

Cover Sheet: Request 13874

ENY 4XXX Insect Pest and Vector Management

Info

Process	Course New Ugrad/Pro
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Tolulope Agunbiade agunbiade@ufl.edu
Created	4/19/2019 10:50:25 AM
Updated	11/12/2019 12:37:45 PM
Description of request	Request for an undergraduate course number for Insect Pest and Vector Management course . Co-listed with 6XXX course.

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	CALS - Entomology and Nematology 514914000	Heather Mcauslane		9/5/2019
No document changes					
College	Approved	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	Edits requested by the CALS CC have been addressed.	10/17/2019
Insect Pest and Vector Management - ENY 4XXX and 6XXX.pdf					10/2/2019
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			10/17/2019
No document changes					
Statewide Course Numbering System					
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Office of the Registrar					
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Student Academic Support System					
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Catalog					
No document changes					
College Notified					
No document changes					

Course|New for request 13874

Info

Request: ENY 4XXX Insect Pest and Vector Management

Description of request: Request for an undergraduate course number for Insect Pest and Vector Management course . Co-listed with 6XXX course.

Submitter: Tolulope Agunbiade agunbiade@ufl.edu

Created: 11/12/2019 12:42:04 PM

Form version: 8

Responses

Recommended Prefix ENY

Course Level 4

Number xxx

Category of Instruction Joint (Ugrad/Grad)

Lab Code None

Course Title Insect Pest and Vector Management

Transcript Title Insect Management

Degree Type Baccalaureate

Delivery Method(s) Online

Co-Listing Yes

Co-Listing Explanation Much of the course content is the same for both undergraduate and graduate students. For example, there will be 3 examinations, 10 graded discussions, and 5 quizzes to complete the course requirements.

Graduate students will, in addition:

1. have additional readings
2. be required to complete a project report to complete the course requirements. The project report will include:
 - a. an abstract – concise and not more than 250 words
 - b. a description of the insect pest problem, including the pest biology, history, monitoring techniques, and economic importance (pest impact)
 - c. the pest management options available, including the implications of each for pest management
 - d. list of references

Effective Term Earliest Available

Effective Year Earliest Available

Rotating Topic? No

Repeatable Credit? No

Amount of Credit 3

If variable, # min 0

If variable, # max 0

S/U Only? No

Contact Type Regularly Scheduled

Weekly Contact Hours 3

Course Description Covers the principles and practices used in pest and vector management, and also emphasizes the arthropod pests affecting crop and ornamental plants, humans and livestock.

Prerequisites An introductory course in entomology is required

Co-requisites None

Rationale and Placement in Curriculum The graduate version of this course has been taught for several years at the Entomology Department as ENY 5236. Undergraduates requesting to enroll have been enrolled under special topics (ENY 4905). This course is also been considered as an elective course for a planned undergraduate biosecurity certificate, and will also count as an elective in the

entomology undergraduate major/minor.

Course Objectives Students that successfully complete this course will be able to:

- describe the philosophy of integrated pest management
- evaluate the ecological and economic basis for the attainment of pest status
- assess the management approaches available to pest managers, including the advantages and disadvantages of each
- formulate the most appropriate pest management tactic for each pest situation

Course Textbook(s) and/or Other Assigned Reading The following are assigned readings for undergraduate students taking the course. The PDF files of these readings will be made available on the course website.

1. Herms, D. A., and D. G. McCullough. 2014. Emerald ash borer invasion of North America: History, biology, ecology, impacts and management. *Annual Review of Entomology* 59:13 – 30
2. War A. R., G. K. Taggar, M. Y. War, and B. Hussain. 2016. Impact of climate change on insect pests, plant chemical ecology, tritrophic interactions and food production. *International Journal of Clinical and Biological Sciences* 1(2): 16 – 29
3. McCravy K. W. 2018. A review of sampling and monitoring methods for beneficial arthropods in agroecosystems. *Insects* 9: 170
4. Oberemok V. V., K. V. Laikova, Y. I. Gninenko, A. S. Zaitsev, P. M. Nyadar, and T. A. Adeyemi. 2015. A short history of insecticides. *Journal of Plant Protection Research* 55(3): 221-226
5. Ranson H., and N. Lissenden. 2016. Insecticide resistance in African Anopheles mosquitoes: A worsening situation that needs urgent action to maintain malaria control. *Trends in Parasitology* 32 (3): 187 – 196
6. Parker J. E., W. E. Snyder, G. C. Hamilton, and C. Rodriguez-Saona. 2013. Companion planting and insect pest control. In Soloneski S., and M. Larramendy (Eds). *Weed and pest control – Conventional and new challenges*. InTech
7. van Lenteren J. C., K. Bolckmans, J. Köhl, W. J. Ravensberg, and A. Urbaneja. 2018. Biological control using invertebrates and microorganisms: Plenty of new opportunities. *BioControl* 63: 39 – 59
8. Sarwar M. 2015. Microbial insecticides: An ecofriendly effective line of attack for insect pests management. *International Journal of Engineering and Advanced Research Technology* 1(2): 4 – 9
9. Alphey L., A. McKemey, D. Nimmo, M. N. Oviedo, R. Lacroix, K. Matzen, and C. Beech. 2013. Genetic control of Aedes mosquitoes. *Pathogens and Global Health* 107(4): 170 – 179
10. Bruce T. J. A., G. I. Aradottir, L. E. Smart, J. L. Martin, J. C. Caulfield, A. Doherty, C. A. Sparks, C. M. Woodcock, M. A. Birkett, J. A. Napier, H. D. Jones, and J. A. Pickett. 2015. The first crop plant genetically engineered to release an insect pheromone for defence. *Scientific Reports* 5: 11183
11. Smith C. W., and W-P Chuang. 2013. Plant resistance to aphid feeding: Behavioral, physiological, genetic and molecular cues regulate aphid host selection and feeding. *Pest Management* 70: 528 – 540
12. Khan Z. R., and J. A. Pickett. 2008. Push-pull strategy for insect management, Pages 3074-3082. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
13. Vincent C., G. Hallman, B. Panneton, and F. Fleurat-Lessard. 2003. Management of agricultural insects with physical control methods. *Annual Review of Entomology* 48: 261 – 281
14. Riley D. G. 2008. Economic injury level and economic threshold concepts in pest management, Pages 1282-1286. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
15. Klapwijk M. J., A. J. M. Hopkins, L. Eriksson, M. Pettersson, M. Schroeder, A. Lindelow, J. Ronnberg, E. C. H. Keskitalo, and M. Kenis. 2016. Reducing the risk of invasive forest pests and pathogens: Combining legislation, targeted management and public awareness. *Ambio* 45(Suppl.2): S223 – S234

