Description and Objectives. This course will examine the fundamental concepts, philosophies, strategies, and tactics used to manage pest populations. Terms, history, and an overview of pest groups will be presented. Ecological principles, disease vector ecology, and the value of biodiversity in agroecosystems will be examined. Sampling strategies, decision-making criteria, management tactics, and area-wide pest management will be discussed. Specific cases of pest management in plant production systems will be studied. Videos and readings will provide more in-depth information for responding to weekly written questions. Assignments will synthesize information in lectures and assigned readings and review information available on the Internet. A project paper on a topic directly related to plant-pest management and a Featured Creature article will be prepared by the student.

In this course, the student will learn:
1. What is IPM, what it does, and who benefits from it.
2. Ecological principles related to IPM.
3. Disease vector ecology.
5. Economic injury level concept and how it is quantified.
6. Management tactics in IPM, their strengths and their weaknesses.
7. Area-wide pest management.
8. Examples of successful implementation of IPM.

The NARRATED POWERPOINT PRESENTATIONS (PPTs) are short lectures on selected topics divided into 11 chapters. All presentations are available on Sakai. These PPTs should be viewed weekly so that the student is capable of answering written questions provided by the professor.

The READING ASSIGNMENTS should be read during the same week as the associated PPT. The purpose of these readings is to supplement information on topics discussed in the PPTs, and they provide additional material for written responses to questions. The course’s textbook is:

The EXAMS are taken on-line. Students may use your notes, books, and Internet as resources and may even discuss responses with other students. However, because the exams are time-limited, students should prepare themselves for the exam beforehand rather than depend on finding information during the exam. For short answer question, all responses must be in your own words. Exam schedule is as follows:

**Exam I: February 17 3:00-7:30pm**
**Exam II: March 24 3:00-7:30pm**
**Exam III: April 21 3:00-7:30pm**

The SHORT ASSIGNMENTS are to be done individually, not as a group. Please provide the citations of at least three literature sources and/or websites consulted (except for Short Assignment #1). Use of information gathered from Wikipedia is not allowed. Citation of Wikipedia will automatically result in a 0 on the assignment. All short assignments must be delivered via Sakai within 10 days after they are assigned. A late assignment will be penalized 2 points for each calendar day it is late. Grammar, neatness, formatting, and spelling will be considered in the evaluation of these assignments.

**Short Assignment #1: Communication posted on course site on Sakai**
- Send a communication to **Introductions** under the **COMMUNICATIONS FORUM**
- In the communication, give your name, major, and hometown
- State why you are in the course (for example, required course, want to control pests in my organic garden)
- Describe any previous experience with pest management
- Describe your career goals and how pest management might fit in
- Posting a photograph is optional.

**SHORT ASSIGNMENT #1 IS DUE JANUARY 16, 2014**

**Short Assignment #2: Extension poster for identifying and monitoring a pest**

Research one plant pest species and develop an extension poster using PowerPoint. A sample poster is on Sakai. Address the following topics in the poster:
- Identification, brief biology, and injury caused by the plant pest
- Sampling tactics used to monitor the pest and whether the sampling method measures absolute density or relative abundance?
- What other information besides pest population should be monitored (e.g., rainfall, plant stage, beneficial organisms)
- References cited

Use the poster template available on the Sakai site (see Short Assignment #2 instructions). Graphs, tables, and photographs are encouraged, but do not make them too large. DO NOT make any mention of control methods.

**TIPS:**
- Use font Arial or Tahoma;
- Use font size 72 for title, font size 40 for your name, font size 32 or 36 for text.
- Use a uniform, pale background with dark letters in bold (no shadowing)
- Give each figure a number and a caption, and cite each figure in the text.
- Remember: It is an extension poster, so make it attractive yet informative to the client.

