UNDERGRADUATE CERTIFICATE: CONTROLLED ENVIRONMENT AGRICULTURE

Student Learning Outcomes

Students graduating from this program will:

- Design, maintain, and operate the environmental and mechanical control systems of any CEA facility.
- Design and implement nutrient management programs for hydroponic crops.
- Articulate how plant physiology interacts with the production environment.
- Manage arthropod and pathogen pests that occur in hydroponics.
- Identify food safety risks and implement good agricultural practices.
- Manage and maintain CEA engineering systems and technologies.
- Analyze the agronomic practices that affect plant yield and crop quality
- Demonstrate leadership skills in effectively coordinating teams, making strategic decisions, and fostering innovation within CEA operations

This multidisciplinary certificate will prepare students to forge connections between horticulture education and complementary fields such as engineering, plant science, nutrition and food science, business management, data science and analytics, biotechnology, sustainability studies, and more. This cross-disciplinary approach cultivates a diverse skill set among students, preparing students to excel in dynamic agricultural environments and making meaningful contributions to sustainable food production systems.

To be granted a certificate students must achieve a grade-point average of at least 2.0 in the 15-hour program described below. No credit will be given for courses in which the grade is below C-. This certificate may only be awarded in conjunction with a UMKC undergraduate degree. Students interested in enrolling in Controlled Environment Agriculture (CEA) certificate program must contact the IDEA Coordinator prior to enrollment.

Certificate Requirements

Code	Title	Credits
Required Coursework:		
ENV-SCI 230	Introduction to Controlled Environment Agriculture	3
ENV-SCI 350	Indoor Vertical Farming	3
ENV-SCI 360	CEA Engineering and Technology Systems	3
ENV-SCI 440	Hydroponic Food Production	3
Elective Coursework		**3**
Students must complete 3 hours of coursework from the list below:		
ENV-SCI 365	Mushroom Production in Controlled Environment Agriculture (course requires a prerequisite)	
ENV-SCI 321	Climate Change Impact Assessment and Policy Response (course requires a prerequisite)	
ENV-STDY 325	Cultural Perspectives on the Environment	
UPD 432	Urban Environment Planning And Design	
GEOG 444	Spatial Data Analysis	
CIV-ENGR 488	Applied Artificial Intelligence (course requires a prerequisite)	
POL-SCI 435	Environmental Politics	
ENT 315	Entrepreneurial Mindset and Opportunity Recognition	
Total Credits		**15**