The following are assigned readings for graduate students taking the course. The PDF files of these readings will be made available on the course website.

1. Herms, D. A., and D. G. McCullough. 2014. Emerald ash borer invasion of North America: History, biology, ecology, impacts and management. *Annual Review of Entomology* 59:13 – 30
2. Fasulo T. R. 2008. History and insects, Pages 1158-1169. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
3. War A. R., G. K. Taggar, M. Y. War, and B. Hussain. 2016. Impact of climate change on insect pests, plant chemical ecology, tritrophic interactions and food production. *International Journal of Clinical and Biological Sciences* 1(2): 16 – 29

4. Capinera J. L. 2002. North American vegetable pests: The pattern of invasion. *American Entomologist* 48: 20-39
5. McCravy K. W. 2018. A review of sampling and monitoring methods for beneficial arthropods in agroecosystems. *Insects* 9: 170
6. Naranjo S. E. 2008. Sampling arthropods, Pages 3231-3246. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
7. Oberemok V. V., K. V. Laikova, Y. I. Gninenko, A. S. Zaitsev, P. M. Nyadar, and T. A. Adeyemi. 2015. A short history of insecticides. *Journal of Plant Protection Research* 55(3): 221-226
8. Ebert T., and R. Downer. 2008. Insecticide application: The dose transfer process, Pages 1958-1974. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
9. Ranson H., and N. Lissenden. 2016. Insecticide resistance in African Anopheles mosquitoes: A worsening situation that needs urgent action to maintain malaria control. *Trends in Parasitology* 32 (3): 187 – 196
10. Sarwar M. 2015. The killer chemicals for control of agriculture insect pests: The botanical insecticides. *International Journal of Chemical and Biomolecular Science* 1(3): 123-128
11. Parker J. E., W. E. Snyder, G. C. Hamilton, and C. Rodriguez-Saona. 2013. Companion planting and insect pest control. In Soloneski S., and M. Larramendy (Eds). *Weed and pest control – Conventional and new challenges*. InTech
12. Finch S., and R. H. Collier. 2008. Host plant selection by insects, Pages 1163-1173. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
13. van Lenteren J. C., K. Bolckmans, J. Köhl, W. J. Ravensberg, and A. Urbaneja. 2018. Biological control using invertebrates and microorganisms: Plenty of new opportunities. *BioControl* 63: 39 – 59
14. Hoddle M. S. 2002. Classical biological control of arthropods in the 21st century. Pages 3-16 in *International Symposium on Biological Control of Arthropods*.
15. Sarwar M. 2015. Microbial insecticides: An ecofriendly effective line of attack for insect pests management. *International Journal of Engineering and Advanced Research Technology* 1(2): 4–9
16. Jisha V. N., R. B. Smitha, and S. Benjamin. 2013. An overview on the crystal toxins from *Bacillus thuringiensis*. *Advances in Microbiology*. 3: 462-472
17. Klasse W. 2008. Area-wide insect pest management, Pages 266-282. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
18. Alphey L., A. McKemey, D. Nimmo, M. N. Oviedo, R. Lacroix, K. Matzen, and C. Beech. 2013. Genetic control of *Aedes* mosquitoes. *Pathogens and Global Health* 107(4): 170 – 179
19. Megido R. C., E. Haubruge, and F. J. Verheggen. 2013. Pheromone-based management strategies to control the tomato leafminer, *Tuta absoluta* (Lepidoptera: Gelechiidae). A review. *Biotechnology, Agronomy, Society and Environment* 17(3): 475 – 482
20. Bruce T. J. A., G. I. Aradottir, L. E. Smart, J. L. Martin, J. C. Caulfield, A. Doherty, C. A. Sparks, C. M. Woodcock, M. A. Birkett, J. A. Napier, H. D. Jones, and J. A. Pickett. 2015. The first crop plant genetically engineered to release an insect pheromone for defence. *Scientific Reports* 5: 11183
21. Smith C. W., and W-P Chuang. 2013. Plant resistance to aphid feeding: Behavioral, physiological, genetic and molecular cues regulate aphid host selection and feeding. *Pest Management* 70: 528 – 540
22. Khan Z. R., and J. A. Pickett. 2008. Push-pull strategy for insect management, Pages 3074-3082. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
23. Mitchell C., R. M. Brennan, J. Graham, and A. J. Karley. 2016. Plant defense against herbivorous pests: Exploiting resistance and tolerance traits for sustainable crop protection. *Frontiers in Plant Science* 7: 1132
24. Vincent C., G. Hallman, B. Panneton, and F. Fleurat-Lessard. 2003. Management of agricultural insects with physical control methods. *Annual Review of Entomology* 48: 261 – 281
25. Cormier D., J. Veilleux, and A. Firlej. 2015. Exclusion net to control spotted wing *Drosophila* in blueberry fields. *Integrated Protection of Fruit Crops* 109: 181-184
26. Shimoda M., and K-I Honda. 2013. Insect Reactions to light and its applications to pest management. *Applied Entomology and Zoology* 48: 413-421
27. Bortolotto O. C., A. Pomari-Fernandes, R. C. O. de F. Bueno, A. de F. Bueno, Y. K. S. da Kruz, A. P. Queiroz, A. Sanzovo, and R. B. Ferreira. 2015. The use of soybean integrated pest management in Brazil: A review. *Agronomy Science and Biotechnology* 1(1): 25 – 32
28. Riley D. G. 2008. Economic injury level and economic threshold concepts in pest management, Pages 1282-1286. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
29. Bueno A. F., S. V. Paula-Moraes, D. L. Gazzoni, and A. F. Pomari. 2013. Economic thresholds in soybean-integrated pest management: Old concepts, current adoption, and adequacy. *Neotropical*