**SHORT ASSIGNMENT #2 IS DUE FEBRUARY 3, 2014**
Short Assignment #3: Descriptions of cultural control for three pests

Research three target-specific cultural control methods, either three different methods used in the same crop or in 2-3 different crops. Complete the form provide on the Sakai site (see Short Assignment #3 instructions). For each of the three methods, this form will ask you to provide: 1) the scientific and common names of the pest and the crop in which the method is used; 2) the specific objective of the method, including an explanation of how the method interferes biologically with the pest’s survivorship, dispersal, establishment, and/or reproduction, and how the method is employed; and 3) where (state or geographic region or country other than USA) the method is used. For each method, provide references of your sources of information.
SHORT ASSIGNMENT #3 IS DUE February 17, 2014

Short Assignment #4: Comparative analysis of 4 commercially available natural enemies

For each of the four natural enemies listed below, locate three companies on-line that sell them (the three companies need not be the same for all four natural enemies). For each natural enemy, compare the commercialization of it among the three companies. Compare pricing, quantities available, packaging and availability of supporting information (e.g., release recommendation, biology, anything else). Also, mention from whom you would purchase the natural enemy and briefly explain your choice. The four natural enemies are:
*Trichogramma* sp. (there are several species but all attack insect eggs, select ONE species and compare it across the three companies)
*Chrysopa/Chrysoperla* (predators commonly called aphid lions and green lacewings)
*Hippodamia convergens* (convergent lady beetle)
*a predatory mite* (many different species are available, select ONE species and compare it across the three companies)

Provide the name of each company mentioned and its website address.
SHORT ASSIGNMENT #4 IS DUE March 10, 2014

The PROJECT PAPER, also an individual effort, is a synthesis of information from literature and/or experience on a topic directly related to any aspect of pest management. The topic of the paper MUST be delivered to and approved by the instructor no later than February 1, 2014. No two project papers on the same topic may be done, so decide on a topic and have it approved by the instructor soon. You must cite at least five journal articles and/or books and no more than four websites; provide the complete reference of all literature cited and the URL for all websites cited. Use of information gathered from Wikipedia is not allowed. Citation of Wikipedia will automatically result in a 0 on the project paper. Tables and images may be employed. The report should be 4-5 pages in length (excluding tables and images), single-spaced with font Times New Roman size 12. See an example project paper on the Sakai for proper formatting. A complete and well-written draft should be delivered through Sakai by March 18, 2014 (drafts received after this date will receive a 0 for this portion of the grade). The instructor will review the paper, make comments and suggestions, and return the paper to the student by April 6. The student will revise the project paper according to the instructor’s comments and suggestions, and return the final version to the instructor no later than April 14, 2014. Final project paper grade will be based on the revised copy. A late paper will be penalized 5 points for each calendar day it is late. Grammar, neatness, formatting, and spelling will be considered in the final evaluation of your paper.
SCORING:
Topic approval on or before February 11 5 pts
Draft delivered on or before March 18 15 pts
Content 60 pts
Presentation: organization, grammar, format 20 pts

TIPS: A model project paper is available for your viewing on the Sakai site. Please pay attention to proper formatting details.
- title in small caps and font size 14
- your name and city,state after title
- use 1” margins on all sides
- no space between paragraphs
- section headings in bold (but headings are optional)
- follow proper references format under References Cited
- give each figure and each table a unique number and caption, and cite all figures and tables in the text

The WRITTEN RESPONSES are given to a set of three questions pertaining to each week’s study material (PPTs and assigned reading). The student should provide his/her responses on the form provided and return it to the instructor as an attachment to an email on or before the due date. The response to each question should not be less than 50 words and not more than 200 words. Late Written Responses will be penalized 2 points for each calendar day after the due date. The student may abstain from delivery of any 2 Written Responses during the semester without penalty.

FEATURED CREATURE ARTICLE: Each graduate student is required to develop a “Featured Creatures” (FC) fact sheet on a plant pest that is NOT CURRENTLY in or planned for FC (http://creatures.ifas.ufl.edu/). Students must upload their first draft, peer-review, and final draft documents to Sakai. Use the “Assignments” feature of Sakai to complete the uploads. All deadlines are noon of the day that they are due. Late submissions will be docked 2 points on the individual component grade for each 24 hrs after each deadline.

Visit http://entomology.ifas.ufl.edu/creatures/FC_format.pdf for the FC-specific guidelines for article preparation. The content should include the taxonomy of the pest, identification, biology, management tactics, images, and references.

