

# GRADUATE CERTIFICATE IN FOOD-ENERGY-WATER SYSTEMS (FEWS)

This certificate will provide students with a broad overview of Food-Energy-Water (FEW) nexus issues, an understanding of the science underpinning FEW issues, working knowledge about the tradeoffs amongst sectors and experience analyzing the socio-economic constraints and policy limitations incumbent on solutions to FEWS challenges. The certificate will equip students with transdisciplinary and systems thinking skills that advance capacity to assess and solve complex FEWS issues.

## Learning Objectives

Students who obtain the Graduate Certificate in FEWS will develop:

1. Capacity to explain and critically analyze issues related to each food, energy, and water systems and the connections between those systems;
2. Capacity to understand and consider tradeoffs and interconnections among FEW sectors in semi-arid regions with scarce water resources;
3. Capacity to synthesize broad, integrated perspectives on the interactions among natural and built infrastructure and socioeconomic and policy considerations, including social and environmental justice and public health outcomes;
4. Ability to communicate across disciplines and understand jargon, perspectives, and the conceptual frameworks used outside of their core discipline;
5. Skills to apply systems thinking tools improve understanding of complex food, energy, water problems.

## Requirements Effective Fall 2024

Additional coursework may be required due to prerequisites.

Code	Title	Credits
<b>Required Course:</b>		
CIVE 528/GES 528	Assessing the Food, Energy, Water Nexus	3
<b>Technical Electives (select a minimum of 3 credits):</b>		
AGRI 510	Sustainable Agriculture	
ATS 543/ESS 543	Global Climate Change	
CIVE 530	Environ Engr at the Water-Energy-Health Nexus	
CIVE 544	Water Resources Planning and Management	
CIVE 575	Sustainable Water and Waste Management	
CIVE 578	Infrastructure and Utility Management	
CIVE 622	Risk Analysis of Water/Environmental Systems	
ENGR 565/ ECE 565	Electrical Power Engineering	
ENGR 570	Coupled Electromechanical Systems	
ESS 501	Principles of Ecosystem Sustainability	

ESS 524	Foundations for Carbon/Greenhouse Gas Mgmt	
ESS 545	Applications in Greenhouse Gas Inventories	
ESS 555/ ANEQ 555	Life Cycle Assessment for Sustainability	
FSHN 500	Food Systems, Nutrition, and Food Security	
GES 520	Issues in Global Environmental Sustainability	
MECH 575	Solar and Alternative Energies	
SOCR 620	Modeling Ecosystem Biogeochemistry	
<b>Policy, Economics, and Social Science Electives (select a minimum of 3 credits):</b>		<b>3</b>
ANTH 530	Human-Environment Interactions	
AREC 540/ ECON 540	Environmental and Natural Resource Economics	
AREC 542	Applied Advanced Water Resource Economics	
AREC 605	Agricultural Production and Cost Analysis	
ESS 542	Greenhouse Gas Policies	
POLS 670	Politics of Environment and Sustainability	
SOC 562/ AGRI 562	Sociology of Food Systems and Agriculture	
SOC 564	Environmental Justice	
SOC 668	Environmental Sociology	
<b>Program Total Credits:</b>		<b>9</b>

\*This certificate may have courses in common with other graduate certificates. A student may earn more than one certificate, but a given course may be counted only in one certificate.