Entomology 42: 439-447

30. Baldwin R. W., and C. W. Scherer. 2008. School IPM, or pest management on school grounds, Pages 3289-3299. In J. L. Capinera (Ed.), Encyclopedia of Entomology. Springer Dordrecht, Netherlands

31. Matthews G., M. Zaim, R. S. Yadav, A. Soares, J. Hii, B. Ameneshewa, A. Mnzava, A. P. Dash, M. Ejov, S. H. Tan, and H. van den Berg. 2011. Status of legislation and regulatory control of public health pesticides in countries endemic with or at risk of major vector-borne diseases. Environmental Health Perspectives 119(11): 1517 – 1522

32. Klapwijk M. J., A. J. M. Hopkins, L. Eriksson, M. Pettersson, M. Schroeder, A. Lindelow, J. Ronnberg, E. C. H. Keskitalo, and M. Kenis. 2016. Reducing the risk of invasive forest pests and pathogens: Combining legislation, targeted management and public awareness. Ambio 45(Suppl.2): S223 – S234

Weekly Schedule of Topics Week Topic

- 1 Pests and humans
- 2 Causes of pest and vectored disease outbreaks
- 3 Sampling and monitoring of arthropods
- 4 Insecticides and problems with using insecticides
- 5 Environmental and cultural control
- 6 Biological control
- 7 Insect pathogens
- 8 Genetic control and area-wide management
- 9 Attractants, repellents, and Pheromones
- 10 Host plant resistance
- 11 Physical measures
- 12 Legislation and regulation/Emerging concepts and practices

Links and Policies 1. Grading - <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

2. Attendance and make-up work - <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

3. Online course evaluation process - <https://evaluations.ufl.edu>

4. Academic honesty - <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>

5. Students with disabilities - www.dso.ufl.edu/drc/

6. University counseling and wellness center - www.counseling.ufl.edu

7. U matter we care - www.umatter.ufl.edu/

8. Campus resource center - <https://career.ufl.edu/>

Grading Scheme The course grade is based on performance on the exams, quizzes, and participation in discussion activities. The final grades will be converted to percentages. The final grade will be assigned as:

Course Requirement

Point Value

Points

Percentages

Discussions/participation

20 each

200

29%

Quizzes

40 each

200

29%

Exam 1

100

100

14%

Exam 2

100 100

14%

Exam 3

100

100

14%

Total

700

100%

Grading Scale

Grade Percentages

A 93 – 100

A- 90 – 92.9

B+ 87 – 89.9

B 83 – 86.9

B- 80 - 82.9

C+ 77 - 79.9

C 73 - 76.9

C- 70 - 72.9

D+ 67 - 69.9

D 63 - 66.9

D- 60 - 62.9

E <59.9 and below

Instructor(s) Dr. Tolulope Agunbiade

INSECT PEST AND VECTOR MANAGEMENT

ENY 4XXX

3 CREDITS
SUMMER C

INSTRUCTOR INFORMATION

Instructor

Dr. Tolulope Agunbiade

Contact Information & Hours

Location: 3212 Steinmetz Hall

Email: agunbiade@ufl.edu

Phone: (352) 294-6792

Office hours: by phone or email

GENERAL INFORMATION

Course Description

The course will cover the principles and practices used in insect pest and vector management and will also emphasize the arthropod pests affecting crops and ornamental plants, humans and livestock. The course will explore content using narrated PowerPoint presentations and assigned readings.

