

AGRN 373
INTEGRATED PEST MANAGEMENT
Fall 2022

I. General Information

AGRN 373 (Integrated Pest Management) is a 4-credit hour that covers the identification and biology of economically-important weeds, insects, diseases and vertebrate pests affecting plants; selection and use of effective biological, cultural, chemical and mechanical pest control methods; safe handling and application of pesticides.

Lecture: MWF 10:00-10:50 a.m., Knoblauch 152
Laboratory: 042 – TH 10:00-11:50 p.m., Knoblauch 226 or AFL – Agronomy Unit
043 – TH 1:00-2:50 P.M., Knoblauch 226 or AFL – Agronomy Unit

All labs will be held in person and attendance is required. Most will be held at the WIU Agronomy Farm or the School of Agriculture Greenhouses where we will have hands-on activities, generally outside. You are expected to come prepared for the weather conditions of the day and time.

Prerequisites: AGRN 176 – Principles of Crop Science or equivalent

Instructor: Dr. Mark Bernards
Knoblauch Hall 321
Office: 309-298-1569
Mobile: 309-313-5917
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Office Hours: in person or on Zoom at <https://wiu.zoom.us/j/7913862524>
M 11:00-12:50 a.m.; W 12:00 p.m.-12:50 p.m., F 9:00-9:50 a.m. or by appointment

Required Texts:

1. Bissonnette et al. 2010. Field Crop Scouting Manual. University of Illinois Extension, Champaign, IL. (<https://pubsplus.illinois.edu/>).
2. Carson R. 1962. Silent Spring. Mariner Books, Boston, Massachusetts.
3. Wiesbrook et al. 2012. Illinois Pesticide Applicator Training Manual – General Standards. SP39. University of Illinois Extension, Champaign, IL. (<https://pubsplus.illinois.edu/>).

Reference texts used in course development:

1. Bohmont BL. 2007. The Standard Pesticide User's Guide. Pearson-Prentice Hall, Upper Saddle River, New Jersey.
2. Cavigelli et al. 2000. Michigan Field Crop Pest Ecology and Management. Michigan State University Extension Bulletin E-2704.
3. Mueller DS, Bradley CA. 2008. Field Crop Fungicides for the North Central United States. North Central IPM Center, Champaign, Illinois. <http://www.ncipmc.org/action/Fungicide%20Manual4.pdf>
4. Norris RF, Caswell-Chen E, Kogan M. 2003. Concepts in Integrated Pest Management. Pearson-Prentice Hall, Upper Saddle River, New Jersey.
5. Whitford F. 2002. The Complete Book of Pesticide Management. John Wiley & Sons, Inc., New York.

II. University Policies

Student rights and responsibilities: A complete description is available at www.wiu.edu/provost/students.

Disruptive Student Policy: Students who interfere with normal class function or the ability of other students to learn may be asked to leave the class for the day. For repeated offenses, a student may be

removed from the course. Details may be found at: <http://www.wiu.edu/vpas/policies/disrupst.php>

Academic Integrity: <http://www.wiu.edu/policies/acintegrity.php> Western Illinois University, like all communities, functions best when its members treat one another with honesty, fairness, respect, and trust. . . It is the student's responsibility to be informed and to abide by all University regulations and policies on Academic Integrity. Plagiarism, cheating, and other forms of academic dishonesty constitute a serious violation of University conduct regulations. Students who engage in dishonesty in any form shall be charged with academic dishonesty. . . Any student, faculty member, or staff person who has witnessed an apparent act of student academic dishonesty, or has information that reasonably leads to the conclusion that such an act has occurred or has been attempted, has an ethical responsibility for reporting said act(s).

The policy for AGRN 373: Any confirmed act of academic dishonesty (especially plagiarism, cheating, copying another student's assignment or allowing another student to copy your work) will result in the loss of all points associated with that assignment, and may result in an "F" for the course.

Equal Opportunity: <http://www.wiu.edu/policies/affirmact.php> Western Illinois University complies fully with all applicable federal and state nondiscrimination laws, orders, and regulations. The University is committed to providing equal opportunity and an educational and work environment for its students, faculty, and staff that is free from discrimination based on sex, race, color, sexual orientation, gender identity and gender expression, religion, age, marital status, national origin, disability, or veteran status.