The Featured Creatures article grade will be determined through a multi-step evaluation process that includes topic approval, submission of a 1st draft, return of a peer-review evaluation, and submission of a final draft. Please be sure to read the following to ensure that you are meeting the deadlines. Failure to adhere to the schedule and process will result in lost points.

1. Students must contact the instructor to receive approval for their topic BEFORE proceeding. The topic must be approved by January 28, 2014. (5 pts.)

2. To be eligible for full credit, the first draft must be submitted to the instructor in electronic form (Sakai ASSIGNMENT link) by April 1, 2014. These are expected to be nearly complete documents with significant material provided in each category. The instructor will review the draft for effort, form, and overall progress. (25 pts.)
3. Final drafts of Featured Creature articles are due **April 23, 2014**. The assignment will be evaluated on the completeness of the overall document, thoroughness of the subject matter, incorporation of appropriate original artwork and the incorporation (or not) of suggested revisions (not all suggestions must be incorporated, but you must justify when comments are not incorporated) provided by the instructor. (50 pts.)

**STUDENT ASSESSMENT:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three exams (80 points each)</td>
<td>240 pts</td>
</tr>
<tr>
<td>Four short assignments (20 pts each)</td>
<td>80 pts</td>
</tr>
<tr>
<td>Project paper</td>
<td>100 pts</td>
</tr>
<tr>
<td>Written responses</td>
<td>150 pts</td>
</tr>
<tr>
<td>Featured Creature article</td>
<td>80 pts</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>650 pts</strong></td>
</tr>
</tbody>
</table>

**COURSE GRADING SCALE:**

- A   = 90-100%
- B+  = 86-89%
- B   = 80-85%
- C+  = 76-79%
- C   = 70-75%
- D+  = 66-69%
- D   = 60-65%
- F   = 0-59%

**Absences 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/ugrad/current/regulations/info/attendance.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx).

**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.

**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/

**Distance Courses**
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.

**COURSE OUTLINE 2014**
January 6-10:
- View introductory video
- Do Short Assignment #1; deliver on or before January 16
- View PPTs on Chapter 1: Introduction to Pest Management
- Reading assignment: Chapters 1 and 2 of textbook

January 13-17:
- Deliver Written Responses for Chapter 1 on or before January 13
- View PPTs on Chapter 2: Ecological Principles
- Reading assignment: Chapters 4, 6, and 7 of textbook

January 27-31:
- Deliver Written Responses for Chapter 2 on or before January 27
- Receive approval from instructor for Featured Creature topic by January 28
- View PPTs on Chapter 3: Monitoring and Making Decisions
- View video on IPM for blueberries
- Reading assignment: Chapter 8 of textbook

February 3-7:
- Deliver Written Responses for Chapter 3 on or before February 3
- Do Short Assignment #2; deliver on or before February 3
- View PPTs on Chapter 4: Regulatory Control
- Reading assignment: Chapters 9 and 10 of textbook

February 10-14:
- Deliver Written Responses for Chapter 4 on or before February 10
- Project Paper topic: inform instructor on or before February 11
- View PPTs on Chapter 5: Cultural Control
- Reading assignment: Chapter 16 of textbook

February 17-21:
- Deliver Written Responses for Chapter 5 on or before February 17
- Do Short Assignment #3; deliver on or before February 17
- EXAM I: February 17
- View PPT on Chapter 6: Behavioral Control
- View video on IPM for tomatoes
- Reading assignment: Chapter 14 of textbook
- Do Short Assignment #3; deliver on or before February 17

February 24-28:
- Deliver Written Responses for Chapter 6 on or before February 24
- View PPTs on Chapter 7: Biological Control Part I
- View videos on IPM for foliage plants and for strawberries
- Reading assignment: Chapter 13 of textbook
March 10-14:
- Deliver Written Responses for Chapter 7 Part I on or before March 10
- Do Short Assignment #4; deliver on or before March 10
- View PPTs on Chapter 7: Biological Control Part II
- View videos on biological control of tropical soda apple and of mole crickets
- Reading assignment: Chapter 13 of textbook

March 17-21:
- Deliver Written Responses for Chapter 7 Part II on or before March 17
- Project Paper draft: deliver through Sakai on or before March 18
- View PPT on Chapter 8 Physical Control
- Reading assignment: Chapter 15 of textbook

