

**ALS 4210/AOM6932**  
**CONTROLLED ENVIRONMENT PLANT PRODUCTION**  
FALL 2022; 3 CREDITS

**Course Format:**

This course is taught through online lectures delivered through Canvas. Lectures, learning materials, and assessments go “live” at 9 am every Monday during the semester. Most assignments in this course are due at 11:59PM on Sundays.

**Catalog Description:**

This course covers foundational information on the principles of controlled environment plant production. Students are introduced to concepts describing the interactions between plants and their microenvironments created by different production systems and climate control strategies. Engineering aspects of environmental control will be discussed. Current technologies and practices for indoor plant production are reviewed. Students are presented with current trends in the controlled environment industry, and are asked to identify costs, develop budgets, and make decisions that impact profitability, output, and marketing methods in plant-production supply chains.

**Instructors:**

**Dr. Brian Pearson**

- a. Office location: A-111, UF/IFAS Mid-Florida Research and Education Center, Apopka, FL
- b. Telephone: 407-410-6930
- c. E-mail address: [bpearson@ufl.edu](mailto:bpearson@ufl.edu)
- d. Course site: Canvas e-Learning
- e. Office hours: Thursdays 4-5pm (Zoom) or by appointment

**Dr. Ying Zhang**

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**Dr. Adam Watson**

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- e. Office hours: Thursdays 4-5pm (Zoom) or by appointment

**Teaching assistants (TA):**

Carley Anderson

- a. Office location: Virtual
- b. E-mail: Canvas

When contacting us, please allow up to 48 hours for a response, not including weekends or holidays.

**Pre-requisites and Co-requisites:** Junior standing

**Course Objectives:**

Students, upon completing this course, will be able to:

- a. Describe environmental parameters that will affect plant growth and productivity in controlled environments
- b. Compare environmental sensors for plant production
- c. Interpret environmental and crop data obtained in the production environment
- d. Describe canopy environments with energy balance equations
- e. Identify moist air properties and analyze psychrometric processes
- f. Explain advanced climate control methods and technologies
- g. Apply essential business functions and plan for financial success
- h. Integrate sound economic principles into a controlled environment plant production operation
- i. Evaluate optimal output to achieve profitability

**Class/Laboratory Schedule:** This course is available online in asynchronous weekly format. There are 15 modules made available Monday of each week starting the first week of class. You are responsible for watching all lectures, completing weekly online discussion and quizzes, as well completing exams. Activities, due dates, and key events are available in the course Canvas Calendar page.

Your instructors will be available each week to answer questions or discuss course material. Please visit navigate to **Zoom each Thursday at 4:00PM** by visiting: Zoom URL (TBD) or by navigating to the Zoom Conferences tab in Canvas and selecting the appropriate meeting date.

**Note: Zoom meetings in this course, require a password that will be sent to you through Canvas announcements. Please be sure to set your Canvas notification preferences so that you receive these messages.**

**Material and Supply Fees:** None

**Textbooks and Software Required:** Handouts and online material will be provided to you that will serve as a text.

**Recommended Reading:** None

**Course Outline:**

<b><u>WEEK</u></b>	<b><u>TOPICS/ASSIGNMENTS &amp; EXAMS</u></b>
Week 1	Introduction to controlled environments /discussion posts & weekly quiz
Week 2	Light /discussion posts & weekly quiz
Week 3	Gases / discussion posts & weekly quiz
Week 4	Thermal radiation / discussion posts & weekly quiz
Week 5	Considerations for indoor plant production / discussion posts & weekly quiz
Week 6	Leaf and canopy environment / discussion posts & weekly quiz & Exam 1
Week 7	Psychrometrics / discussion posts & weekly quiz
Week 8	System components / discussion posts & weekly quiz
Week 9	HVAC systems / discussion posts & weekly quiz
Week 10	Advanced technologies / discussion posts & weekly quiz
Week 11	Planning for production / discussion posts & weekly quiz & Exam 2

Week 12	Budgeting / discussion posts & weekly quiz
Week 13	Output decisions / discussion posts & weekly quiz
Week 14	Marketing methods of horticultural and ornamental plants / discussion posts & weekly quiz
Week 15	Evaluating financial performance / discussion posts & weekly quiz
Week 16	Exam 3

**Attendance, Expectations, and Exam Make-up Policy:** As this is an online class, attendance is not taken. However, students are expected to participate in the course by watching and reading all assigned material, engaging in the online discussion board, and completing assignments. It is the responsibility of the student to contact the instructors if assignments have been missed.