Sex-Discrimination and Misconduct: University values, Title IX, and other federal and state laws prohibit sex discrimination, including sexual assault/misconduct, dating/domestic violence, and stalking. If you, or someone you know, has been the victim of any of these offenses, we encourage you to report this to the Title IX Coordinator at 309-298-1977 or anonymously online at: http://www.wiu.edu/equal_opportunity_and_access/request_form/index.php. If you disclose an incident to a faculty member, the faculty member must notify the Title IX Coordinator. The complete Title IX policy is available at: <http://www.wiu.edu/vpas/policies/titleIX.php>

Disabilities: Students with disabilities: In accordance with University values and disability law, students with disabilities may request academic accommodations where there are aspects of a course that result in barriers to inclusion or accurate assessment of achievement. To file an official request for disability-related accommodations, please contact the Disability Resource Center at 309-298-2512, disability@wiu.edu or in 143 Memorial Hall. Please notify the instructor as soon as possible to ensure that this course is accessible to you in a timely manner.

Education Majors: The Illinois State Teaching license requires all education majors to receive a grade of a "C-" or better in this course in order to meet its requirements.

University Covid-19 Policies:

- Masks will not be required nor discouraged in class.
- Please avail yourself of the opportunity to test regularly
- If you feel ill, please get tested, stay home, and let your instructor know.

III. Course Expectations and Policies

1. Live the Golden Rule. Treat others with respect and courtesy in your conversation and actions. Wear your face mask properly (covering mouth and nose). Turn off and put away electronic devices (smart watches, phones, tablet computers, laptop computers, etc.) when you are in class or lab, unless directed to use them for class activities. Inappropriate use of an electronic device will result in loss of participation points for that day. In the event that we meet for a class session over Zoom, please turn your camera on but mute your microphone unless asking a question or making a comment.
2. Show up. Attendance and punctuality is expected. Notify the instructor in advance if you have any reason to miss a class period through the O.A.R.S system (<http://wiu.edu/oars>). Please provide an explanation so I know the reason for your absence. A minimum of 24 h notice (email or phone) is

required if there is any cause to miss a quiz or exam. If you do miss a class, do not ask the instructor "Did I miss anything important?" It is your responsibility to arrange to get the information you missed and to make up any missed assignments, even when the absence is due to illness or quarantining.

3. Participate. Be prepared for class discussions by completing readings, answering questions, taking notes, asking questions, and working effectively with other students on lecture and laboratory activities.
4. Study. You should plan to spend 7 hours outside of class each week to master the material. Reading assignments relating to each lecture/lab will be particularly beneficial.
5. Complete assignments. Assignments not turned in on the assigned date may have 10% of the total potential points deducted for each day after the due date. The instructor will generally return exams and assignments within 1 week.
6. The use of tobacco is prohibited in Knoblauch Hall, nor is it allowed during sessions at the AFL.
7. Students must wear sturdy, close-toed to participate in lab sessions at the AFL. Wearing long pants is highly recommended. Be prepared for the weather as portions of labs will be held outside.

IV. Course Objectives

Foundational Knowledge

1. Identify at least 25 common insect pests or beneficial insects found in Illinois crops, and describe their life cycle and ecology
2. Identify at least 20 common diseases of Illinois crops, and describe their life cycle and ecology
3. Identify at least 30 weeds common to Illinois crops, and describe their life cycle and ecology
4. Identify at least 3 common vertebrate pests and damage caused by vertebrate pests, and describe their life cycle and ecology
5. Define pest, Integrated Pest Management, economic threshold, economic injury level, pesticide, adjuvant, pesticide toxicity, exposure and risk
6. Describe pesticide mechanism of action and site of action

Application

7. Scout fields systematically to diagnose probable causes of poor crop growth
8. Recommend appropriate chemical, behavioral, biological, cultural, and physical methods for managing insect, disease, weed and vertebrate pest problems
9. Select appropriate pesticide application equipment (especially nozzles) to safely and effectively apply pesticides
10. Calculate the appropriate rates of pesticide to apply when loading a sprayer
11. Calibrate a sprayer and granular applicator

