

Civil and Environmental

Graduate Certificate in Engineering: 12 credits / 4 courses

Students pursuing a Graduate Certificate in Engineering must focus on one of the four of the following areas of study:

**Geotechnical and Pavements
Structures
Environmental and Water Resources
Transportation**

Geotechnical and Pavements:	
<i>Students must enroll in:</i>	
	ENCE640 Advanced Soil Mechanics
	ENCE741 Earth Retaining Structures
<i>And select two of the following courses:</i>	
	ENCE641 Advanced Foundations Systems
	ENCE743 Soil Dynamics and Earthquake Eng.
	ENCE745 Geoenvironmental Site Remediation

Structures:	
<i>Students must enroll in:</i>	
	ENCE611 Finite Element Methods
	ENCE710 Steel Structures I
	ENCE713 Concrete Structures I
<i>And select one of the following courses:</i>	
	ENCE610 Fundamentals of Structural Analysis
	ENCE613 Structural Dynamics
	ENCE615 Structural Reliability

Transportation:	
<i>Select four of the following courses:</i>	
	ENCE674 Urban Transit Planning and Rail Transport. Engineering
	ENCE675 Airport Planning and Design
	ENCE677 OR Models for Transportation Systems Analysis
	ENCE681 Freight Transportation Analysis

Environmental and Water Resources:	
<i>Students must enroll in</i>	
	ENCE630 Environmental and Water Resource Systems I
<i>And select three of the following courses:</i>	
	ENCE635 GIS for Watershed Analysis
	ENCE650 Process Dynamics in Environmental Systems
	ENCE651 Chemistry of Natural Waters
	ENCE652 Microbial Principles of Environmental Engineering
	ENCE655 Environmental Behavior of Organic Pollutants
	ENCE730 Environmental and Water Resource Systems II
	ENCE756 Bioremediation

*NOTE: Any courses not listed above must be approved by the Senior Academic Advisor **PRIOR** to registration.*

KEY	
Online Option *	(offering information)
[Prerequisite course]	