IPM 5305
PRINCIPLES OF PESTICIDES
Spring 2015
Three (3) credit hours – Spring semesters

Instructor: Dr. Fred Fishel
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OFFICE HOURS: I am in my office most days. While I do not set aside dedicated office hours, I am readily available to make appointments. To arrange an appointment, email or call me on the telephone as listed above. Please do not text me. I do not communicate by texting, and will not respond to you.

COURSE MEETINGS: Asynchronous – UF Elearning (Distance).

COURSE DESCRIPTION
Principles of Pesticides will provide opportunities for students to gain a basic knowledge of pesticides and their use. The course is not designed for students to memorize chemical structures, but to gain a practical working knowledge of all types of pesticides used primarily in agricultural and horticultural settings. Emphasis will be placed upon major classes of agricultural pesticides used on commodities grown in Florida. Students are expected to be able to associate common names of pesticide active ingredients with chemical families, modes of action, and use patterns.

COURSE OBJECTIVES
- To have a thorough knowledge of the history of pest management, particularly the specific role pesticides have served in the development of management strategies.
- To have a knowledge of pesticide families and be able to differentiate among families based on their specific modes of activity.
- To evaluate specific pest scenarios caused by arthropods, nematodes, pathogens and weeds in order to develop appropriate pesticide management strategies.
- To be knowledgeable of the laws and regulations governing the proper use of pesticides.
- To obtain a working knowledge of the equipment used to apply pesticides and to understand the factors involved in calibrating application equipment for pesticide applications and be able to make accurate calculations for these purposes.
- To understand the potential hazards to humans, wildlife, and the environment by the use of pesticides.

COURSE PREREQUISITES: Graduate standing or approval by the instructor.
REQUIRED TEXTBOOKS: None

SUGGESTED TEXTBOOKS (not required):


RECOMMENDED GENERAL REFERENCES
Students are advised to review assigned reading materials (see listings of lectures and required readings). Material from assigned readings and class lectures is considered fair game for exams. A list of helpful references is provided for your own information. Some of my lecture material is taken from these references.

GRADING CRITERIA
The course grade will be determined from:
• 2 semester exams
• A final comprehensive exam
• 4 written assignments
• A project PowerPoint presentation

The following is a breakdown of how the final course grade is calculated by total available points:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1 (Module 01)</td>
<td>200</td>
</tr>
<tr>
<td>Exam 2 (Module 02)</td>
<td>200</td>
</tr>
<tr>
<td>Final Exam (Comprehensive)</td>
<td>200</td>
</tr>
<tr>
<td>Written Assignments</td>
<td>200</td>
</tr>
<tr>
<td>Project Presentation</td>
<td>200</td>
</tr>
<tr>
<td>Total</td>
<td>1000</td>
</tr>
</tbody>
</table>

Written Assignments: under the “Assignments” tab in the Sakai course management system, students will find instructions and due dates for completing these written assignments of relevant topics.

Assignment 1: (introductory bio) **Due: 5:00 p.m. Friday, January 16, 2015**
Assignment 2: (justifying the use of pesticides in the U.S.) **Due: 5:00 p.m. Friday, January 30, 2015**
Assignment 3: (the biotech dilemma) **Due: 5:00 p.m. Friday, March 20, 2015**
Assignment 4: (calculation problems) **Due: 5:00 p.m. Monday, April 13, 2015**
**Project Presentation:** the presentation will be a comprehensive pest management plan for an agricultural commodity. Instructions and the due date will be posted in the course management system under the “Assignments” tab. **Due:** 5:00 p.m. Friday, April 17 2015.

**Learning Activities:** some weeks I will post a learning activity. Although not required, your learning of relevant material will be enhanced with your participation and interaction with your classmates. My hope is that these activities will foster an interactive environment and be driven by you, the students. Typically in the past, those students who actively participate do well in IPM 5305.