March 24-28:
- Deliver Written Responses for Chapter 8 on or before March 24
- EXAM II: March 24
- View PPTs on Chapter 9: Chemical Control
- Reading assignment: Chapters 11 and 12 of textbook

March 31-April 4:
- Deliver Written Responses for Chapter 9 on or before March 31
- Featured Creature draft: deliver through Sakai on or before April 1
- View PPT on Chapter 10: Genetic Control
- Reading assignment: Chapter 17 of textbook

April 7-11:
- Deliver Written Responses for Chapter 10 on or before April 8
- View PPT on Chapter 11: Area-Wide Pest Management
- Reading assignment: Chapters 19 and 20 of textbook

April 14-18:
- Deliver Written Responses for Chapter 11 on or before April 14
- Finalize Project Paper and deliver through Sakai on or before April 16

April 21:
- EXAM III: April 21
- Finalize Featured Creature article and deliver through Sakai on or before April 23
Information Retrieval and Referral Systems

Database of IPM Resources (DIR)
http://www.IPMnet.org/DIR/

Acarology WWW Home Page
http://www.nhm.ac.uk/hosted_sites/acarology/

AgNIC- a guide to online agricultural information
http://www.agnic.org/

Agricultural Genome Information Server
http://ars-genome.cornell.edu/

All the Virology on the WWW
http://www.tulane.edu/~dmsander/garryfavweb.html

Arachnology Page (Spiders and their relatives)
http://www.ufsia.ac.be/Arachnology/Arachnology.html

Compendium of IPM Definitions (CID)
http://www.ippc.orst.edu/IPMdefinitions/home.html

Entomology Index of Internet Resources
http://www.ent.iastate.edu/list/

Internet Resources on Weeds & Their Control
http://www.ippc.orst.edu/cicp/gateway/weed.htm

Internet Resources on Vertebrate Pests
http://www.ippc.orst.edu/cicp/pests/vertpest.htm

IPMnet NEWS
http://ipmwww.ncsu.edu/cicp/IPMnet_NEWS/archives.html

Nematology Sites on the Web
http://nematode.unl.edu/wormsite.htm

Pesticide & Agrichemical Industry Information
http://www.bmckay.com/

Pesticide Information Profiles (PIPs)
http://ace.ace.orst.edu/info/extoxnet/pips/pips.html

Plant Pathology Internet Guide Book
http://www.ifgb.uni-hannover.de/extern/ppigb/ppigb.htm

Radcliffe’s IPM World Textbook
http://ipmworld.umn.edu/

Texas Plant Disease Handbook (USA)
http://cygnus.tamu.edu/Texlab/tpdh.html

US National Pesticide Information Retrieval System
http://www.ceris.purdue.edu/npirs/npirs.html

Biocontrol Network
http://www.biconet.com/

Biointegral Resource Center
http://www.birc.org/

NSF Center for Integrated Pest Management
http://cipm.ncsu.edu/

National Sustainable Agriculture Information Service, Pest Management Section
http://www.attra.org/pest.html
Biological Control Virtual Information Center
http://cipm.ncsu.edu/ent/biocontrol/

Phenology, models, and pest forecasting and alert systems (dynamic and integrated tools)
Blue Mold Forecast Website (USA)
http://www.ces.ncsu.edu/depts/pp/bluemold/
Disease Model Database (USA)
http://www.ipm.ucdavis.edu/DISEASE/DATABASE/
Models of Plants, Pests, and Beneficials Using Degree-Days (USA)
http://www.ipm.ucdavis.edu/PHENOLOGY/models.html
Near Real-time Pest Alert Systems
http://ippc.orst.edu/pestalert/
Online Weather Data and Degree-Days (USA)
http://www.orst.edu/Dept/IPPC/wea/