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/UGRD/academic-regulations/attendance-policies/>.

Additional information and UF policies related to attendance, expectations, make-up exams can be found in the [Undergraduate Catalog/Academic regulations](#).

**Grading:**

	Undergraduate Students			Graduate Students		
	Pts. Per Assignment	No. of Assignments	Total Points in Category	Pts. Per Assignment	No. of Assignments	Total Points in Category
Syllabus Quiz	8	1	8	8	1	8
Discussion*	8	13	104	8	13	104
Quizzes*	8	13	104	8	13	104
Exam 1	100	1	100	75	1	75
Exam 2	100	1	100	75	1	75
Exam 3	100	1	100	75	1	75
Graduate Student Design Project	0	0	0	75	1	75
<b>Total After Drops</b>		<b>30</b>	<b>516</b>		<b>31</b>	<b>516</b>

\*Fifteen assignments are included in this category, but two lowest grades will be dropped.

*Syllabus Quiz (8 pts.).* A syllabus quiz will be assigned at the first week of the semester to avoid misconceptions of important content and policies on the syllabus, such as the course structure, due dates, late work, and communication policies. Students will have 7 days to complete the quiz.

*Discussion Posts (8 pts. Each).* Every module, you will be required to review an article or book chapter selected by your instructors that corresponds to an assigned module. In Part A, students will write a three-sentence summary of the article followed by a 150-word reaction piece. In addition, each student must provide one question about the article to prompt discussions (**due by Wednesday each week**). In Part B, students must comment on at least two reaction pieces from different classmates. At least one

comments should attempt to answer a question raised by another student (**due by Sunday each week**). Both Part A and Part B are to be submitted in the Discussions tab in canvas. Participation in the discussion will be graded on a weekly basis using the following rubric:

Total	Points	2 to >1.52	1.52 to >0.72	0.72 to >0	0
2	Quality of post	Appropriate comments; thoughtful, reflective and respect of other's postings	Appropriate comments and respectful of other's postings	Responds with minimum of effort; states thoughts/opinions without supporting content	No posting
2	Relevance of post	Post related to discussion topic and prompts further discussion	Post related to discussion topic	Post not related to discussion content	No posting
2	Response to others	Responds thoughtfully to specified number of posts (2 each week); prompts further discussion	Responds thoughtfully to specified number of posts (2 each week) with minimal effort	Responds to one post with minimal effort	Does not respond to other posts
2	Grammar/Mechanics/ Word Count	Summary meets word requirement (250 words +/- 50 words); free of noticeable grammar, spelling, or punctuation errors	No more than 50 words above/below the word requirement; some noticeable grammar, spelling, or punctuation errors	No more than 50 words above/below word requirement; multiple noticeable grammar, spelling, or punctuation errors	No post

**Important note:** The reaction piece is not supposed to be another summary. It should instead focus on your impression or past experience regarding the main topic of the article. Late posts for part A will not receive credit.

The assignment of discussion posts in each module is designed 1) to deepen students' understanding of the topic covered by assigning a corresponding literature to read, 2) to develop students' scholarly skills of literature review by asking students to summarize complex readings, 3) to establish students' critical thinking skill of issue analysis and identification by asking students to identify one course-related arguable issue and post one questions, and 4) to promote communication skills through explaining and discussing issues and their possible solutions with peers. The two lowest grades will be dropped for the final course grade.

*Weekly quizzes (8pts. Each).* There will be 15 quizzes during the semester, one for each module. **Quizzes will become available on Monday at 12:00 AM, and they will be due Sunday at 11:59 PM.** Each quiz

will be timed to 60 minutes, and it can only be taken once. Each quiz will consist of a mix of multiple-choice, true false, as well as short, open-ended, essay-style questions. Students can refer to personal notes, websites, or any reference materials to complete the quiz. However, each student must work individually. Make up quizzes will be provided in accordance with the policy described below. For the final course grade, the two lowest grades will be dropped. If there are concerns about quiz questions, please send an email to the corresponding instructor, who will respond within 24 hours.

