

Laboratory Instruction: Theory and Practice

AEC 6229

Spring 2025 – 3 credits
(Section 8475)



AGRICULTURAL
EDUCATION AND
COMMUNICATION

Instructor

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Office hours: By appointment (email to schedule)

Class Times

Tuesday, Periods 7 – 9 (1:55 – 4:55 pm)

Location

Rolfs Hall 306

Course Description

This course will focus on theoretical and practical approaches to teaching agriscience in laboratory settings. Research and theoretical foundations that underline the aspects of planning, management, teaching, evaluation, safety, and facility design will be discussed within the context of agriscience laboratory instruction.

Course Objectives

At the completion of the course, the learner will be able to:

1. Connect theoretical designs and empirical evidence guiding laboratory-based teaching and learning processes.
2. Establish instructional goals and define the nature of agriscience laboratory teaching.
3. Examine key learning constructs as they pertain to learning in agriscience laboratory settings.
4. Plan and deliver effective agriscience laboratory instruction.
5. Develop and implement an agriscience laboratory safety instructional program.
6. Establish strategies for effective management and supervision of student performance in the agriscience laboratory.
7. Integrate research on teacher effectiveness into the planning, teaching, and management aspects of agriscience laboratory teaching.
8. Evaluate agriscience laboratory facilities and develop plans for facility improvement and expansion.
9. Design strategies for effectively teaching agriscience in informal settings.

Course Design

This course is designed as an in-person application-based approach. Students will be asked to participate in the discussion-based lectures and complete the projects/assignments for application of the course material.

Requirements

Readings (Available at the provided links) – any additional will be shared weekly.

- 1) Visit this link <http://nap.edu/9596> to download a free PDF of *Inquiry and the National Science Education Standards*
- 2) What is Inquiry-based Instruction - <https://edis.ifas.ufl.edu/pdffiles/WC/WC07500.pdf>
- 3) Evaluating Learning in Laboratory Settings – <https://edis.ifas.ufl.edu/pdffiles/WC/WC06000.pdf>
- 4) Teachers' Use of Agricultural Laboratories in Secondary Agricultural Education - <http://www.jae-online.org/attachments/article/1675/53.2.124%20Shoulders.pdf>

- 5) Effects of Inquiry–based Agriscience Instruction on Student Achievement - <http://www.jae-online.org/attachments/article/1589/52.4.175%20Thoron.pdf>
- 6) Effects of Inquiry–based Agriscience Instruction on Student Scientific Reasoning - <http://www.jae-online.org/attachments/article/1705/53.4.156%20Thoron.pdf>
- 7) Effects of Inquiry–based Agriscience Instruction and Subject Matter–based Instruction on Student Argumentation Skills - <http://www.jae-online.org/attachments/article/1670/53.2.58%20Thoron.pdf>
- 8) Students’ Perceptions of Agriscience when Taught Through Inquiry-Based Instruction - http://www.jae-online.org/attachments/article/1801/2013-0778_thorona.pdf
- 9) Constructivism: The Career and Technical Education Perspective - <https://files.eric.ed.gov/fulltext/EJ598590.pdf>
- 10) A Philosophical Examination of Experiential Learning Theory for Agricultural Educators - http://www.jae-online.org/attachments/article/243/Roberts_Vol47_1_17-29.pdf

Technology:

To succeed in this course, you must have access to the following technology:

- Desktop Computer or Laptop
 - Audio Capabilities
 - Webcam and Microphone for synchronous sessions
- Microsoft Word - [Microsoft 365 basics video training](#)
- Adobe Reader - [Acrobat tutorials](#)
- Zoom - [Zoom Privacy Policy](#)
- Internet Connection with access to Canvas
 - Canvas is the course management system at the University of Florida in which students will find course content, links to video lectures, assignments, quizzes, discussions, and grades. The use of this system will vary by instructor, but the following videos describe the most common tools in Canvas. The [full student guide](#) is provided if you have additional questions.
 - View [Canvas Privacy Policy](#)
- **Web Browser - Chrome** is the preferred browser for Canvas. If you do not have Chrome, you can [download it](#).
- University of Florida Email
 - Students are expected to check their my.ufl emails daily. View the [Student Computing Requirements](#) page for information on technology requirements and expectations.

Prerequisite Knowledge:

There are no pre-requisite courses required to take AEC6211. There is no pre-requisite educational delivery knowledge or experience required to be successful in the course.