Learning Objectives

After completing this course, students will be able to:

- describe the philosophy of integrated pest management,
- evaluate the ecological and economic basis for the attainment of pest status,
- assess the management approaches available to pest managers, including the advantages and disadvantages of each,
- formulate the most appropriate pest management tactic for each pest situation

Prerequisite

An introductory course in entomology

Course Website

The course content, including narrated lectures, assigned readings, examinations, quizzes, and discussions will be available through the course website in Canvas at <https://elearning.ufl.edu/>. Each week, students are required to view the lectures, and associated readings, participate in the discussion activities, and take the quizzes and examinations prior to the assigned due dates in order to complete the course requirements.

Course Communications

In addition to the assigned discussion activities, students are encouraged to post general questions on topics taught in the class under the General Questions thread. The instructor will respond to the questions. Other students are also encouraged to respond to the questions. Private questions should be sent to the instructor via email.

COURSE MATERIALS

Textbooks/Readings

The following textbooks are recommended for this course.

- van Emden H. F. and M. W. Service. 2004. Pest and vector control. Cambridge University Press. 349 pp.
This textbook is available free of charge as an ebook through the UF libraries with your Gatorlink login
- Pedigo L. P. and M. E. Rice. 2009. Entomology and pest management. Waveland Press Inc. 784 pp.

The following are required readings for the course. The PDF files of these readings will be made available on the course website.

1. Herms, D. A., and D. G. McCullough. 2014. Emerald ash borer invasion of North America: History, biology, ecology, impacts and management. *Annual Review of Entomology* 59:13 – 30
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5. Ranson H., and N. Lissenden. 2016. Insecticide resistance in African *Anopheles* mosquitoes: A worsening situation that needs urgent action to maintain malaria control. *Trends in Parasitology* 32 (3): 187 – 196
6. Parker J. E., W. E. Synder, G. C. Hamilton, and C. Rodriguez-Saona. 2013. Companion planting and insect pest control. In Soloneski S., and M. Larramendy (Eds). *Weed and pest control – Conventional and new challenges*. InTech
7. van Lenteren J. C., K. Bolckmans, J. Köhl, W. J. Ravensberg, and A. Urbaneja. 2018. Biological control using invertebrates and microorganisms: Plenty of new opportunities. *BioControl* 63: 39 – 59
8. Sarwar M. 2015. Microbial insecticides: An ecofriendly effective line of attack for insect pests management. *International Journal of Engineering and Advanced Research Technology* 1(2): 4 – 9
9. Alphey L., A. McKemey, D. Nimmo, M. N. Oviedo, R. Lacroix, K. Matzen, and C. Beech. 2013. Genetic control of *Aedes* mosquitoes. *Pathogens and Global Health* 107(4): 170 – 179
10. Bruce T. J. A., G. I. Aradottir, L. E. Smart, J. L. Martin, J. C. Caulfield, A. Doherty, C. A. Sparks, C. M. Woodcock, M. A. Birkett, J. A. Napier, H. D. Jones, and J. A. Pickett. 2015. The first crop plant genetically engineered to release an insect pheromone for defence. *Scientific Reports* 5: 11183
11. Smith C. W., and W-P Chuang. 2013. Plant resistance to aphid feeding: Behavioral, physiological, genetic and molecular cues regulate aphid host selection and feeding. *Pest Management* 70: 528 – 540
12. Khan Z. R., and J. A. Pickett. 2008. Push-pull strategy for insect management, Pages 3074-3082. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
13. Vincent C., G. Hallman, B. Panneton, and F. Fleurat-Lessard. 2003. Management of agricultural insects with physical control methods. *Annual Review of Entomology* 48: 261 – 281
14. Riley D. G. 2008. Economic injury level and economic threshold concepts in pest management, Pages 1282-1286. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands

15. Klapwijk M. J., A. J. M. Hopkins, L. Eriksson, M. Pettersson, M. Schroeder, A. Lindelow, J. Ronnberg, E. C. H. Keskitalo, and M. Kenis. 2016. Reducing the risk of invasive forest pests and pathogens: Combining legislation, targeted management and public awareness. *Ambio* 45(Suppl.2): S223 – S234

