CIVIL ENGINEERING, PH.D.

Degree Requirements (60 Post-Baccalaureate Hours)

Completion of the doctoral degree requires a minimum of 60 credits beyond the baccalaureate degree, of which 12 must be ECIV 899. Students having an earned M.S. or M.E. degree must complete a minimum of 30 credit hours beyond the master's degree. At least half of the course work must be completed at the 700 level or higher. Prescribed core courses are required for each area of study (see "Core Courses" below).

For students pursuing a Ph.D. degree in the same program area as their M.S. or M.E. degree, a minimum of 18 credit hours of course work is required. Core courses may be satisfied during the M.S. or M.E. degree. For students pursuing a Ph.D. degree in a different program area from their M.S. or M.E. degree, a minimum of 24 credit hours of course work in the new area is required. "Program area" refers to environmental, geotechnical, structural, transportation or water resources engineering.

Credits earned in ECIV 798 do not count toward a student's program of study.

The residency requirement for the Ph.D. degree ensures that students benefit from and contribute to the complete spectrum of educational and professional opportunities provided by the graduate faculty of a comprehensive university. The granting of a doctoral degree presupposes a minimum of three full years of graduate study following admission to the doctoral program. As such, the residency requirement may be fulfilled by enrollment in at least 18 graduate credit hours within a span of three consecutive semesters (excluding summers). Enrollment in a summer term is not required to maintain continuity, but credits earned during summer terms may be used to count toward residency. Enrollment through the APOGEE program does not satisfy the residency requirement for the Ph.D. degree.

Core Courses

Each area of study has a minimum core requirement for the M.S., M.E., and Ph.D. degrees. The core requirements in the different areas of study are as follows:

Environmental Engineering

Course	Title	Credits
ECIV 750	Principles of Environmental Engineering Process	3
Select two of the following:		6
ECIV 555	Principles of Municipal Solid Waste Engineering	
ECIV 556	Air Pollution Control Engineering	
ECIV 558	Environmental Engineering Process Modeling	
ECIV 751	Water and Wastewater Treatment Theory I	
ECIV 752	Water and Wastewater Treatment Theory II	
ECIV 753	Unit Operations Laboratory for Water and Wastewater Treatment	
ECIV 755	Industrial Wastewater Treatment	
Total Credit Hours		**9**

Geotechnical Engineering

Course	Title	Credits
ECIV 730	Advanced Soil Mechanics	3
Select three of the following:		9
ECIV 731	Slope Stabilty, Retaining Systems and Lateral Earth Pressure	
ECIV 732	Theoretical and Numerical Methods in Geomechanics	
ECIV 733	Physico-chemical Properties of Soils	
ECIV 734	Dynamics of Soils and Foundations	
ECIV 736	Ground Improvement Techniques	
ECIV 737	Advanced Foundation Design	
Total Credit Hours		**12**

Structural Engineering

Course	Title	Credits
ECIV 720	Advanced Structural Mechanics and Analysis	3
Select three of the following:		9
ECIV 722	Theory and Design of Plates and Shells	
ECIV 724	Dynamics of Structures	
ECIV 725	Advanced Analysis and Design in Structural Metals	
ECIV 726	Repair and Retrofit of Structures	
ECIV 727	Advanced Analysis and Design of Reinforced Concrete	
ECIV 728	Prestressed Concrete Analysis and Design	
ECIV 737	Advanced Foundation Design	
Total Credit Hours		**12**

Transportation Engineering

Course	Title	Credits
Select one from each group:		9
Group One		
ECIV 535	Geotechnical Engineering in Transportation	
ECIV 540	Transportation Systems Planning	
ECIV 541	Highway Design	
Group Two		
ECIV 542	Traffic Engineering	
ECIV 748	Traffic Flow Theory	
Group Three		
ECIV 705	Deterministic Civil and Environmental Systems Engineering	
ECIV 706	Probabilistic Civil and Environmental Systems Engineering	
Total Credit Hours		**9**

Water Resources Engineering

Course	Title	Credits
Select one of the following options:		9
Option One		
Select two of the following:		
ECIV 760	Computational Hydraulics	
ECIV 761	Numerical Methods in Subsurface Hydrology	
ECIV 762	Advanced Hydrology	
ECIV 763	Unsaturated Flow Theory	

ECIV 764	Contaminant Transport
ECIV 765	Erosion and Sediment Control
ECIV 766	Fluid Transients
ECIV 767	Sediment Transport and River Mechanics
Select one of the following:	
ECIV 560	Open Channel Hydraulics
ECIV 562	Engineering Hydrology
ECIV 563	Subsurface Hydrology
Option Two	
Select three of the following:	
ECIV 760	Computational Hydraulics
ECIV 761	Numerical Methods in Subsurface Hydrology
ECIV 762	Advanced Hydrology
ECIV 763	Unsaturated Flow Theory
ECIV 764	Contaminant Transport
ECIV 765	Erosion and Sediment Control
ECIV 766	Fluid Transients
ECIV 767	Sediment Transport and River Mechanics
Total Credit Hours	**9**