**Due Dates:** all exam, assignment, and project presentation due dates and times are strictly adhered.

**Grading (% of total points):** 93 to 100 A; 90 to 92 A-; 87 to 89 B+; 83 to 86 B; 80 to 82 B-; 77 to 79 C+; 73 to 76 C; 70 to 72 C-; 67 to 69 D+; 63 to 66 D; 60 to 62 D-; <60 E.

**ACADEMIC HONESTY, SOFTWARE USE, SERVICES FOR STUDENTS WITH DISABILITIES, UF COUNSELING SERVICES**

The University of Florida Honor Code may be found in the Regulations of the University of Florida under section 6C1-4.041.

**Preamble:** In adopting this Honor Code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the University community. Students who enroll at the University commit to holding themselves and their peers to the high standard of honor required by the Honor Code. Any individual who becomes aware of a violation of the Honor Code is bound by honor to take corrective action. Student and faculty support are crucial to the success of the Honor Code. The quality of a University of Florida education is dependent upon the community acceptance and enforcement of the Honor Code.

The University of Florida requires all members of its community to be honest in all endeavors. Cheating, plagiarism, and other acts diminish the process of learning. When students enroll at UF they commit themselves to honesty and integrity. Your instructor fully expects you to adhere to the academic honesty guidelines you signed when you were admitted to UF.

As a result of completing the registration form at the University of Florida, every student has signed the following statement:

**The Honor 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 by abiding by the Honor Code.
On all work submitted for credit by students 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."

Reminder: you have 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."

It is to be assumed all work will be completed independently unless the assignment is defined as group project, in writing by the professor.

This policy will be vigorously upheld at all times in this course.

**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 crisis or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The University Counseling and Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are also available at the Career Resource Center on campus for students having personal or lacking clear career and academic goals, which interfere with their academic performance.

1. *University Counseling and Wellness Center*, 3190 Radio Road, (352) 392-1575; personal and career counseling: [http://www.counseling.ufl.edu/cwc/](http://www.counseling.ufl.edu/cwc/)

2. *Sexual Assault Recovery Services (SARS), University Counseling and Wellness Center*, 3190 Radio Road, (352) 392-1575; sexual assault counseling: [http://www.counseling.ufl.edu/cwc/](http://www.counseling.ufl.edu/cwc/)


**Students with Disabilities**
The Dean of Students Office coordinates the needed accommodations of students with disabilities. This includes the registration of disabilities, academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services, and mediating faulty-student disability related issues.

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

***The Sakai Course Management System***

We will be utilizing the Sakai course management system (http://lss.at.ufl.edu) to communicate relevant course-related material, due dates, etc. You will login with your GatorLink username and password. Students must have an active GatorLink ID to access E-Learning. Should you encounter problems or you cannot remember your GatorLink login information, visit the GatorLink website (http://gatorlink.ufl.edu) or the UF Computing Help Desk: (352) 392-HELP for assistance.

***Listings of lectures and required readings***

Readings are also found in the “Lessons” tab of the course Sakai management system. Upon entering the weekly lesson, select “Readings.” I suggest that you print and read these.

**Module 01 (The Foundation of Principles of Pesticides and Fungicides):** opens Tuesday, January 6.

**01.01.01_** Introduction to IPM 5305 (Review course syllabus)
**01.01.02_** What is a Pesticide and Why Use Pesticides?

**Weekly readings:**
2. What is and isn’t a Pesticide? [http://edis.ifas.ufl.edu/PI133](http://edis.ifas.ufl.edu/PI133)
4. Why Do We Use Pesticides? [http://edis.ifas.ufl.edu/PI140](http://edis.ifas.ufl.edu/PI140)

**01.02.01_** History of Pest Management and Pesticides
**01.02.02_** The Law and Pesticide Application
**01.02.03_** Principles of Pesticides and Pest Control

**Weekly readings:**
1. Pest Management and Pesticides: A Historical Perspective [http://edis.ifas.ufl.edu/pi219](http://edis.ifas.ufl.edu/pi219)
2. Restricted Use Pesticides [http://edis.ifas.ufl.edu/PI073](http://edis.ifas.ufl.edu/PI073)
3. Agricultural and Related Pest Control Applicator License Classifications under the Florida Department of Agriculture and Consumer Services http://edis.ifas.ufl.edu/PI095
4. Federal Regulations Affecting Use of Pesticides http://edis.ifas.ufl.edu/pi168