COURSE SCHEDULE

Week	Topic	Tasks
<i>Background to Insect Pest and Vector Management</i>		
1 May 13 – 17	Pests and humans	Participate in Discussion 1 - Introductions Participate in Discussion 2 Read required reading 1
2 May 20 – 24	Causes of pest and vectored disease outbreaks	Read required reading 2 Take Quiz 1 Participate in Discussion 3
3 May 28 – 31	Sampling and monitoring of arthropods	Read required reading 3 Participate in Discussion 4
<i>Approaches to Insect Pest and Vector Management</i>		
4 June 3 – 7	Insecticides, applications, and problems with using insecticides	Read required readings 4 - 5 Take Quiz 2 Participate in Discussion 5
5 June 10 – 14	Environmental and cultural control	Read required reading 6 Take Exam 1
6 June 17 – 21	Biological control	Read required reading 7 Take Quiz 3 Participate in Discussion 6
June 24 – 28	<i>No classes – summer break</i>	
7 July 1 – 5	Insect pathogens	Read required reading 8 Participate in Discussion 7
8 July 8 – 12	Genetic control and area-wide management	Read required reading 9 Take Quiz 4 Participate in Discussion 8
9 July 15 – 19	Attractants, repellents, and pheromones	Read required reading 10 Take Exam 2
10 July 22 – 26	Host plant resistance	Read required readings 11 - 12 Participate in Discussion 9
11 July 29 – August 2	Physical measures	Read required reading 13 Take Quiz 5 Participate in Discussion 10
12 August 5 – 9	Legislation and Regulation/Emerging concepts and practices	Read required reading 14 - 15 Take Exam 3

COURSE POLICIES

Course Requirements

There are 3 examinations, 10 graded discussions, and 5 quizzes to complete the course requirements.

Examinations

There are three, non-cumulative exams (100 points each). The first, second and third exams will cover weeks 1 - 5, 6 - 9, and 10 - 12, respectively. The exams are open-book and essay-based. Each exam will be made available and accessible in Canvas from Thursday 8:00 am EST to Friday 11:59 pm EST of the exam week. Once you begin the exam, you will have 3 hours to complete it in a single session, so do not open the exam until you are ready to complete it.

Quizzes

There are five quizzes (40 points each) scheduled every other week throughout the semester. The quizzes will consist of 10 multiple choice, mix and match, and true/false questions and will cover the lectures and/or required readings. The quizzes are closed-book and will be made available and accessible in Canvas from Thursday 8:00 am EST to Friday 11:59 pm EST of the quiz week. Once you begin the quiz, you will have 15 minutes to complete it in a single session, so do not open the quiz until you are ready to complete it.

Discussions

Every week, questions will be posted by the instructor in the Discussion forum in Canvas. Students are required to make at least one post in the discussion thread (20 points each). These questions are designed to generate discussions, provide opportunities for student engagement, and aid the students' understanding of pest management issues. Each discussion thread will be open for one week. You will not receive any grade if you do not post at all or if you simply post "I agree". Please note that there will be two discussions the first week – one is to introduce yourself and the other is based on course content.

GRADING POLICIES

The course grade is based on performance on the exams, quizzes, and participation in discussion activities. The final grades will be converted to percentages. The final grade will be assigned as:

Course Requirement	Point Value	Points	Percentages
Discussions/participation	20 each	200	29%
Quiz 1	40	40	5.8%
Quiz 2	40	40	5.8%
Quiz 3	40	40	5.8%
Quiz 4	40	40	5.8%
Quiz 5	40	40	5.8%
Exam 1	100	100	14%
Exam 2	100	100	14%
Exam 3	100	100	14%
Total		700	100%

Grading Scale

Grade	Percentages
A	93 – 100
A-	90 – 92.9
B+	87 – 89.9
B	83 – 86.9
B-	80 – 82.9
C+	77 – 79.9
C	73 – 76.9
C-	70 – 72.9
D+	67 – 69.9
D	63 – 66.9
D-	60 – 62.9
E	<59.9 and below

UNIVERSITY OF FLORIDA POLICIES AND ASSISTANCE

Grades and Grade Points

For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

Attendance and Make-Up Work

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/>

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 how to give feedback in a professional and respectful manner is available at: <https://gatorevals.aa.ufl.edu/students/>. 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/>.

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/process/student-conduct-honor-code>.

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.

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/>

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*
 - Counseling Services
 - Groups and Workshops
 - Outreach and Consultation
 - Self-Help Library
 - Wellness Coaching
- U Matter We Care, www.umatter.ufl.edu/
- *Career Connections Center, First Floor JWRU, 392-1601, <https://career.ufl.edu/>.*

Student Complaints:

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INSECT PEST AND VECTOR MANAGEMENT

ENY 6XXX

3 CREDITS
SUMMER C

INSTRUCTOR INFORMATION

Instructor

Dr. Tolulope Agunbiade

Contact Information & Hours

Location: 3212 Steinmetz Hall

Email: agunbiade@ufl.edu

Phone: (352) 294-6792

Office hours: by phone or email

GENERAL INFORMATION

Course Description

The course will cover the principles and practices used in insect pest and vector management and will also emphasize the arthropod pests affecting crops and ornamental plants, humans and livestock. The course will explore content using narrated PowerPoint presentations and assigned readings.