North America
Biocontrol of Plant Diseases
BT (Bacillus thuringiensis) Toxin Resources
http://www.nalusda.gov/bic/BTTOX/bttoxin.htm
Cornell University.s Guide to Natural Enemies in North America
http://www.nysaes.cornell.edu/ent/biocontrol/
Clemson Entomology - Insect Information
http://entweb.clemson.edu/cuentres/
Crop Protection Guide (Insects, Disease, & Weeds)
http://www.agr.gov.sk.ca/Docs/crops/cropguide00.asp
Diagnostic Key to Major Tree Fruit Diseases in the Mid-Atlantic Region
http://www.caf.wvu.edu/kearneysville/wvufarm6.html
Electronic Resources on Lepidoptera
http://www.chebucto.ns.ca/Environment/NHR/lepidoptera.html
University of Florida IPM Program
http://ipm.ifas.ufl.edu/
Fungal Databases
http://nt.ars-grin.gov/fungaldatabases/databaseframe.cfm
Northwest Berry & Grape InfoNet
http://www.orst.edu/dept/infonet/
Overview of Organic Fruit Production
http://www.attra.org/attra-pub/fruitover.html
Pest/Biocontrol Information
http://www.ceris.purdue.edu/napis/pests/index.html
Pesticide Handling and Storage Tutorial
Photo Gallery of Insects and Mites
http://ipmwww.ncsu.edu/current_ipm/otimages.html
Plant and Insect Parasitic Nematodes Homepage
http://nematode.unl.edu/wormhome.htm
University of California Pest Management Guidelines
http://www.ipm.ucdavis.edu/
Urban Integrated Pest Management
Weed Images and Descriptions
http://www.rce.rutgers.edu/weeddocuments/index.htm
IPM of North America, Inc.
http://www.ipminstitute.org/
US Department of Agriculture Cooperative State Research, Education & Extension Service (USDA, CSREES)
http://www.reeusda.gov/
Alternative Methods of Mole Cricket Control
http://molecrickets.ifas.ufl.edu/
Cultural Control in Landscapes
http://www.uky.edu/Ag/Horticulture/landipm/ipm/cultural_control.htm
Cultural Control for Management of Vegetable Pests in Florida
http://www.imok.ufl.edu/liv/groups/cultural/pests/insects.htm
Alabama Pecan Management Checklist
http://www.aces.edu/department/ipm PMC.htm
EPA IPM
http://www.epa.gov/pesticides/food/ipm.htm
University of California Statewide IPM Project
http://www.ipm.ucdavis.edu/
National Foundation for IPM Education
http://www.ipm-education.org/

Australasia
Insect and Allied Pests of Extensive Farming in Western Australia
Plant Viruses Online

Asia
Japan’s Pesticide Database
http://chrom.tutms.tut.ac.jp/JINNO/PESDATA/00database.html
Malaysia’s Crop Technology

Africa
Biological control of Cereal Stemborers in East and Southern Africa
http://nbo.icipe.org/agriculture/stemborers/default.html

South America
Brazilian National Fungal Catalogue
http://www.bdt.org.br
**Europe**
A Guide to the use of Terms in Plant Pathology  
http://www.bspp.org.uk/fbpp.htm

Cereal Pathology at Scottish Crop Research Institute (SCRI), UK  
http://www.scri.sari.ac.uk/mbn/cerpath/cerpath.htm

Chemical Ecology (Sweden)  
http://www.vsv.slu.se/cec/h.htm

ExPASy - Molecular Biology Server (Switzerland)  
http://www.expasy.ch/

IPM Europe (UK)  
http://www.nri.org/IPMEurope/homepage.htm

The Pherolist (Sweden)  
http://www-pherolist.slu.se/

**International**
FAO: Pesticide Management  
http://www.fao.org/waicent/FaoInfo/Agricult/AGP/AGPP/Pesticid/

Global Plant Protection Information System  
http://pppis.fao.org/

IPMnet  
http://www.IPMnet.org/

International Survey of Herbicide-Resistant Weeds  
http://www.weedscience.com/

The Universal Virus Database  

**Industry**
American Crop Protection Association.s IPM: The Quiet Evolution  

Cyanamid.s Weed Identification Guide  

Integrated Pest Management (IPM) from Asia-PacificCrop Protection Association  
http://www.apcpa.org/ipm.htm

**Growers**
Grape Grower’s Notebook  
http://users.erols.com/gmead/

North American Fruit Explorers Website  
http://www.nafex.org/