01.03.01_Understanding Pesticide Labeling
01.03.02_Pesticide Formulations

Weekly readings:
1. Interpreting Pesticide Label Wording http://edis.ifas.ufl.edu/PI071
2. Understanding Safety Data Sheet Language http://edis.ifas.ufl.edu/PI072
3. Pesticide Formulations http://edis.ifas.ufl.edu/pi231

01.04.01_Pesticides and the Environment
01.04.02_Harmful Effects and Emergency Response
01.04.03_Personal Protective Equipment

Weekly readings:
1. Pesticide-Organism Interactions http://edis.ifas.ufl.edu/PI080
2. Pesticide Effects on Nontarget Organisms http://edis.ifas.ufl.edu/pi122
3. Protecting Water Resources from Agricultural Pesticides http://edis.ifas.ufl.edu/pi001
4. Pesticide Residues http://edis.ifas.ufl.edu/PI106
5. Personal Protective Equipment for Handling Pesticides http://edis.ifas.ufl.edu/pi061
6. Glyphosate Biomonitoring for Farmers and Their Families: Results from the Farm Family Exposure Study http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1241861/

01.05.01_Transportation, Storage and Security, and Disposal of Pesticide Wastes
01.05.02_Pesticide Drift
01.05.03_Pesticide Resistance

Weekly readings:
1. Proper Disposal of Pesticide Waste https://edis.ifas.ufl.edu/pi010
2. Secure Pesticide Storage: General Features https://edis.ifas.ufl.edu/pi068
5. Florida’s Organo-Auxin Herbicide Rule - 2012 http://edis.ifas.ufl.edu/wg051
7. A Dresser Drawer Method of Managing Insect and Mite Resistance in Ornamentals http://edis.ifas.ufl.edu/in773

01.06.01_Introduction to Fungicides I
01.06.02_Introduction to Fungicides II
01.06.03_Introduction to Fungicides III
Weekly readings:
1. Fungicide Resistance Action Committee's (FRAC) Classification Scheme of Fungicides According to Mode of Action [http://edis.ifas.ufl.edu/pi131](http://edis.ifas.ufl.edu/pi131)

01.07.01_Introduction to Fungicides IV
01.07.02_Introduction to Fungicides V
01.07.03_Introduction to Fungicides VI

Weekly readings:
1. Fungicide Resistance Action Committee's (FRAC) Classification Scheme of Fungicides According to Mode of Action [http://edis.ifas.ufl.edu/pi131](http://edis.ifas.ufl.edu/pi131)

End of material for Exam I
Exam I opens 8:00 a.m. Monday, February 23 and must be completed by 5:00 p.m. Wednesday, February 25, 2015. Module content is closed during the exam period.

Module 02 (Insecticides, Herbicides and Miscellaneous Pesticides): opens Monday, February 23.

02.01.01_Introduction to Insecticides I
02.01.02_Introduction to Insecticides II
02.01.03_Introduction to Insecticides III

Weekly readings:
1. IRAC’s Insecticide Mode of Action Classification (Students should focus on this document for all insecticide lectures) [http://edis.ifas.ufl.edu/pi121](http://edis.ifas.ufl.edu/pi121)
02.02.01_Introduction to Insecticides IV
02.02.02_Introduction to Insecticides V
02.02.03_Introduction to Insecticides VI

Weekly readings:
1. IRAC’s Insecticide Mode of Action Classification (Students should focus on this document for all insecticide lectures) http://edis.ifas.ufl.edu/pi121
2. Genetically Modified Food http://edis.ifas.ufl.edu/fs084
3. Water pH and the Effectiveness of Pesticides http://edis.ifas.ufl.edu/pi193
4. Natural Products for Managing Landscape and Garden Pests in Florida http://edis.ifas.ufl.edu/in197