Minimum Technical Skills:

Minimum technical skills required:

- Proficiency in utilizing Canvas and navigating the internet effectively.
- Competence in using email for communication purposes, including sending and receiving messages and managing attachments.
- Familiarity with commonly used word processing applications (such as Microsoft Word or Google Docs), including the ability to create, edit, and format documents.
- Basic computer skills, including understanding fundamental operations like file management, using menus and toolbars, and navigating between different applications.
- Ability to perform online research using a variety of search engines and library databases.

Instructor Response & Feedback

The instructor is committed to responding to your Canvas and email messages **within 48 hours** when feasible during the work week, Monday through Friday, *except holidays*. You can also meet with me via Zoom by emailing for an appointment; links provided in the Contact section above. The major assignments will be graded, with *meaningful feedback* provided, **within one week of their submission**.

Assignments

Description of Assignments:

Participation/Weekly Assignments [Objectives 1, 3, and 7]

Each week you will bring a resource/reference to discussion at the opening of class that pertains to the topic of the week, starting with the second week of class. All students should be prepared to share insights from their source and add to the overall discussion, no written summary will be required. Additionally, other in-class activities will occur periodically which will also be included as participation credit. [Objectives 1, 3, and 7]

Classroom Inquiry Vignettes [Objectives 1 and 3]

Read the classroom vignettes included in Chapter 3 "Images of Inquiry in K-12 Classroom" of *Inquiry and the National Science Education Standards* available as a free PDF download on-line at this link <http://nap.edu/9596>. Write a 2-3 page reflection and identify how to apply the principles and ideas of these vignettes in the School-Based Agricultural Education Classroom or other educational setting.

Agriscience Written Lesson Plan [Objectives 2, 4, 7 and 9]

Prepare a unit of agricultural lesson plans that will require approximately 3-5 hours of instruction appropriate to be used in a middle school or secondary school agriscience education program based upon the content included in this course. These lessons must include laboratory instruction. At a minimum, the lesson plans should include the following:

- Describe the audience and/or situation for which instruction will be provided (i.e., middle school students, 10th graders, Agriscience Foundations, etc.)
- List the objectives, questions, or competencies that will guide the learning process
- Connect to Sunshine State Standards (SSS) and Student Performance Standards (SPS)
- Describe the interest approaches used
- Outline the subject matter to be taught as a daily format and include transitions from day to day as you move through the content of the Unit
- Describe the teaching techniques that will be used
- Describe the learning environment in which the activities will be conducted (i.e., classroom, land laboratory, ag mechanics laboratory, etc.)
- List all references and/or instructional materials that will be used
- Describe the application/evaluation procedures that will be used (include any device[s] and/or grading key[s])
- Include teaching materials (visual aids, handouts, presentations, etc.)
- Modifications that can be made for students with disabilities

A template will be provided for use, but you can use any format you are already comfortable with for the layout of this assignment, just make sure these bulleted components are present.

Lab-Based Instructional Moment [Objectives 2, 4, and 7]

During the designated week on the course schedule, you will choose a 30-minute segment from your lesson plan assignment to deliver in front of your peers. This segment should include interactive lab-based instruction where you can demonstrate effective teaching as discussed earlier in the course.

Agriscience Facility Plan

Part One [Objective 8]

- a. Conduct a comprehensive evaluation of your assigned educational laboratory facility

- b. Submit a brief report explaining how this facility could be better utilized to address teaching agriscience content

Part Two [Objectives 7, 8, and 9]

- a. Design an indoor &/or outdoor “ideal” laboratory facility
- b. Indicate the subject areas the facility is designed to accommodate
- c. This is a “perfect world” and therefore money is no object for this design
- d. Your laboratory site should contain at least 10 different components
- e. Include a drawing/diagram of the area
- f. Complete a written narrative describing each component in your design and suggestions of activities that could be conducted using each component. Include connections to theoretical foundations for laboratory instruction.