Integration

12. Define ecology and provide examples of how the interaction of organisms and the environment influences pest pressure and management
13. Clearly explain what pesticide resistance is, how it develops or evolves, and how it differs from resurgence or replacement
14. Describe how pesticide formulations and adjuvants affect pesticide tank-mixtures and pesticide efficacy
15. Explain the potential fate of a pesticide after it is released into the environment

Human Dimension

16. Demonstrate how to safely handle pesticides and use application equipment to protect yourself, others and the environment
17. Explain key laws and regulations that govern use of pesticides in the U.S. and Illinois

Caring

18. Appreciate the changes in pesticide use over in the United States over the past 100 years and the factors that contributed to those changes
19. Be committed to a life of judicious pesticide use

Learning to Learn

20. Teach your classmates how to identify and manage a pest of interest to you
21. Read to understand a pesticide label
22. Communicate effectively with the public about issues relating to pesticides
23. Be familiar with reliable sources of information regarding economic pest management

V. Grading

The Gradebook will be available at Western Online. It will be set so you can see your current grade (i.e., everything I have finished grading) throughout the semester.

<u>Grade components</u>	<u>Portion</u>
Participation/Attendance	10%
Assignments	30%
Lab quizzes/exams	18%
Lecture Quizzes and Final Exam	42%

I reserve the right to adjust the weight of the grade components (this will be announced in class or at Western Online) and to make adjustments to the grading scale downward (e.g., an "A" may begin at 92.5 instead of 93.0).

Grading Scale

<u>Percentage</u>	<u>Grade</u>	<u>Percentage</u>	<u>Grade</u>
93.0-100	A	73.0-76.9	C
90.0-92.9	A-	70.0-72.9	C-
87.0-89.9	B+	67.0-69.9	D+
83.0-86.9	B	63.0-66.9	D
80.0-82.9	B-	60.0-62.9	D-
77.0-79.9	C+	<59.9	F

VI. Learning Assessments

Participation/Attendance: You are expected to be prepared for and participate during all class sessions. Reading assignments will be announced in class and posted at Western Online. Each student will be allowed 3 "vacation" days (for funerals, interviews, oversleeping, etc). "Vacation" absences that exceed "3" will result in the lowering of the grade 2 percentage points per absence (up to 10% points of the final grade). Absence for WIU-sanctioned activities (such as livestock judging competitions, intercollegiate athletic events, professional meetings, etc.) will not count against "vacation" days. Absence due to illness will be evaluated on a case-by-case basis and where legitimate and appropriately reported will not count against the vacation days. Students who accumulate more than 10 unexcused absences will receive a failing grade for the course.

Assignments will include the following:

- Silent Spring, by Rachel Carson, was published in 1962. This book was important in raising awareness of unintended consequences of pesticides, and this awareness eventually led to the passage of key laws and the formation of regulatory agencies that now govern pesticide use. As part of the class you will be expected to read Silent Spring. You will be asked to complete question sets for each chapter and participate in class discussion on the reading assignment (*cumulative of 210 points*). At the conclusion of the class you will write a reflection essay (500 word minimum, *60 points*) pertaining to the book or its impact on agriculture.
- Pest Presentation (*118 points*): Imagine you are an Agronomist who has been asked to provide education on an important pest at a field day or during a farm visit. Prepare a 4-minute field presentation and a handout (1 page summary sheet) on an important insect, disease, weed or

vertebrate pest as agreed to with the instructor. You will give this presentation during a laboratory session. The presentation must include information on identification of the pest, its biology and life cycle, the reasons it is regarded as a pest, and integrated pest management strategies for controlling it. Your grade will be based on the content and quality of the handout, and your ability to effectively teach other students how to correctly identify your pest.

