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 Stability, 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 |
<table>
<thead>
<tr>
<th>Course Code</th>
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</thead>
<tbody>
<tr>
<td>ECIV 764</td>
<td>Contaminant Transport</td>
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<tr>
<td>ECIV 765</td>
<td>Erosion and Sediment Control</td>
</tr>
<tr>
<td>ECIV 766</td>
<td>Fluid Transients</td>
</tr>
<tr>
<td>ECIV 767</td>
<td>Sediment Transport and River Mechanics</td>
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<tr>
<td>ECIV 560</td>
<td>Open Channel Hydraulics</td>
</tr>
<tr>
<td>ECIV 562</td>
<td>Engineering Hydrology</td>
</tr>
<tr>
<td>ECIV 563</td>
<td>Subsurface Hydrology</td>
</tr>
</tbody>
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**Option Two**

Select three of the following:

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**Total Credit Hours** 9