Part Three [Objectives 5 and 6]

Using your design from Part Two create a safety and management plan, including,

- a. General safety protocols for all lab spaces
- b. Specific detailed safety procedures for one area of your design layout (may be useful to establish a safety incident scenario when creating these procedures)
- c. Laboratory management philosophy statement establishing your student management plan and how you believe these strategies will effectively help you supervise student performance

Assignment	Percentage	Due Dates
Participation/ Weekly Assignments	50	Weekly – See Schedule
Classroom Inquiry Vignettes	100	February 18 th
Agriscience Written Lesson Plan	150	March 4 th
Lab-based Instructional Moment	150	March 25 th
Agriscience Facility Plan Part 1	100	Draft- April 8 th / Final- April 30 th
Agriscience Facility Plan Part 2	150	Draft- April 1 st / Final- April 30 th
Agriscience Facility Plan Part 3	100	Draft- April 8 th / Final- April 30 th
<p>Late Assignments and Make-Up Work: There will be no late assignments allowed that are unexcused. All assignments are due by the date listed in the syllabus and course outline. Following an excused absence, students may turn in late work without penalty within 3 business days of the absence. For non-university excused absences, late work will be accepted up to 1 week past the due date and will be penalized 10% per day.</p> <p>Students requesting classroom accommodations 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 accommodations.</p> <p>Make-up work should be arranged prior to the expected absence. In case of emergencies, arrangements for completing assignments should be made upon return to class.</p>		

Course Grading:

Grading Scale				
A = 752 - 800	B+ = 696 - 719	C+ = 616 - 639	D+ = 536 - 559	E = 0 - 479
A- = 720 - 751	B = 672 - 695	C = 592 - 615	D = 512 - 535	
	B- = 640 - 671	C- = 560 - 591	D- = 480 - 511	

Further information about UF grading policies can be found here:

<https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

Reading & Assignment Schedule:

Date	Session Topics	Items Due
January 14	What is laboratory-based instruction?	
January 21	Purpose of lab-based instruction	Weekly Resource/Reference starts
January 28	Theoretical foundations	
February 4	No Classes – SAAS Conference	
February 11	Inquiry/problem-based instruction	
February 18	Planning for lab-based instruction	Classroom Inquiry Vignettes
February 25	Effective teaching in informal settings	
March 4	Evaluating students within lab-based instruction	Agriscience Lesson Plans
March 11	Managing students within lab-based instruction Facility design and layout	
March 18	No Classes – Spring Break	
March 25	Lab-based instruction teaching moments	Teaching Moment
April 1	Maintaining safe practices within lab instruction	Facility Plan Part 2 Draft
April 8	Presentation of Facility Layouts (present drafts of all parts and receive feedback)	Facility Plan Part 1 & 3 Drafts
April 15	No Classes – AIAEE Conference	
April 22	No F2F Session – Final Draft of Agriscience Facility Plan all three parts (Due April 28 th)	

Academic Integrity

UF's Academic Honesty Statement:

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 dishonesty to the instructor, department chair, college dean or Student Honor Court. **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: [UF Student Code of Conduct Webpage](#).

Plagiarism:

Plagiarism includes taking **verbatim phrases of just a few words** without permission or full attribution. It includes **quoting too much** from your sources, thereby substituting their expression for your own, or quoting too much from one source, effectively taking more than a *fair use* of their work. **Over quoting (direct quotes)** comprising more than 10% of any assignment will be considered plagiarism. Plagiarism includes **unique expression**, which can be a phrase of a few words or a simple moniker. Our writing is mostly *our own expression*. When writing for science and business, we base our work on **facts** obtained from a variety of **credible sources**. We give credit where it is due. We **cite our sources** so others can access the information we present. When appropriate, we very carefully, ethically, and lawfully use others' expression of that information. We obtain permission to use our sources' expression or give full credit for a *limited, fair use*, including direct quotes.

Attendance Policies

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: [UF Attendance Policies](#).

Institutional Policies

Recording Statement

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of

the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or guest lecturer during a class session. Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code. [UF IN-CLASS RECORDING](#)

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. [UF ACCEPTABLE USE POLICY](#)

Course Evaluations

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. 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/>

Student Services

Health & Wellness

- U Matter, We Care
 - If you or someone you know is in distress, please contact 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.
 - 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.
- 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).
 - GatorWell Health Promotion Services
 - For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the [GatorWell website](#) or call 352-273-4450.

Academic Resources

- E-learning technical support
 - Contact the [UF Computing Help Desk](#) at 352-392-4357 or via e-mail at 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.
- Student Complaints On-Campus
 - Visit the [Student Honor Code and Student Conduct Code webpage](#) for more information.
- On-Line Students Complaints
 - View the [Distance Learning Student Complaint Process](#).

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, [UF Disability Resource Center](#).
[Canvas Accessibility Standards](#)
[Zoom Accessibility Information](#)