Learning Objectives

After completing this course, students will be able to:

- describe the philosophy of integrated pest management,
- evaluate the ecological and economic basis for the attainment of pest status,
- assess the management approaches available to pest managers, including the advantages and disadvantages of each,
- formulate the most appropriate pest management tactic for each pest situation

Prerequisite

An introductory course in entomology

Course Website

The course content, including narrated lectures, assigned readings, examinations, quizzes, and discussions will be available through the course website in Canvas at <https://elearning.ufl.edu/>. Each week, students are required to view the lectures, and associated readings, participate in the discussion activities, and take the quizzes and examinations prior to the assigned due dates in order to complete the course requirements.

Course Communications

In addition to the assigned discussion activities, students are encouraged to post general questions on topics taught in the class under the General Questions thread. The instructor will respond to the questions. Other students are also encouraged to respond to the questions. Private questions should be sent to the instructor via email.

COURSE MATERIALS

Textbooks/Readings

The following textbooks are recommended for this course.

- van Emden H. F. and M. W. Service. 2004. Pest and vector control. Cambridge University Press. 349 pp.
This textbook is available free of charge as an ebook through the UF libraries with your Gatorlink login
- Pedigo L. P. and M. E. Rice. 2009. Entomology and pest management. Waveland Press Inc. 784 pp.

The following are required readings for the course. The PDF files of these readings will be made available on the course website.

1. Herms, D. A., and D. G. McCullough. 2014. Emerald ash borer invasion of North America: History, biology, ecology, impacts and management. *Annual Review of Entomology* 59:13 – 30
2. Fasulo T. R. 2008. History and insects, Pages 1158-1169. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
3. War A. R., G. K. Taggar, M. Y. War, and B. Hussain. 2016. Impact of climate change on insect pests, plant chemical ecology, tritrophic interactions and food production. *International Journal of Clinical and Biological Sciences* 1(2): 16 – 29
4. Capinera J. L. 2002. North American vegetable pests: The pattern of invasion. *American Entomologist* 48: 20-39
5. McCravy K. W. 2018. A review of sampling and monitoring methods for beneficial arthropods in agroecosystems. *Insects* 9: 170
6. Naranjo S. E. 2008. Sampling arthropods, Pages 3231-3246. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
7. Oberemok V. V., K. V. Laikova, Y. I. Gninenko, A. S. Zaitsev, P. M. Nyadar, and T. A. Adeyemi. 2015. A short history of insecticides. *Journal of Plant Protection Research* 55(3): 221-226
8. Ebert T., and R. Downer. 2008. Insecticide application: The dose transfer process, Pages 1958-1974. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
9. Ranson H., and N. Lissenden. 2016. Insecticide resistance in African *Anopheles* mosquitoes: A worsening situation that needs urgent action to maintain malaria control. *Trends in Parasitology* 32 (3): 187 – 196
10. Sarwar M. 2015. The killer chemicals for control of agriculture insect pests: The botanical insecticides. *International Journal of Chemical and Biomolecular Science* 1(3): 123-128
11. Parker J. E., W. E. Synder, G. C. Hamilton, and C. Rodriguez-Saona. 2013. Companion planting and insect pest control. In Soloneski S., and M. Larramendy (Eds). *Weed and pest control – Conventional and new challenges*. InTech
12. Finch S., and R. H. Collier. 2008. Host plant selection by insects, Pages 1163-1173. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
13. van Lenteren J. C., K. Bolckmans, J. Köhl, W. J. Ravensberg, and A. Urbaneja. 2018. Biological control using invertebrates and microorganisms: Plenty of new opportunities. *BioControl* 63: 39 – 59
14. Hoddle M. S. 2002. Classical biological control of arthropods in the 21st century. Pages 3-16 in *International Symposium on Biological Control of Arthropods*.

