

**Department of Agricultural and Biological Engineering  
University of Florida**

**Agricultural Operations Management 5334C  
*Agricultural Chemical Application Technology*  
Fall, 2020 (Class Number 10637)**

**Catalog Description:** AOM 5334C Agricultural Chemical Application Technology. F. **Credits: 3.** Equipment and methods used to apply pesticides in agriculture. Emphasis on techniques to avoid misapplication and pesticide drift.

**Prerequisite:** Graduate standing in the College of Agricultural and Life Sciences and other related disciplines or instructor approval. Minimum technical skills include basic math and logical thinking skills.

**Instructor:** Dr. Wonsuk "Daniel" Lee  
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<https://abe.ufl.edu/people/faculty/wonsuk-lee/>

**Lab TA:** Mr. Michael Zingaro  
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[zgator1@ufl.edu](mailto:zgator1@ufl.edu)

**Lecture Hours** : M W 1:55 PM – 2:45 PM (7<sup>th</sup> period). Lectures will be delivered synchronously at these times using Zoom. Recorded lectures will be available later. During lectures, each student will be given a review question in random order for extra credit, which requires you to be present during lectures.

**Laboratory Hour:** W 3:00 PM – 4:55 PM (8<sup>th</sup>-9<sup>th</sup> periods). Lab exercises will be conducted online using pre-recorded videos, which can be viewed asynchronously. Since there are nine lab exercises, sometimes lectures will be given instead.

**Course homepage:** <https://elearning.ufl.edu>. Course lecture notes will be available on the course website.

**Office Hours:** By appointment

**Text:** *SM 53 Private Applicator Agricultural Pest Control*, 4<sup>th</sup> Edition, by Frederick M. Fishel, UF/IFAS Communication Services, Revised 2019. (<http://ifasbooks.ifas.ufl.edu/p-118-private-applicator-agricultural-pest-control.aspx>). See the UF/IFAS Bookstore map on the last page.

***SM 1 Applying Pesticides Correctly: A Study Guide for the General Certifications Standards (Core) Exam***, 7<sup>th</sup> Edition, by Frederick M. Fishel, UF/IFAS Communications Services, 2014 (Revised for 2015, <http://ifasbooks.ifas.ufl.edu/p-104-applying-pesticides-correctly-a-guide-for-pesticide-applicators-core.aspx>)

: You will summarize each chapter every week during the first 9 weeks, so that you can use the summary to (1) learn the basic knowledge by yourself and (2) take a license exam in the future.

Every Monday, **starting Sep. 14th**, you will need to submit a summary of each chapter in the E-Learning. Start with "Terms to Know" and include all sub-sections of each chapter.

**Course Objectives:**

1. To be familiar with agricultural pests and the measures for controlling them
2. To understand different sprayer components and learn how they work
3. To be able to properly calibrate different types of spray equipment. Special emphasis will be placed on using the proper equipment and techniques for applying pesticides.
4. To become familiar with pesticide laws, labels, and safety

**Lecture Topics:**

Pest identification and control	Pumps
Nozzles and flow rate formula	Granule applicators and calibration
Sprayer components	Spray drift
Calibration of farm sprayers	Aquatic weed control
Pesticide formulation and arithmetic	Pesticide laws, labels, and safety
Variable rate application (VRA)	

**Laboratory Topics:**

General purpose boom sprayer	Airblast sprayer	Variable rate application (VRA)
Nozzles and spray patterns	Pumps	
Sprayer calibration	Granule applicator	
Different types of sprayers	Aerial application	

