ENY 6821 – INSECT MICROBIOLOGY
Spring 2016
Online
Graduate Level Credits: 3 (honor level undergraduate students will be accepted)

Instructor:
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Course Description: Insect Microbiology ENY 6821 will cover the diverse associations that exist between insects and microorganisms. These associations include mutualistic relationships, commensalism, vector biology, and insect-pathogen interactions. Insects from a wide range of orders as well as a diverse array of microbes will serve as theoretical models for the students to learn about developmental biology, physiology, behavior, and ecology involved in interactions between insects and microbes. In addition, various methods in scientific research will be presented and discussed. The course is composed of lectures, student presentations, and journal club discussions in order to build a comprehensive understanding of insect microbiology.

Learning Objectives: Students who will have completed this course will be able to:

1. Define and classify the major groups of microorganisms associated with insects.
2. Identify and differentiate between beneficial, neutral, and pathogenic interactions.
3. Assess metabolic pathways with regard to prospective industrial use (e.g., biofuel production).
4. Explain and discuss vector biology and implement the concept of vector control for disease prevention in various agricultural systems.
5. Synthesize and integrate the concept of biological control into pest management strategies.
6. Analyze and critique research publications.

Prerequisites: There are no formal prerequisites, however introductory coursework in entomology and microbiology are suggested.

Grades for ENY 6821 will be based on a total of 500 points as outlined below:

Tests (2 written tests at 50 pts each)	100
Class presentation (2 x 25 pts each), incl. peer evaluation	100
Writing Assignment (12 x 25 pts each)	300
Total	500

Grading policy: Tests will be composed of multiple choice, short answer and essay questions. To be fair to all students, there will be no extra credit opportunities. Class presentations will be graded according to the evaluation criteria of the Entomological Society of America for oral presentations at scientific meetings. These and the evaluation criteria for paper group discussions will be available in the assignment section of Sakai. Writing assignments are due by the date posted and must be submitted using the Sakai Assignments feature as an unlocked MS Word document (*doc or *docx). Late submissions will be reduced 10% of the total grade for each 24h past the scheduled deadline. All graded material remains the property of the instructors, and any unreturned test or assignment will result in a

grade of zero. For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Grading Scale:

A	93-100% of 500 points	B-	80-82%	D+	67-69%
A-	90-92%	C+	77-79%	D	63-66%
B+	87-89%	C	73-76%	D-	60-62%
B	83-86%	C-	70-72%	E	<60%

For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Attendance and Make-up Policy:
Students are encouraged to participate in Sakai Discussions and in the Sakai chat room. The course is entirely online; however, because exams will consist of materials covered in lectures and paper assignments, students that do not participate will not do well on these assessments.

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.

Evaluation of writing assignments: Writing assignments will be evaluated for grammar, content, style, and adherence to topic. Assignments should be completed independently, and will be evaluated using Turnitin® to check for plagiarism. Grades will be available on the Gradebook section of Sakai.

Tentative topical schedule (Spring 2016):

Module	Topic
1	Introduction to insect microbiology
	Diversity and significance of microbe interactions
	Basic entomology and microbiology
2	Mutualistic associations between insects and microbes
	Homework Reading/Writing Assignment 1 due before noon (12 p.m. EST) 1/19
3	Insect nutrition and the importance of microbes
	Homework Reading/Writing Assignment 2 due before noon (12 p.m. EST) 1/25
4	Gut symbionts
	Homework Reading/Writing Assignment 3 due before noon (12 p.m. EST) 2/1
5	Fungal symbioses:
	Ant fungal gardens
	Termites
	Ambrosia beetles
	Homework Reading/Writing Assignment 4 due before noon (12 p.m. EST) 2/8
6	Non-nutritional functions of intra- and extracellular symbionts
	Homework Reading/Writing Assignment 5 due before noon (12 p.m. EST) 2/15
7	Wolbachia
	Homework Reading/Writing Assignment 6 due before noon (12 p.m. EST) 2/22

	Class presentations
	Exam 1: Covers course material from first half of semester, including reading assignments. Available Feb. 22, due by Feb 26 at 5 p.m. EST
	Spring Break
9	Microorganisms and insect behavior
	Homework Reading/Writing Assignment 7 due before noon (12 p.m. EST) 3/14
11	Entomopathogenic Nematodes
	Homework Reading/Writing Assignment 8 due before noon (12 p.m. EST) 3/21
12	Entomopathogens
	Homework Reading/Writing Assignment 9 due before noon (12 p.m. EST) 3/28
13	Insects as Vectors of Plant pathogens
	Homework Reading/Writing Assignment 10 due before noon (12 p.m. EST) 4/4
14	Insects as Vectors of Animal pathogens
	Homework Reading/Writing Assignment 11 due before noon (12 p.m. EST) 4/11
15	Integrated pest management for vector control
	Homework Reading/Writing Assignment 12 due before noon (12 p.m. EST) 4/18
	Class presentations
	Exam 2: Covers course material from second half of semester, including reading assignments. Available Apr. 25, due by April 27 before noon (12 p.m. EST)

Readings: A series of assigned research and review articles covering lecture topics will be provided. Examples of reading assignments include:

Baverstock, J., Roy, H.E. and Pell, J.K. (2010) Entomopathogenic fungi and insect behaviour: from unsuspecting hosts to targeted vectors. Biocontrol 55, 89-102.

