

CONTROLLED ENVIRONMENT PLANT PRODUCTION
AOM/ORH4932-AOM/HOS6932
FALL 2020; 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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- h. d. Course site: Canvas e-Learning

Dr. Adam Watson

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- d. Course site: Canvas e-Learning

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: Listed assigned meeting times.

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 for controlled environment plant production
- 13 Business and output decisions
- 14 Marketing methods of horticultural and ornamental plants
- 15 Measures of business success

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 letter-head 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 Planning Project	-	20%

*Lowest score within each component will be dropped

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. 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. For the final course grade, discussion posts will be weighted at 20% of the final grade. The lowest scored discussion post will be dropped. Participation in the discussion will be graded on a weekly basis using the following rubric:

Total	Points	20 - 25	10 - 19	1 - 9	0
25	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
25	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
25	Response to others	Responds thoughtfully to specified number of posts (2 each)	Responds thoughtfully to specified number of posts (2 each)	Responds to one post with minimal effort	Does not respond to other posts

		week); prompts further discussion	week) with minimal effort		
25	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.

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 5:00 PM, 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. The lowest scored quiz will be dropped.

Exams (100 pts. each). Each module will conclude with a comprehensive online, proctored 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 2 hours to complete each exam over a 4-day period. Students may be provided formula sheets, but the exam is closed note and book and work must be completed individually. For the final course grade, exams will be weighted at 20% for undergraduates and 15% for graduate students. **The exam will be proctored using Honorlock. It is highly recommended that students complete the practice Honorlock quiz prior to taking their first exam.**

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 5:00 PM on the day following the due date, will be marked down 10 points. Assignments returned late, before 5:00 PM on the second day following the due date will be marked down 50 points. No assignments will be accepted after 5:00 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/>.

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](#).

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/

[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.