CIVIL ENGINEERING, M.E.

Degree Requirements (30 Hours)

For the M.E. degree, a minimum of 30 credit hours is required. Students may take either 30 credit hours of course work or 24 hours of course work and 6 hours of ECIV 797 (as a master of engineering project). At least 15 hours of course work must be 700-level or higher. Up to 12 credit hours of course work may be taken outside of the department for degree credit with the approval of the student's advisor and the graduate director. At least 12 hours of core course work are required for each area of specialization (see "Core Courses" below).

Prior to graduation, each M.E. candidate must pass a comprehensive assessment based on program learning objectives by demonstrating the ability to integrate graduate level coursework into engineering practice in one of two ways:

1. a written career planning document; or
2. a written summary of the engineering project performed as part of ECIV 797.

Students should consult the graduate director for additional information.

Core Courses

Each area of specialization has specific graduate core course requirements that are presented in the tables below. These requirements are designed to provide opportunities for cross-disciplinary programs of study that require breadth and flexibility beyond classical courses offered for a given area of specialization, and that may better reflect the student's personal interests. This can be achieved by allowing to substitute one additional core course with any USC graduate (500-level or higher) course, subject to the approval of the student's advisor and ECIV graduate director through the program of study (MPOS) form.

Environmental Engineering (12 hours)

Course | Title | Credits
---|---|---
ECIV 750 | Principles of Environmental Engineering Process | 3
Select three of the following: | | 9
ECIV 502 | Life Cycle Assessment of Engineered Systems | 
ECIV 555 | Principles of Municipal Solid Waste Engineering | 
ECIV 556 | Air Pollution Control Engineering | 
ECIV 558 | Environmental Engineering Process Modeling | 
ECIV 590 | Intermediate Special Topics | 
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 | 
ECIV 790 | Selected Topics in Civil Engineering | 
Select one USC graduate (500-level or higher) course | | 

Total Credit Hours | 12

* To be approved by student's advisor and ECIV graduate director through program of study (MPOS) form.

Geotechnical Engineering (12 hours)

Course | Title | Credits
---|---|---
ECIV 730 | Advanced Soil Mechanics | 3
Select three of the following: | | 9
ECIV 590 | Intermediate Special Topics | 
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 | Soil Dynamics and Geotechnical Earthquake Engineering | 
ECIV 736 | Ground Improvement Techniques | 
ECIV 737 | Advanced Foundation Design | 
ECIV 790 | Selected Topics in Civil Engineering | 
Select one USC graduate (500-level or higher) course | | 

Total Credit Hours | 12

Railway Engineering (12 hours)

Course | Title | Credits
---|---|---
Select two of the following "Fundamental" core courses: | | 6
ECIV 580 | Railway Engineering I | 
ECIV 582 | Operation and Logistics of Railway Systems | 
ECIV 588 | Design of Railway Bridges and Structures | 
ECIV 590 | Intermediate Special Topics | 
Select one "Advanced" core course | | 
Select one "Advanced" or "Cross-Disciplinary" core course | | 
Select one of the following "Advanced" core courses: | | 3
ECIV 707 | Management of Engineering Projects | 
ECIV 724 | Dynamics of Structures | 
ECIV 734 | Soil Dynamics and Geotechnical Earthquake Engineering | 
ECIV 784 | Dynamic Analysis of Railway Systems | 
ECIV 789 | Design Project in Railway Engineering | 
ECIV 790 | Selected Topics in Civil Engineering | 
Select one of the following "Cross-Disciplinary" core courses: | | 3
Select one Environmental Engineering core course | | 
Select one Geotechnical Engineering core course | | 
Select one Structural Engineering core course | | 
Select one Transportation Engineering core course | | 
Select one Water Resources Engineering core course | | 
Select one USC graduate (500-level or higher) course | | 

Total Credit Hours | 12

* To be approved by student's advisor and ECIV graduate director through program of study (MPOS) form.

** Applies to PhD student with MS/ME degree only. May be taken for either "Fundamental" core course credit, or "Advanced" or "Cross-Disciplinary" core course credit, not both.
### Structural Engineering (12 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECIV 720</td>
<td>Advanced Structural Mechanics and Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Select three of the following: 9

- ECIV 590 Intermediate Special Topics *
- 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
- ECIV 790 Selected Topics in Civil Engineering *

Select one USC graduate (500-level or higher) course *

Total Credit Hours 12

* To be approved by student's advisor and ECIV graduate director through program of study (MPOS) form.

### Transportation Engineering (12 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECIV 535</td>
<td>Geotechnical Engineering in Transportation</td>
<td>3</td>
</tr>
<tr>
<td>ECIV 540</td>
<td>Transportation Systems Planning</td>
<td></td>
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<tr>
<td>ECIV 541</td>
<td>Highway Design</td>
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</tbody>
</table>

Select one of the following: 3

Select one of the following: 3

- ECIV 542 Traffic Engineering
- ECIV 748 Traffic Flow Theory

Select one of the following: 3

- ECIV 705 Deterministic Civil and Environmental Systems Engineering
- ECIV 706 Probabilistic Civil and Environmental Systems Engineering

Select one of the following: 3

- ECIV 590 Intermediate Special Topics *
- ECIV 790 Selected Topics in Civil Engineering *

Select one USC graduate (500-level or higher) course *

Total Credit Hours 12

* To be approved by student's advisor and ECIV graduate director through program of study (MPOS) form.

### Water Resources Engineering (12 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECIV 560</td>
<td>Open Channel Hydraulics</td>
<td>0-3</td>
</tr>
<tr>
<td>ECIV 562</td>
<td>Engineering Hydrology</td>
<td></td>
</tr>
<tr>
<td>ECIV 563</td>
<td>Subsurface Hydrology</td>
<td></td>
</tr>
<tr>
<td>ECIV 590</td>
<td>Intermediate Special Topics</td>
<td></td>
</tr>
</tbody>
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Select at least two of the following: 6-12

- 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
- ECIV 790 Selected Topics in Civil Engineering *

Select up to one of the following: 0-3

Select one USC graduate (500-level or higher) course *

Total Credit Hours 12

* To be approved by student's advisor and ECIV graduate director through program of study (MPOS) form.