**Course Schedule (Dates are approximate)**

Week (Date)	Lecture	Lab	Quiz	SM1 Summary	HW	Test/ Review Paper
1 (8/31)	Module 1 – Pest identification and control	(Continue Module 1)				
2 (9/7)	(Continue Module 1)	Lab 1 – General purpose farm sprayer			#1	
3 (9/14)	Module 2 – Nozzles and flow rate formula	Lab 2 – Nozzle pressure vs. flow rate and spray patterns	#1	Ch.1		
4 (9/21)	(Continue Module 2; Solve HW #1)	Lab 3 – Different types of sprayers	#2	Ch. 2		Outline
5 (9/28)	Module 3 – Sprayer parts and calibration	No Lab	#3	Ch. 3		Test 1
6 (10/5)	(Continue Module 3)	Lab 4 – Calibration of a general purpose farm sprayer	#4	Ch. 4	#2	
7 (10/12)	Module 4 – Pesticide formulation and arithmetic	Lab 5 – Aerial pesticide application	#5	Ch. 5		
8 (10/19)	(Continue Module 4)	Solve HW #2	#6	Ch. 6		Progress report
9 (10/26)	Module 5 – Pumps	No Lab	#7	Ch. 7		Test 2
10 (11/2)	Module 6 – Granule applicators	Lab 6 – Airblast sprayer calibration and other activities at PSREU	#8	Ch. 8		
11 (11/9)	Module 7 – Drift and aquatic weed control	Lab 7 – Pumps	#9	Ch. 9	#3	
12 (11/16)	(Continue Module 7)	Lab 8 – Granular application	#10			
13 (11/23)	Module 8 – Laws, labels, and safety	Solve HW #3	#11			Final report
14 (11/30)	Module 9 – Variable Rate Technology (VRT)	Lab 9 – VRT	#12			
15 (12/7)	(Continue Module 9)	No Lab	#13			Test 3

**Course grading will be based on the following items:**

1. **Quizzes** will be given every Monday at the end of the lecture in the E-Learning using Honorlock. The quiz problems are from the previous week's lecture, lab exercise, and/or homework. Quizzes will help you study course materials and achieve course objectives. Quizzes cannot be made up.
2. **Lab assignments** will be handed out for every laboratory session. They will help you better understand the goals of lab exercises and facilitate opportunities to work on calibration of various sprayers.
3. **Homework** – Three sets of problems related to the calibration of pesticide application equipment will be assigned. The problems will be similar to calibration problems given on the quizzes and tests. The support numbers needed to arrive at the problem answer must be shown on homework paper. As long as you have tried to solve them, you will receive a credit. Homework problems are from actual spray applications and help you practice to solve real situations for sprayer calibration.
4. **Tests** – There will be three (3) tests. There will not be a comprehensive final examination. The test could have calculation problems similar to those in the previous test(s), but any verbal questions will be tested only once. Tests will help review course materials and practice more calibration problems, towards achieving course objectives. Tests will be given in the E-Learning using Honorlock.
5. **SM1 Summary** – Start with "Terms to Know" and include all sub-sections of each chapter. SM1 summary help you understand the core information of pesticide application, which we don't cover during lectures and lab exercises.
6. **Review Paper** – Choose a topic of interest related to pesticide application technology and write a review paper. You will have an opportunity to present your paper near the end of the semester.
7. **All assignments need to be submitted in the E-Learning. Email submissions will be NOT accepted.**
8. **Late submission policy: All assignments are due at the beginning of the class.** Thereafter 10% reduction/business day.

**Tests:**      Test 1: Wed, Sep. 30      Test 2: Wed, Oct. 28      Test 3: Wed, Dec. 9

**Grading** will be based on the following assignment of weights:

Tests:	20% each	91.0 – 100%	A	72.0 – 75.9%	C
Quiz:	10%	89.0 – 90.9%	A-	69.0 – 71.9%	C-
Lab assignment:	10%	86.0 – 88.9%	B+	66.0 – 68.9%	D+
Homework:	5%	82.0 – 85.9%	B	62.0 – 65.9%	D
SM1 summary:	5%	79.0 – 81.9%	B-	59.0 – 61.9%	D-
Review paper:	10%	76.0 – 78.9%	C+	Below 59.0%	E