- Pest Collection (300 points): Each student will make a pictorial collection of the weed, insect, and plant disease pests presented in the lab. In addition, each individual will identify an additional 5 weeds, 3 insects and 2 diseases not discussed in class. The collections will be graded on content and quality. A rubric will be provided for you in the first lab session.
- School of Agriculture Career Fair (40 points): Attend and write a 1-page summary of your experience and what you learned.
- Pesticide Calculations and Sprayer and Spreader Calibration exercises. In a series of lab sessions you will complete problem sets that will prepare you to apply pesticides accurately. The assignments will be graded on showing how you solved the questions. An answer key will be provided.
- Pesticide label review (80 points): You will be assigned to read a label and identify important information listed on that label that will ensure applications are made in a safe and efficacious manner.
- Pest management plans (150 points): In this final project you will assume the role of an agronomist and develop an appropriate integrated pest management plan for a simulated field. You will present portions of your plan in the final lab of the semester. For this project you will use information learned in class and lab, and appropriate pest management resources from Extension and Industry.
- Other assignments not listed above will be given to help you become more familiar with pest management resources or to improve your understanding of concepts pertaining to integrated pest management.

Laboratory Quizzes and Exams: A quiz will be given in many laboratory periods that will review material covered in previous lab sessions. A Pest ID exam and a Calculations and Calibration exam will also be administered during laboratory sessions.

Lecture Quizzes: A quiz will be administered during lecture period approximately every third week. The lecture quizzes will include multiple choice, fill in the blank, and short essay questions.

Extra Credit: Extra Credit will be available for participating in the School of Agriculture Alumni Panel discussion (Sept 22). To obtain points you will need to write a 1-page summary (your experience and what you learned). If other suitable activities arise during the course of the semester, they will be announced at Western Online.

VII. Probable Course Calendar

Date	Topic (Location of Lab)	Reading / Assignment due
Aug 22	Introduction	FCSM pp. 4-7. <i>Pest presentation sign-up. Student survey.</i>
Aug 24	Scouting, <i>Syllabus quiz</i>	FCSM pp 8-43, 177-178
Aug 25	Scouting, Sampling and Troubleshooting (AFL)	FCSM pp 8-43, 177-178
Aug 26	Pest Ecology	WO: Principles of Field Crop Pest Ecology
Aug 29	<i>Silent Spring</i> 1-2. Defining IPM	Pest search summary due. FCSM pp. 2-7; IPATM pp 2-4
Aug 31	Thresholds	FCSM pp. 3-4, 179-181. Introduce Pest Management Plan Assignment (and sub-sections)
Sep 1	Pest ID Keys (226 KH).	FCSM 107-117, 182-184 / <i>Scouting App Review due</i>
Sep 2	<i>Silent Spring</i> 3. Pesticide History & Pesticide Classification	WO post: Norris et al. Ch 3; IPATM p. 14, 21