*Exams (100 pts. Each for undergraduates; 75 pts. Each for graduates).* Each module will conclude with a comprehensive take-home exam. In Exam 1, students will be presented with different scenarios and asked to select among available technologies, strategies, and tradeoffs to optimize indoor plant production. In Exam 2, students will be asked to analyze different indoor production systems using engineering principles. In Exam 3, students will be tasked with applying economic principles to achieve success in the operation. **Exams will be posted at the end of each five-module unit and students will have 48 hours to complete each exam.** Exams can be submitted as a .doc or .pdf file in Canvas. Students can use reference materials (class slides, textbooks, etc.), but they must work individually and cite their sources as appropriate.

*Graduate Student CEPP Planning Project (75 pts. total).* Graduate students are required to complete a solo project where they develop a plan for a greenhouse, plant factory, or other facility that produces crops in a controlled environment. This includes specifications and design elements. Select a crop or crops to produce and estimate materials, equipment, production, energy costs for the design and operation of this venture. Students will carefully consider the production environment including effects on plant growth, environmental control as well as environmental modification such as temperature, lighting, watering, and carbon dioxide enrichment to design a facility that produces marketable plants. For the final course grade, the graduate student review article will be weighted 20%. For the final course grade, the following grading scale will be used:

For the final course grade, the following grading scale will be used:

**Grading Scale:**

- A 516 – 480 pts.
- A- 479 – 464 pts.
- B+ 463 – 433 pts.
- B 432 – 428 pts.
- B- 427 – 413 pts.
- C+ 412 – 397 pts.
- C 396 – 377 pts.
- C- 376 – 361 pts.
- D+ 360 – 346 pts.
- D 345 – 325 pts.
- D- 324 – 310 pts.
- E 309 – 0 pts.

Students who have questions about their grades should contact their professor by e-mail. Do NOT contact the TA about grades assigned.

For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>.

**Assignments:** Assignments will be marked down for a sloppy presentation and, if excessive, they may be returned un-graded. All assignments must be typed and are due one week from when assigned. Assignments must be submitted via Canvas by 11:59 PM of due date. Assignments submitted late, but before 11:59 PM on the day following the due date, will be marked down 0.8 point. Assignments returned late, before 11:59 PM on the second day following the due date will be marked down 4 points. No assignments will be accepted after 11:59 PM on the second day following the due date.

**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/>.

**Honorlock Requirement:** Honorlock will proctor your exams this semester. Honorlock is an online proctoring service that allows you to take your exam from the comfort of your home. You DO NOT need to create an account, download software or schedule an appointment in advance. Honorlock is available 24/7 and all that is needed is a computer, a working webcam, and a stable Internet connection. To get started, you will need Google Chrome and to download the Honorlock Chrome Extension. You can download the extension at [www.honorlock.com/extension/install](http://www.honorlock.com/extension/install). When you are ready to test, log into Canvas, go to your course, and click on your exam. Clicking "Launch Proctoring" will begin the Honorlock authentication process, where you will take a picture of yourself, show your ID, and complete a scan of your room. Honorlock will be recording your exam session by webcam as well as recording your screen. Honorlock also has an integrity algorithm that can detect search-engine use, so please do not attempt to search for answers, even if it's on a secondary device. Honorlock support is available 24/7/365. If you encounter any issues, you may contact them via live chat.

**Academic Honesty Policy:** All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others. All work must be original and completed individually.

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 academic misconduct to appropriate personnel. 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 [View the Student Conduct and Honor Codes](#).

**Recorded Course Content and Student Privacy:** 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 un-mute 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.

**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, [Disability Resource Center](#)

**Campus Helping Services:** Students experiencing crises or personal problems that interfere with their general wellbeing are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

[University Counseling & Wellness Center](#), 3190 Radio Road, 352-392-1575,

Counseling Services

Groups and Workshops

Outreach and Consultation

Self-Help Library

Wellness Coaching

*U Matter We Care*, [www.umatter.ufl.edu/](http://www.umatter.ufl.edu/)

[Career Resource Center](#), First Floor JWRU, 392-1601

#### **Student Complaints:**

Residential course: Dean of Students Office [UF Complaints Policy](#)

Online course: Distance Learning [Student Complaint Process](#)

**Software Use:** All faculty, staff and student 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.