15. Sarwar M. 2015. Microbial insecticides: An ecofriendly effective line of attack for insect pests management. *International Journal of Engineering and Advanced Research Technology* 1(2): 4–9
16. 16. Jisha V. N., R. B. Smitha, and S. Benjamin. 2013. An overview on the crystal toxins from *Bacillus thuringiensis*. *Advances in Microbiology*. 3: 462-472
17. 17. Klasse W. 2008. Area-wide insect pest management, Pages 266-282. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
18. 18. Alphey L., A. McKemey, D. Nimmo, M. N. Oviedo, R. Lacroix, K. Matzen, and C. Beech. 2013. Genetic control of *Aedes* mosquitoes. *Pathogens and Global Health* 107(4): 170 – 179
19. Megido R. C., E. Haubruge, and F. J. Verheggen. 2013. Pheromone-based management strategies to control the tomato leafminer, *Tuta absoluta* (Lepidoptera: Gelechiidae). A review. *Biotechnology, Agronomy, Society and Environment* 17(3): 475 – 482
20. Bruce T. J. A., G. I. Aradottir, L. E. Smart, J. L. Martin, J. C. Caulfield, A. Doherty, C. A. Sparks, C. M. Woodcock, M. A. Birkett, J. A. Napier, H. D. Jones, and J. A. Pickett. 2015. The first crop plant genetically engineered to release an insect pheromone for defence. *Scientific Reports* 5: 11183
21. Smith C. W., and W-P Chuang. 2013. Plant resistance to aphid feeding: Behavioral, physiological, genetic and molecular cues regulate aphid host selection and feeding. *Pest Management* 70: 528 – 540
22. Khan Z. R., and J. A. Pickett. 2008. Push-pull strategy for insect management, Pages 3074-3082. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
23. Mitchell C., R. M. Brennan, J. Graham, and A. J. Karley. 2016. Plant defense against herbivorous pests: Exploiting resistance and tolerance traits for sustainable crop protection. *Frontiers in Plant Science* 7: 1132
24. Vincent C., G. Hallman, B. Panneton, and F. Fleurat-Lessard. 2003. Management of agricultural insects with physical control methods. *Annual Review of Entomology* 48: 261 – 281
25. Cormier D., J. Veilleux, and A. Firlej. 2015. Exclusion net to control spotted wing *Drosophila* in blueberry fields. *Integrated Protection of Fruit Crops* 109: 181-184
26. Shimoda M., and K-I Honda. 2013. Insect Reactions to light and its applications to pest management. *Applied Entomology and Zoology* 48: 413-421
27. Bortolotto O. C., A. Pomari-Fernandes, R. C. O. de F. Bueno, A. de F. Bueno, Y. K. S. da Kruz, A. P. Queiroz, A. Sanzovo, and R. B. Ferreira. 2015. The use of soybean integrated pest management in Brazil: A review. *Agronomy Science and Biotechnology* 1(1): 25 – 32
28. Riley D. G. 2008. Economic injury level and economic threshold concepts in pest management, Pages 1282-1286. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
29. Bueno A. F., S. V. Paula-Moraes, D. L. Gazzoni, and A. F. Pomari. 2013. Economic thresholds in soybean-integrated pest management: Old concepts, current adoption, and adequacy. *Neotropical Entomology* 42: 439-447
30. Baldwin R. W., and C. W. Scherer. 2008. School IPM, or pest management on school grounds, Pages 3289-3299. In J. L. Capinera (Ed.), *Encyclopedia of Entomology*. Springer Dordrecht, Netherlands
31. Matthews G., M. Zaim, R. S. Yadav, A. Soares, J. Hii, B. Ameneshewa, A. Mnzava, A. P. Dash, M. Ejov, S. H. Tan, and H. van den Berg. 2011. Status of legislation and regulatory control of public health pesticides in countries endemic with or at risk of major vector-borne diseases. *Environmental Health Perspectives* 119(11): 1517 – 1522

32. Klapwijk M. J., A. J. M. Hopkins, L. Eriksson, M. Pettersson, M. Schroeder, A. Lindelow, J. Ronnberg, E. C. H. Keskitalo, and M. Kenis. 2016. Reducing the risk of invasive forest pests and pathogens: Combining legislation, targeted management and public awareness. *Ambio* 45(Suppl.2): S223 – S234

COURSE SCHEDULE

Week	Topic	Tasks
<i>Background to Insect Pest and Vector Management</i>		
1 May 13 – 17	Pests and humans	Participate in Discussion 1 - Introductions Participate in Discussion 2 Read required reading 1 - 2
2 May 20 – 24	Causes of pest and vectored disease outbreaks	Read required reading 3 - 4 Take Quiz 1 Participate in Discussion 3
3 May 28 – 31	Sampling and monitoring of arthropods	Read required reading 5 - 6 Participate in Discussion 4 Last week to submit topic of group project report
<i>Approaches to Insect Pest and Vector Management</i>		
4 June 3 – 7	Insecticides, applications, and problems with using insecticides	Read required readings 7 - 10 Take Quiz 2 Participate in Discussion 5
5 June 10 – 14	Environmental and cultural control	Read required reading 11 - 12 Take Exam 1
6 June 17 – 21	Biological control	Read required reading 13 - 14 Take Quiz 3 Participate in Discussion 6 Last week to submit group project report
June 24 – 28	<i>No classes – summer break</i>	
7 July 1 – 5	Insect pathogens	Read required reading 15 - 16 Participate in Discussion 7 Last week to submit your peer review of group project report
8 July 8 – 12	Genetic control and area-wide management	Read required reading 17 - 18 Take Quiz 4 Participate in Discussion 8
9 July 15 – 19	Attractants, repellents, and pheromones	Read required reading 19 - 20 Take Exam 2
10 July 22 – 26	Host plant resistance	Read required readings 21 - 23 Participate in Discussion 9
11 July 29 – August 2	Physical measures	Read required reading 24 - 26 Take Quiz 5 Participate in Discussion 10
12 August 5 – 9	Legislation and Regulation/Emerging concepts and practices	Read required readings 27 - 33 Take Exam 3

COURSE POLICIES

Course Requirements

There are 3 examinations, 10 graded discussions, 5 quizzes, and a group project to complete the course requirements.

Examinations

There are three, non-cumulative exams (100 points each). The first, second and third exams will cover weeks 1 - 5, 6 - 9, and 10 - 12, respectively. The exams are open-book and essay-based. Each exam will be made available and accessible in Canvas from Thursday 8:00 am EST to Friday 11:59 pm EST of the exam week. Once you begin the exam, you will have 3 hours to complete it in a single session, so do not open the exam until you are ready to complete it.