Date	Topic (Location of Lab)	Reading / Assignment due
Sep 5	Labor Day, no class	
Sep 7	<i>Silent Spring</i> 4. Value and Use of Pesticides	
Sep 8	Pest ID & Management 1 (AFL)	Student-authored pest fact sheets /
Sep 9	<i>Lec Quiz 1</i>	
Sep 12	<i>Review Quiz 1</i> . IPM Strategies & Tactics 1	IPATM pp. 2-4, WO Post: "Landis Insect Ecology"
Sep 14	<i>Silent Spring</i> 5. IPM Strategies & Tactics 2	IPATM pp. 2-4, WO Post: "Landis Insect Ecology"
Sep 15	Pest ID & Management 2 (AFL)	Student-authored pest fact sheets /
Sep 16	IPM Strategies & Tactics 3	
Sep 19	<i>Silent Spring</i> 6. Arthropod biology	IPATM pp. 4-7. MFCPE&M, Insect Ecology
Sep 21	Insect orders	
Sep 22	Pest ID & Management 3 (AFL)	Student-authored pest fact sheets /
Sep 23	<i>Silent Spring</i> 7-8. Weeds 1	IPATM pp. 10-13, FCSM pp 4-6, MFCPE&M, Weed Ecology
Sep 26	Weeds 2	IPATM pp. 10-13, FCSM pp 4-6
Sep 28	<i>Lec Quiz 2</i> .	
Sep 29	Pest ID & Management 4 (AFL)	Student-authored pest fact sheets /
Sep 30	<i>Review Quiz 2</i> . Diseases 1	IPATM pp. 7-10; MFCPE&M: "Disease Ecology;"
Oct 3	<i>Silent Spring</i> 9-10. Diseases 2	IPATM pp. 7-10; MFCPE&M: "Disease Ecology;" Lab-presented Pest Collection Due
Oct 5	Career Fair (No Class)	
Oct 6	Pest ID Exam	
Oct 7	Pesticide Formulations & adjuvants	Career Fair Summary due , IPATM pp. 14-20; Purdue Extension PPP-31
Oct 10	Pesticide Formulations & adjuvants	Individually-identified Pest Collections due IPATM pp. 14-20; Purdue Extension PPP-31
Oct 12	<i>Silent Spring</i> 11-12. Pesticide Risk & Toxicity	IPATM pp 32-39
Oct 13	Pesticide Formulations, Adjuvants & Mixing Order	IPATM pp. 14-20; Purdue Extension PPP-31
Oct 14	Fall Break! (No class)	
Oct 17	Pesticides and Human Health	IPATM pp 39-45. <i>Reading worksheet</i>
Oct 19	<i>Quiz 3</i>	
Oct 20	Pesticide Calculations (KH 226)	IPATM pp 14-20
Oct 21	<i>Review Quiz 3</i> . PPE & WPS	IPATM pp 39-45, 95-96 <i>Reading worksheet</i>
Oct 24	<i>Silent Spring</i> 13. Pesticide handling	IPATM pp 45-52
Oct 26	Sprayer Nozzles	IPATM pp. 67-72, TeeJet Catalog
Oct 27	Sprayer Components, Sprayer Nozzle Selection & Calculations (KH 226)	IPATM pp. 67-72, TeeJet Catalog
Oct 28	<i>Silent Spring</i> 14. Fungicide Mode of Action	WO post "Field Crop Fungicides for the North Central US"
Oct 31	Insecticide Mode of Action	
Nov 2	Herbicide Mode of Action	FCSM pp 207-22,

Date	Topic (Location of Lab)	Reading / Assignment due
Nov 3	Sprayer Calibration (AFL)	<i>Nozzle Selection worksheet due</i>
Nov 4	<i>Quiz 4.</i>	
Nov 7	<i>Review Quiz 4. Pesticide Labels 1</i>	IPATM pp 24-31, 95-96
Nov 9	<i>Silent Spring 15. Pesticide Selection</i>	Growmark books
Nov 10	Granular Calibration (AFL)	
Nov 11	Pesticide Resistance 1	IPATM pp 22-23, FCSM pp 231-234
Nov 14	<i>Silent Spring 16. Pesticide Resistance 2</i>	IPATM pp 22-23, FCSM pp 231-234
Nov 16	Pesticide Resistance 3. Pesticide Labels 2.	<i>Pesticide Label Review due.</i> IPATM pp 24-31, 95-96
Nov 17	<i>Calculations and Calibration Exam (KH 226)</i>	
Nov 18	<i>Silent Spring 17. Environmental Fate 1.</i>	IPATM pp 53-62, FCSM pp 222-227
Nov 21-25	<i>Thanksgiving Break</i>	
Nov 28	Environmental Fate 2	PPP-52. <i>Silent Spring Reflection Due.</i>
Nov 30	Environmental Fate 3	
Dec 1	<i>Course Evaluations. Pest Management Scenarios (KH 226)</i>	
Dec 2	<i>Quiz 5</i>	
Dec 5	<i>Review Quiz 5. Pesticide Laws, Regulations and Record-keeping</i>	IPATM pp 82-97.
Dec 7	<i>Silent Spring</i> documentary	
Dec 8	<i>Pest Management Plan Discussion. Course Evaluations</i>	<i>Pest Management Plan</i>
Dec 9	Pesticide Discovery and Development	Purdue Extension PPP-71
Dec 12	<i>Final Exam, 10:00-11:50 a.m.</i>	