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. Readings will provide more in-depth information for responding to weekly written questions. Short assignments will mainly review information available on the Internet, and a project paper and a poster on a topic related to pest management 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.
4. Economic injury level concept and how it is quantified.
5. Management tactics in IPM, their strengths and their weaknesses.
6. Area-wide pest management.
7. 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 all take-home and open-book, so you may use your notes, books, and Internet as resources. You may even discuss responses with other students. However, all responses must be in your own words. You must enter your responses on the exam form sent to you and return it to the instructor through Sakai no later than five days after the exam is delivered. Exam schedule is as follows:

**Exam I** will be delivered on February 11, due by 11:59pm February 16
**Exam II** will be delivered on March 18, due by 11:59pm March 23
**Exam III** will be delivered on April 15, due by 11:59pm April 20
A late exam will be penalized 4 points for each calendar day it is late. **Grammar, neatness, and spelling will be considered in the evaluation of these exams.**

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 17, 2013**

**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 extension client.

**SHORT ASSIGNMENT #2 IS DUE FEBRUARY 14, 2013**

**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 28, 2013**

**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 21, 2013**

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 11, 2013 (this counts 5 points towards the paper’s grade). 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 5 journal articles or books and no more than 4 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 **5-6 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, 2013** (drafts received after this date are not accepted). 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 15, 2013**. 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.**

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 instructor will deliver the appropriate week’s questions to the student 3 days before the responses are due. 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.

The **PLANT-PEST POSTER** is about a topic to be decided by mutual agreement between the instructor and the student. 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. At least 4 information source references (literature and/or websites) should be provided and cited correctly. **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.

The poster is **due on or before April 15, 2003.**

**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>50 pts</td>
</tr>
<tr>
<td>Plant-pest poster</td>
<td>50 pts</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>520 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%

ACADEMIC HONESTY:
As a result of completing the registration form at the University of Florida, every student has signed the following statement: “I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University”.

We, the members of the University of Florida, pledge to hold ourselves and peers to the highest standards of honesty and integrity.

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/honocode.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.

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.

Students who plagiarize will be caught and consequences will be applied. Many faculty in our department 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://www.uflib.ufl.edu/msl/services/tutorials/plagiarism/student_intro.html. Please understand that the purpose of bringing to your attention the matter of plagiarism is to help train you to be ethical scientists, not to impugn your character.
Software Use:

All faculty, staff and students of the University of Florida are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damage and/or criminal penalties for the individual violator. Because such violations are against University policies and rules, disciplinary action will be taken, as appropriate.
COURSE OUTLINE 2013

January 7-13:
- Talk to professor in-person or by phone
- Do Short Assignment #1; deliver on or before January 17
- View PPTs on Chapter 1: Introduction to Pest Management
- Reading assignment: Chapters 1 and 2 of textbook

January 14-27:
- Deliver Written Responses for Chapter 1 on or before January 14
- View PPTs on Chapter 2: Ecological Principles
- Reading assignment: Chapters 4, 6, and 7 of textbook

January 28-February 3:
- Deliver Written Responses for Chapter 2 on or before January 28
- View PPTs on Chapter 3: Monitoring and Making Decisions
- Reading assignment: Chapter 8 of textbook

February 4-10:
- Deliver Written Responses for Chapter 3 on or before February 4
- Do Short Assignment #2; deliver on or before February 14
- View PPTs on Chapter 4: Regulatory Control
- Reading assignment: Chapters 9 and 10 of textbook

February 11-17:
- Deliver Written Responses for Chapter 4 on or before February 11
- Project Paper topic: inform instructor on or before February 11
- Receive EXAM I: deliver through Sakai on or before February 16
- View PPTs on Chapter 5: Cultural Control
- Reading assignment: Chapter 16 of textbook

February 18-25:
- Deliver Written Responses for Chapter 5 on or before February 18
- View PPT on Chapter 6: Behavioral Control
- Reading assignment: Chapter 14 of textbook
- Do Short Assignment #3; deliver on or before February 28
February 25-March 10:
- Deliver Written Responses for Chapter 6 on or before February 25
- View PPTs on Chapter 7: Biological Control Part I
- Reading assignment: Chapter 13 of textbook

March 11-17:
- Deliver Written Responses for Chapter 7 Part I on or before March 11
- View PPTs on Chapter 7: Biological Control Part II
- Reading assignment: Chapter 13 of textbook
- Do Short Assignment #4; deliver on or before March 21

March 18-24:
- Deliver Written Responses for Chapter 7 Part II on or before March 18
- Project Paper draft: deliver through Sakai on or before March 18
- Receive EXAM II; deliver through Sakai on or before March 23
- View PPT on Chapter 8 Physical Control
- Reading assignment: Chapter 15 of textbook

March 25-31:
- Deliver Written Responses for Chapter 8 on or before March 25
- View PPTs on Chapter 9: Chemical Control
- Reading assignment: Chapters 11 and 12 of textbook

April 1-7:
- Deliver Written Responses for Chapter 9 on or before April 1
- View PPT on Chapter 10: Genetic Control
- Reading assignment: Chapter 17 of textbook

April 8-14:
- 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 15-20:
- Deliver Written Responses for Chapter 11 on or before April 15
- Deliver Plant-Pest Poster on or before April 15
- Finalize Project Paper and deliver through Sakai on or before April 15
- Receive EXAM III; deliver through Sakai on or before April 20
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.ifg8.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
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/