Dillon, R.J. and Dillon, V.M. (2004) The gut bacteria of insects: nonpathogenic interactions. Annual Review of Entomology 49, 71-92.

Douglas, A.E. (1998) Nutritional interactions in insect-microbial symbioses: Aphids and their symbiotic bacteria *Buchnera*. Annual Review of Entomology 43, 17-37.

Fereres, A. and Moreno, A. (2009) Behavioural aspects influencing plant virus transmission by homopteran insects. Virus Research 141, 158-168.

Purcell, A.H. and Almeida, A.M. (2005) Insects as vectors of disease agents. Encyclopedia of Plant and Crop Science DOI: 10.1081/E-EPCS-120010496, 5 pp.

Roditakis, E., Couzin, I.D., Balrow, K., Franks, N.R. and Charnley, A.K. (2000) Improving secondary pick up of insect fungal pathogen conidia by manipulating host behaviour. Annals of Applied Biology 137, 329-335.

Additional readings for the course will be posted online at:
https://elearning2.courses.ufl.edu/portal

Textbooks:
There is no single textbook available covering the various aspects of insect microbiology addressed in this class. Therefore, no textbook is required; however, selected chapters from the following textbooks will be recommended for additional reading:

Boucias, D.G. and Pendland, J.C. (1998) Principles of Insect Pathology, 537 pp. Kluwer Academic Publishers, Boston.

Bourtzis, K. and Miller, T.A. (2003) Insect Symbiosis (Contemporary Topics in Entomology), Vol. I-III, CRC Press, Boca Raton.
Harris, K.F., Smith, O.P. and Duffus, J.E. (2001) Virus-Insect-Plant Interactions, 376 pp. Academic Press, San Diego.
Lacey, L.A. (1997) Manual of Techniques in Insect Pathology, 409 pp. Academic Press, San Diego.
Nation, J.L. (2002) Insect Physiology and Biochemistry, 485 pp. CRC Press, Boca Raton.
Tortora, G.J., Funke, B.R. and Case, C.L. (2004) Microbiology: an Introduction, 944 pp. Benjamin/Cummings, Redwood City, CA.

UNIVERSITY OF FLORIDA COURSE POLICIES:

Additional General Information: The following information applies to all courses at the University of Florida and is copied here from the indicated sources:

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 th highest standards of honesty and integrity.*" You are expected to exhibit behavior consistent with this commitment to th 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 you obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriat 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.

Campus Helping Resources
Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, **www.counseling.ufl.edu/cwc/**

Counseling Services
Groups and Workshops
Outreach and Consultation
Self-Help Library
Training Programs

Community Provider Database

Career Resource Center, First Floor JWRU, 392-1601, **www.crc.ufl.edu/**

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/**

Plagiarism:
The UF Science and Engineering policy about plagiarism is located here. **Please read it**.

The following information applies to all courses taught at the UF Entomology and Nematology Department and can be found in all class syllabi.

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, or, 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.

In some countries, it is an acceptable practice to write in a manner that faculty members at the University of Florida consider plagiarism. Students studying in our university and with plans to publish their research in the English language need to know what plagiarism is and how to avoid it.

Plagiarism will not be tolerated in this course. Students who plagiarize will be caught and consequences will be applied. I will check all written assignments using an anti-plagiarism software called Turnitin® (http://www.at.ufl.edu/~turnitin/about.html).

For further information and examples of plagiarism, I strongly suggest that you please read the George Smathers' Library Guide to Plagiarism at
http://web.uflib.ufl.edu/msl/subjects/Physics/StudentPlagiarism.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.

Hardware/Internet Requirements

1. All students should have dedicated access to a computer using a modern operating system such as Windows 7 or Mac OS X. Students should make sure to have access to a back-up computer (work, friend or relative's computer) in case of equipment failure.
2. A high-speed Internet connection is highly recommended for all courses. We cannot guarantee multimedia components will work on slower connections. Some wireless connections might also present a problem. Unfortunately, we cannot distribute hard copies (e.g., cd-rom, dvd-rom) of multimedia items.
3. This course requires audio-video presentations. Students will need speakers and/or headphones, and a microphone for the presentations.

Software Requirements

This software is available at no cost (the one exception is the MS Office suite, however there is a free alternative). It is recommended that you download the software even if you already have it on your computer. Many technical problems you might encounter can be resolved by installing the latest version of the following software. Click on the logo(s) to download.

1. Firefox Web Browser – In order to simplify compatibility issues, students should access their courses using Firefox (Chrome, Internet Explorer or Safari have limited functionality)
2. Adobe Flash Player
3. Adobe Reader – This course includes .pdf documents which require Adobe Reader.
4. MS Office or Open Office – Courses require updated business suite applications. Open Office is a free alternative to the MS Office suite. You can get Open Office here.

Contact the UF Computing Help desk immediately with any technological issues:

Ph: 352-392-4357; helpdesk@ufl.edu

Distance Learning
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. 0001 Reid Hall, 352-392-8565, **www.dso.ufl.edu/drc/**