



## **BE 350L Advanced Hydroponic Crop Production Laboratory**

### **Location**

Controlled Environment Agriculture Center (CEAC), Room 117  
1951 E. Roger Rd, Tucson, AZ 85719

### **Time**

Tuesdays 2:30pm – 5:20pm

### **Description of Course**

This is an advanced level laboratory that builds upon the basic principles covered in BE 217L Introduction to Hydroponics Laboratory. Students gain hands-on experience with vine crop and leafy green production, including microgreens, in different hydroponic systems such as Nutrient Film Technique (NFT) and Deep Water Culture (DWC), at the teaching greenhouse located at the Controlled Environment Agriculture Center (CEAC). Students develop and hone critical skills in CEA hydroponic production, including plant propagating, transplanting, and harvesting, nutrient solution management, stock solution calculations, Integrated Pest Management (IPM), and food safety practices.

### **Course Pre-Requisites**

BE 217 and BE 217L are pre-requisites. BE 350 is a co-requisite.

### **Instructor and Contact Information**

Dr. Triston Hooks  
CEAC, Room 103  
520-626-9953  
[tristonh@arizona.edu](mailto:tristonh@arizona.edu)

Office hours: Tuesdays/Thursdays 10:00 am – 1:00 pm

### **Course Format and Teaching Methods**

This lab can only be offered **In-Person** and involves hands-on learning with live plants in a commercial-scale teaching greenhouse at CEAC. Students will be assigned to a group and each group will learn a specific skill/task in the teaching greenhouse after which they will be responsible for completing their assigned task each week. Groups will rotate tasks throughout the semester to gain comprehensive experience. Each student will submit a lab report each week detailing their assigned task and answering questions.

Tasks include:

1. Vegetable harvesting, grading, packaging, and food safety practices
2. Lysimeter measurements and recording
3. Stock tank nutrient solution calculations and replenishment
4. IPM practices such as scouting, prevention, and control
5. Leafy green and microgreen propagation
6. NFT system management
7. DWC system management

## **Course Objectives**

The objectives for this course are for students to gain:

1. ...critical skills in CEA through hands-on experience in a commercial scale greenhouse at CEAC
2. ...advanced experience with crop, greenhouse, and nutrient solution management in multiple hydroponic systems, including Gutter, NFT, and DWC
3. ...a deeper understanding of sustainable food production methods such as IPM food safety practices

## **Expected Learning Outcomes**

This course aligns with five of the Student Learning Outcomes for the Biosystems Engineering Major (based on the 2019-2020 Criteria for Accrediting Engineering Programs):

1. ...an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
2. ...an ability to acquire and apply new knowledge as needed, using appropriate learning strategies
3. ...an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
4. ...an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
5. ...an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

## **Absence and Class Participation Policy**

Participating in the laboratory is vital to the learning process. As such, attendance is required at all labs. Absences may affect a student's final course grade. If you anticipate being absent, are unexpectedly absent, or are unable to participate in class online activities, please contact me as soon as possible.

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable,

<http://policy.arizona.edu/human-resources/religious-accommodation-policy>

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See:

<https://deanofstudents.arizona.edu/absences>

To request a disability-related accommodation to this attendance policy, please contact the Disability Resource Center at (520) 621-3268 or [drc-info@email.arizona.edu](mailto:drc-info@email.arizona.edu).

If you are experiencing unexpected barriers to your success in your courses, the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office is located in the Robert L. Nugent Building, room 100, or call 520-621-7057.

### **Makeup Policy for Students Who Register Late**

Students who register after the first lab meeting must make up all assignments and online discussions within a week of first day of attendance, or time agreed upon by instructor.

### **Course Communications**

All course communications will be done through D2L

### **Required Text**

There is no required textbook. All course materials will be provided to you on D2L. An excellent textbook that I recommend is Hydroponic Food Production by Howard Resh.

### **Required or Special Materials**

Closed-toe shoes are required for safety and hands must be washed before entering the teaching greenhouse to prevent the spreading of plant diseases. Students are encouraged to wear work clothes such as long sleeves, pants, and a hat. And please bring water and stay hydrated!

### **Required Extracurricular Activities**

None.

### **Assignments and Examinations: Schedule/Due Dates**

#### *Lab Reports*

There will be a total of 12 lab reports. A report will be assigned each week and must be submitted at the end of each lab period.

