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:

Students must enroll in:

- ENCE640 Advanced Soil Mechanics
- ENCE741 Earth Retaining Structures

And select two of the following courses:

- ENCE641 Advanced Foundations Systems
- ENCE743 Soil Dynamics and Earthquake Eng.
- ENCE745 Geoenvironmental Site Remediation

### Transportation:

Select four of the following courses:

- ENCE674 Urban Transit Planning and Rail Transport. Engineering
- ENCE675 Airport Planning and Design
- ENCE677 OR Models for Transportation Systems Analysis
- ENCE681 Freight Transportation Analysis
- ENCE688 App. of OR in Transportation Systems Management

### Structures:

Students must enroll in:

- ENCE611 Finite Element Methods
- ENCE710 Steel Structures I
- ENCE713 Concrete Structures I

And select one of the following courses:

- ENCE610 Fundamentals of Structural Analysis
- ENCE613 Structural Dynamics
- ENCE615 Structural Reliability

### Environmental and Water Resources:

Students must enroll in

- ENCE630 Environmental and Water Resource Systems I

And select three of the following courses:

- 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
- ENCE688B Land-Atmosphere Interactions in Hydrology
- 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.

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**KEY**

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

**DISCLAIMER:** All offerings are tentative and subject to change.  
Updated 8/9/2019