**Please be aware that the E-Learning gradebook uses the grading scheme for the undergraduate portion of this course and may not reflect your grade correctly.**

**Grades and Grade Points:** For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>.

**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/ugrad/current/regulations/info/attendance.aspx>.

**Online Course Privacy Related Issues:** This course will be 100% online. Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who unmute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments

live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

**Online Course Evaluation Process:** 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/>.

**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.

**Academic Honesty:** UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor 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." The Honor Code specifies a number of behaviors that are in violation of this code and the possible sanctions. [Click here to read the Honor Code](#). Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

**Services for Students with Disabilities:** 0001 Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc](http://www.dso.ufl.edu/drc). 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.

**Campus Resources:** Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources.

#### Health and Wellness

- *U Matter, We Care:* If you or someone you know is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu), 352-392-1575, or visit [U Matter, We Care website](#) to refer or report a concern and a team member will reach out to the student in distress.
- *Counseling and Wellness Center:* [Visit the Counseling and Wellness Center website](#) or call 352-392-1575 for information on crisis services as well as non-crisis services.
- *Student Health Care Center:* Call 352-392-1161 for 24/7 information to help you find the care you need, or [visit the Student Health Care Center website](#).
- *University Police Department:* [Visit UF Police Department website](#) or call 352-392-1111 (or 9-1-1 for emergencies).
- *Sexual Assault Recovery Services (SARS):* Student Health Care Center, 392-1161.
- *UF Health Shands Emergency Room / Trauma Center:* For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; [Visit the UF Health Emergency Room and Trauma Center website](#)

#### Academic Resources

- *E-learning technical support:* Contact the [UF Computing Help Desk](#) at 352-392-4357 or via e-mail at [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu).
- *Career Connections Center:* Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

- [Library Support](#): Various ways to receive assistance with respect to using the libraries or finding resources.
- [Teaching Center](#): Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.
- [Writing Studio](#): 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.
- *Career Resource Center*, First Floor JWRU, 392-1601, <https://career.ufl.edu/>.
- Student Complaints Residential Course: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>.
- Online Student Complaints: <http://www.distance.ufl.edu/student-complaint-process>

## Review Paper

You are required to write a review paper for this course. You can select any topic related to the course contents. The following are potential journals where you can find related articles. A review article should include at least 50 research articles to describe the current status of the topic of your choice and make some recommendations for future directions. The goal is to publish your review article in a journal.

- Transactions of the ASABE
- Biosystems Engineering
- Applied Engineering in Agriculture
- Journal of Agricultural Safety and Health
- Precision Agriculture
- Computers and Electronics in Agriculture
- ...

The deadlines for a review paper are below.

- Outline (30 pts, due Monday, Sep. 21): Describe your topic of interest including a title and summary. Please feel free to consult with me about your topic of interest.
- Progress report (70 pts, due Monday, Oct. 19): Submit your partially completed review paper including the title, introduction, summary of identified articles, and reference information.
- Final report (100 pts, due Monday, Nov. 23): Submit your completed final paper by email ([wslee@ufl.edu](mailto:wslee@ufl.edu)) and PowerPoint presentation. You will present your article during class at the end of the semester for about 10-15 min.

Once you complete it, you will submit it to a journal for publication.

### Assignment submission guidelines – the following rules will be strictly enforced!

- Submit on time, i.e., “at the beginning of the class”!
- Since the class starts at 1:55 pm, one-day late submission starts from the time when the “Red” folder is closed until 1:55 pm the next day (24-hour period).
- Example 1: If your assignment is due Monday and you submit it at 2 pm on Monday, your submission is considered to be 1-day late (10% deduction). (I am sorry about this strict rule, however have to enforce the rule fairly for all of you.)
- Example 2: If your assignment is due Monday and you submit it at 3 pm on Tuesday, your submission is considered to be 2-days late (20% deduction).
- If you show any extra efforts on your assignments and activities in lecture and lab exercises, there is a high potential for extra credit.

### IFAS Extension Bookstore