Quizzes

There are five quizzes (40 points each) scheduled every other week throughout the semester. The quizzes will consist of 10 multiple choice, mix and match, and true/false questions and will cover the lectures and/or required readings. The quizzes are closed-book and will be made available and accessible in Canvas from Thursday 8:00 am EST to Friday 11:59 pm EST of the quiz week. Once you begin the quiz, you will have 15 minutes to complete it in a single session, so do not open the quiz until you are ready to complete it.

Discussions

Every week, questions will be posted by the instructor in the Discussion forum in Canvas. Students are required to make at least one post in the discussion thread (20 points each). These questions are designed to generate discussions, provide opportunities for student engagement, and aid the students' understanding of pest management issues. Each discussion thread will be open for one week. You will not receive any grade if you do not post at all or if you simply post "I agree". Please note that there will be two discussions the first week – one is to introduce yourself and the other is based on course content.

Project Report

For the project report (150 points), students will prepare an analysis of a pest management technique(s) for a pest or pest complex that is of medical or agricultural importance. The components of the project report should include:

1. An abstract – concise and not more than 250 words
2. A description of the insect pest problem, including the pest biology, history, monitoring techniques, and economic importance (pest impact)
3. The pest management options available, including the implications of each for pest management
4. List of references

Examples of topics for the project report include:

- Predatory fish for mosquito suppression
- Animal dung destruction by beetles for suppression of biting flies
- Nematodes for suppression of Japanese beetles
- The use of *Bacillus thuringiensis* for insect control

- Pheromones for codling moth management

The above are just examples of topics. You are not limited to them. You are to submit your topic to the instructor on or before the topic submission due date. The report should be between 8 - 10 pages in length (including the title page, references, tables and/or figures). It should be double-spaced, size 12 Times New Roman with 1 inch-margin. The references should be at least 5, from primary literature, and must be according to the Journal of Integrated Pest Management style. Instructions on how to structure the report and the rubrics for evaluation will be posted in Canvas. The reports are due by 11:59 pm of the due date. Late submissions will be marked down by 5 points per day. Each report will also be peer-reviewed by two other students in the class. Overall, the project report evaluations will be as follows:

1. Evaluation by the instructor (70 points) - The instructor will evaluate each of the reports.
2. Evaluation of report by peers (40 points) - Each report will be evaluated by two other students in the class using a rubric. The scores from these two other students for that report will be averaged.
3. Submission of evaluations of peers' group reports (40 points) - Each student must read reports submitted by other students in the class and submit their evaluations.

GRADING POLICIES

The course grade is based on performance on the exams, quizzes, participation in discussion activities, and a group project report. The final grades will be converted to percentages. The final grade will be assigned as:

Course Requirement		Point Value	Points	Percentages
Discussions/participation		20 each	200	25%
Quiz 1		40	40	5%
Quiz 2		40	40	5%
Quiz 3		40	40	5%
Quiz 4		40	40	5%
Quiz 5		40	40	5%
Exam 1		100	100	12.5%
Exam 2		100	100	12.5%
Exam 3		100	100	12.5%
Project report	Evaluation of report by instructor	70	70	8.75%
	Evaluations of report by peers	40	40	5%
	Submission of evaluations of peers' reports	40	40	5%
			850	100%

Grading Scale

Grade	Percentages
A	93 - 100
A-	90 - 92.9
B+	87 - 89.9
B	83 - 86.9
B-	80 - 82.9

C+	77 - 79.9
C	73 - 76.9
C-	70 - 72.9
D+	67 - 69.9
D	63 - 66.9
D-	60 - 62.9
E	<59.9 and below

UNIVERSITY OF FLORIDA POLICIES AND ASSISTANCE

Grades and Grade Points

For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

Attendance and Make-Up Work

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/>

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 how to give feedback in a professional and respectful manner is available at: <https://gatorevals.aa.ufl.edu/students/>. 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/>.

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/process/student-conduct-honor-code>.

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.

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

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Insect Pest and Vector Management **ENY 4XXX/6XXX**

This course is jointly taught to both graduate and undergraduate students. While the undergraduate version of the course has a 700-point value, the graduate version has an 850-point value. This difference is reflected in the writing requirement for the graduate students only. Graduate students taking the course have to submit an individual project report. This 8 to 10-page report (150 points) requires students to prepare an analysis of a pest management technique(s) for a pest or pest complex that is of medical or agricultural importance. The components of the project report should include:

1. An abstract – concise and not more than 250 words
2. A description of the insect pest problem, including the pest biology, history, monitoring techniques, and economic importance (pest impact)
3. The pest management options available, including the implications of each for pest management
4. List of references

The report will be evaluated by the instructor, and also peer-reviewed by other graduate students in the class. The evaluation and grading of the individual project report will be as follows:

1. Evaluation by the instructor (70 points) - The instructor will evaluate each of the reports.
2. Evaluation of report by peers (40 points) - Each report will be evaluated by two other students in the class using a rubric. The scores from these two evaluations for that report will be averaged.
3. Submission of evaluations of peers' group reports (40 points) - Each student must read and evaluate reports submitted by other students in the class. The instructor will randomly assign the reports to the students.