### **Grading Scale and Policies**

#### *Points*

<b>What?</b>	<b>How Many?</b>	<b>Points (Each)</b>	<b>Points (Total)</b>
Lab Report	12	20	240
		<b>TOTAL:</b>	<b>240</b>

### Grading Scale

A = 216 – 240 pts

B = 192 – 216 pts

C = 168 – 192 pts

D = 144 – 168 pts

F < 144 pts

University policy regarding grades and grading systems is available at:

<http://catalog.arizona.edu/policy/grades-and-grading-system>

### Late work policy

A grade of “0” will be assigned if the work is turned in after the due date/time, unless otherwise agreed upon by the instructor.

### Requests for incomplete(I) or withdrawal (W)

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at:

<http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete>

<http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal>

### Scheduled Topics/Activities

Week	Date	Lab	Description	Assignment Due
1	13-Jan	-	<i>No Lab!</i>	-
2	18-Jan	1	Overview of tasks/skills	-
3	25-Jan	2	Task 1 - Rep 1	Lab Report 1
4	1-Feb	3	Task 1 - Rep 2	Lab Report 2
5	8-Feb	4	(Rotate) Task 2 - Rep 1	Lab Report 3
6	15-Feb	5	Task 2 - Rep 2	Lab Report 4
7	22-Feb	6	(Rotate) Task 3	Lab Report 5
8	1-Mar	-	<i>No Lab!</i>	-
9	8-Mar	-	<i>Spring Break!</i>	-

10	15-Mar	7	(Rotate) Task 4 - Rep 1	Lab Report 6
11	22-Mar	8	Task 4 - Rep 2	Lab Report 7
12	29-Mar	9	(Rotate) Task 5	Lab Report 8
13	5-Apr	10	(Rotate) Task 6 - Rep 1	Lab Report 9
14	12-Apr	11	Task 6 - Rep 2	Lab Report 10
15	19-Apr	12	(Rotate) Task 7 - Rep 1	Lab Report 11
16	26-Apr	13	Task 7 - Rep 2	Lab Report 12
17	3-May	-	<i>No Lab!</i>	-
18	4-May	-	<i>No Lab!</i>	-

### **Classroom Behavior Policy**

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.). Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

### **Threatening Behavior Policy**

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See:

<http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

### **Accessibility and Accommodations**

At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please contact the Disability Resource Center (520-621-3268, <https://drc.arizona.edu/>) to establish reasonable accommodations.

### **Code of Academic Integrity**

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless

otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See:

<http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism, available at

<http://new.library.arizona.edu/research/citing/plagiarism>.

## **Nondiscrimination and Anti-harassment Policy**

The University of Arizona is committed to creating and maintaining an environment free of discrimination. In support of this commitment, the University prohibits discrimination, including harassment and retaliation, based on a protected classification, including race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, or genetic information. For more information, including how to report a concern, please see

<http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

## **Additional Resources for Students**

UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies>

### *Campus Health*

Campus Health provides quality medical and mental health care services through virtual and in-person care. Phone: 520-621-9202 <http://www.health.arizona.edu/>

### *Counseling and Psych Services (CAPS)*

CAPS provides mental health care, including short-term counseling services. Phone: 520-621-3334

<https://health.arizona.edu/counseling-psych-services>

### *The Dean of Students Office's Student Assistance Program*

Student Assistance helps students manage crises, life traumas, and other barriers that impede success. The staff addresses the needs of students who experience issues related to social adjustment, academic challenges, psychological health, physical health, victimization, and relationship issues, through a variety of interventions, referrals, and follow up services. Email: [DOS-deanofstudents@email.arizona.edu](mailto:DOS-deanofstudents@email.arizona.edu) Phone: 520-621-7057 <http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>

### *Survivor Advocacy Program*

The Survivor Advocacy Program provides confidential support and advocacy services to student survivors of sexual and gender-based violence. The Program can also advise students about relevant non-UA resources available within the local community for support. Email:

[survivoradvocacy@email.arizona.edu](mailto:survivoradvocacy@email.arizona.edu) Phone: 520-621-5767 <https://survivoradvocacy.arizona.edu/>

### *Campus Pantry*

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course, is urged to contact the Dean of Students for support. In addition, the University of Arizona Campus Pantry is open for students to receive supplemental groceries at no cost. Please see their website at:

<https://campuspantry.arizona.edu>

### **Confidentiality of Student Records**

<http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa>

### **Subject to Change Statement**

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.