

CONTROLLED ENVIRONMENT PLANT PRODUCTION
AOM/ORH4932-AOM/HOS6932
FALL 2021; 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. Celina Gómez

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- d. Course site: Canvas e-Learning

Dr. Ying Zhang

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Dr. Adam Watson

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Teaching assistants (TA):

TBD

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

Pre-requisites and Co-requisites: None

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: <https://ufl.zoom.us/j/99013509172?pwd=TDIVVmpMTF5L1lXZ05QWWhYTHFzQT09> 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:

- 1 Introduction to controlled environments
- 2 Light
- 3 Gases
- 4 Thermal radiation
- 5 Considerations for indoor plant production
- 6 Leaf and canopy environments
- 7 The psychrometrics of air conditioning systems
- 8 System components in controlled environments
- 9 HVAC systems for indoor controlled environment plant production
- 10 Advanced technologies in controlled environments
- 11 Planning for production
- 12 Budgeting
- 13 Output decisions
- 14 Marketing methods of horticultural and ornamental plants
- 15 Evaluating financial performance

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.

No make-up assignments including quizzes and exams will be given except in extenuating circumstances as in the case of valid medical reasons or unless prior arrangements have been made.

In the event you do miss assignments for valid medical reasons, your instructors require letterhead documentation from either a physician (NOT health clinic), an academic advisor, or the UF Dean of Student's Office (UF email will suffice) within 24 hours of an assignment deadline. Please note that letterhead documentation does NOT mean a note from your Mom (or Dad or Aunt, Uncle, cousin, Uncle who is a lawyer, best friend, boss, etc.). Letterhead documentation does NOT refer to a note scribbled on a prescription pad from a walk-in clinic or the Student Health Center the day an assignment is due because you had a cold, or pleading that you overslept, had computer problems, or a job interview on a due date...these types of excuses do not satisfy the criteria for extenuating circumstances and cannot be accepted. Letterhead documentation DOES mean the submission of a formal, business letter on letterhead (or a UF email from advisor or UF Dean of Students) including relevant dates for the excuse within 24 hours of a missed assignment.

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

Grading:

| Component | Undergraduate Percent | Graduate Percent |
|---------------------------------|-----------------------|------------------|
| Discussion Posts | 20% | 20% |
| Quizzes | 20% | 15% |
| Exam 1 | 20% | 15% |
| Exam 2 | 20% | 15% |
| Exam 3 | 20% | 15% |
| Graduate Student Design Project | - | 20% |

Discussion Posts (100 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. For Part A (due Wednesday before midnight), students will write a 200-word reaction piece followed by one question about the article to prompt discussions. For Part B (due Sunday before midnight), students must comment on at least two reaction pieces from different classmates. At least one comment should attempt to answer a question raised by another student. Both parts of the assignment are to be submitted in the Discussions tab in canvas (100 points). Participation in the assignment will be graded on a weekly basis using the following rubric:

| Total | Points | 20-25 | 10-19 | 1-9 | 0 |
|-------|-----------------|---|--|---|------------|
| 25 | Quality of post | The reaction piece informs, persuades, and raises a thoughtful question meeting | The reaction piece provides an adequate reflection and critical analysis of the topic but fails to provide a | The reaction piece was written with minimum effort; states thoughts/opinions without supporting | No posting |

| | | | | | |
|----|----------------------------|--|---|---|---------------------------------|
| | | the minimum word requirement | thoughtful question; meets the minimum word requirement | content; does not meet the minimum word requirement | |
| 25 | Relevance of post | The reaction piece is related to the topic and prompts further discussion | The reaction piece is related to the topic but does not prompt further discussion | The reaction piece is not related to the main topic of discussion | No posting |
| 25 | Quality of response | Responds thoughtfully to at least two posts and prompts further discussion; posts answered at least one pending question | Responds thoughtfully to least two posts but with minimal effort; posts answered at least one pending question | Responds to one post with minimal effort and does not answer at least one pending question | Does not respond to other posts |
| 25 | Written mechanics | Posts are free of noticeable grammar, spelling, or punctuation errors, and address others in a professional manner | Posts are written with noticeable grammar, spelling, or punctuation errors, and address others in a professional manner | Posts have multiple noticeable grammar, spelling, or punctuation errors, and do not address others in a professional manner | No post |

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

Weekly quizzes (100 pts. each). Each quiz will be worth 100 points and there will be 15 quizzes during the semester, one for each module. Quizzes will become available on Friday 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, quizzes will be weighted at 20% for undergraduates and 15% for graduate students.

Exams (100 pts. each). 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. For the final course grade, exams will be weighted at 20% for undergraduates and 15% for graduate students.

Graduate Student CEPP Planning Project (100 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%.

Grading Scale:

| | |
|-----------|-------------------|
| A | [100.00 – 93.00%] |
| A- | [92.99 – 90.00%] |
| B+ | [89.99 – 87.00%] |
| B | [86.99 – 83.00%] |
| B- | [82.99 – 80.00%] |
| C+ | [79.99 – 77.00%] |
| C | [76.99 – 73.00%] |
| C- | [72.99 – 70.00%] |
| D+ | [69.99 – 67.00%] |
| D | [66.99 – 63.00%] |
| D- | [62.99 – 60.00%] |
| E | [59.99 – 0.00%] |

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 the Grades and Grading Policies section of the [UF Undergraduate Catalog](#).

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 10 points. Assignments returned late, before 11:59 PM on the second day following the due date will be marked down 50 points. No assignments will be accepted after 11:59 PM on the third 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. 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.

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 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

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 Resources: 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.

Health and 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.

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).

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](#).

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](#).

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.