02.03.01_Introduction to Herbicides I
02.03.02_Introduction to Herbicides II
02.03.03_Introduction to Herbicides III

Weekly readings:
1. The Herbicide Resistance Action Committee’s Classification of Herbicides (Students should focus on the HRAC Code List for all lectures of this section) http://www.hracglobal.com/Education/ClassificationofHerbicideSiteofAction.aspx
2. ACCase Inhibitors http://pested.ifas.ufl.edu/pdfs/ACCase_Inhibitors.pdf
3. ALS Inhibitors http://pested.ifas.ufl.edu/pdfs/ALS_Inhibitors.pdf

02.04.01_Introduction to Herbicides IV
02.04.02_Introduction to Herbicide V
02.04.03_Introduction to Herbicides VI

Weekly readings:
1. The Herbicide Resistance Action Committee’s Classification of Herbicides (Students should focus on the HRAC Code List for all lectures of this section) http://www.hracglobal.com/Education/ClassificationofHerbicideSiteofAction.aspx
2. Specifically Regulated Pesticides in Florida – Bromacil http://edis.ifas.ufl.edu/PI112
3. Photosystem Inhibitors http://pested.ifas.ufl.edu/pdfs/Photosystem_Inhibitors.pdf

02.05.01_Introduction to Herbicides VII
02.05.02_Plant Growth Regulators, Acaricides, and Molluscicides
02.05.03_Soil Fumigants and Nematicides
Weekly readings:
1. The Herbicide Resistance Action Committee’s Classification of Herbicides (Students should focus on the HRAC Code List for all lectures of this section) http://www.hracglobal.com/Education/ClassificationofHerbicideSiteofAction.aspx
2. Synthetic Auxins http://sted.ifas.ufl.edu/pdfs/scans/24d.pdf
3. MSMA http://sted.ifas.ufl.edu/pdfs/scans/msma.pdf
4. Plant Growth Regulators http://edis.ifas.ufl.edu/P1139
5. Movement and Toxicity of Nematicides in the Root Zone http://edis.ifas.ufl.edu/ng002
7. Fumigants and Nematicides http://sted.ifas.ufl.edu/pdfs\Fumigants_and_Nematicides.pdf

End of material for Exam II
Exam II opens 8:00 a.m. Monday, April 6 and must be completed by 5:00 p.m. Wednesday, April 8, 2015. Module content is closed during the exam period.


03.01.01_Application Equipment and Methods
03.01.02_Calibration and Calculations
03.01.03_Adjuvants for Pesticide Applications
03.02.01_Pesticide Interactions

Weekly readings:
1. Boom Sprayer Nozzle Performance Test http://edis.ifas.ufl.edu/P1015
2. Calibration of Herbicide Applicators http://edis.ifas.ufl.edu/WG013
3. View the video, Calibrating and Using Backpack Sprayers (listed under “Videos” in the Lessons tab)
4. Adjuvants http://edis.ifas.ufl.edu/wg050
5. Pesticide Interactions http://edis.ifas.ufl.edu/pi182

End of class material (Last day of class: April 22)
Final exam opens 8:00 a.m. Monday, April 27 and must be completed by 5:00 p.m. Wednesday, April 29, 2015. Module content is closed during the exam period.

List of helpful references (Note: not required reading)

Crop Data Management Systems. (Pesticide product labels) http://www.cdms.net/LabelsMsds/LMDefault.aspx?

EXTOXNET (Extension Toxicology Network provides detailed toxicology data for many pesticide active ingredients) [http://extoxnet.orst.edu/](http://extoxnet.orst.edu/)

Florida Department of Agriculture and Consumer Services. Division of Agricultural Environmental Services. (Licensing and regulatory information) [http://www.flaes.org/](http://www.flaes.org/)


TeeJet Technologies. (Sprayer equipment manufacturer and retailer) [http://www.teejet.com/english/home.aspx](http://www.teejet.com/english/home.aspx)

Use and Management of Insecticides, Acaricides, and Transgenic Crops. 2006. Entomological Society of America. (Good reference for insecticides) [http://entsoc.org](http://entsoc.org)