarism infraction and asked to redo an assignment with a 20% point reduction. The second infraction will result in an automatic failing grade in the course and will be reported to the University of Florida.

For further information and examples of plagiarism, I strongly suggest that you read the George Smathers' Library Guide to Plagiarism at <http://www.uflib.ufl.edu/msl/07b/students.html>

Please understand that our purpose in bringing to your attention the matter of plagiarism is to help train you to be ethical scientists, not to impugn your character.

*This information on plagiarism modified from guidance provided by Dr. Heather McAuslane.*

## **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 honesty and integrity."* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit 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/honorcodes/honorcode.php>.

#### **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.

#### **COMPLAINTS?**

The instructors 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://distance.ufl.edu/student-complaints> for more details.

#### **NEED HELP?**

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](mailto: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.