Civil Engineering (MS)

Master of Science Degree Requirements

Students may choose from the specializations below to complete coursework within a focus area.

Degrees earned will be distributed as: "Master of Science in Civil Engineering" without specialization specifications.

Computing & Systems Specialization

- Select at least five courses in the CE department

### Core Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 536</td>
<td>Introduction to Numerical Methods for Civil Engineers</td>
<td>3</td>
</tr>
<tr>
<td>CE 537</td>
<td>Computer Methods and Applications</td>
<td>3</td>
</tr>
<tr>
<td>CE 591</td>
<td>Special Topics in Civil Engineering Computing</td>
<td>3</td>
</tr>
<tr>
<td>CE 737</td>
<td>Computer-Aided Engineering Systems</td>
<td>3</td>
</tr>
<tr>
<td>CE 791</td>
<td>Advanced Topics in Civil Engineering Computing (High performance computer modeling)</td>
<td>3</td>
</tr>
<tr>
<td>CE 791</td>
<td>Advanced Topics in Civil Engineering Computing (Evolutionary computation)</td>
<td>3</td>
</tr>
<tr>
<td>CE 791</td>
<td>Advanced Topics in Civil Engineering Computing (Inverse modeling)</td>
<td>3</td>
</tr>
<tr>
<td>CE 791</td>
<td>Advanced Topics in Civil Engineering Computing (Advanced methods for systems analysis)</td>
<td>3</td>
</tr>
<tr>
<td>CE 7XX</td>
<td>Complex adaptive systems analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

### Electives

1. Select a minimum of two courses of the following: 6

2. Other relevant departmental courses

3. Other recommended courses

### Construction Engineering Specialization

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON XXX</td>
<td>Select a minimum of seven courses CON XXX</td>
<td>21</td>
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</table>

### Environmental, Water Resources, and Coastal Engineering Specialization

- 30 graduate-level credit hours

### Thesis Research

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 695</td>
<td>Master's Thesis Research</td>
<td>3-6</td>
</tr>
</tbody>
</table>

Total Hours 66-69
Geotechnical and Geoenvironmental Engineering Specialization

• 30 graduate-level credit hours

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<tr>
<th>Code</th>
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<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 695</td>
<td>Master's Thesis Research</td>
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</tr>
</tbody>
</table>

Total Hours 6

Mechanics and Materials Specialization

• 30 graduate-level credit hours

<table>
<thead>
<tr>
<th>Code</th>
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<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 695</td>
<td>Master's Thesis Research</td>
<td>1-6</td>
</tr>
</tbody>
</table>

Total Hours 1-6

Structural Engineering and Mechanics Specialization

<table>
<thead>
<tr>
<th>Code Courses</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 515</td>
<td>Advanced Strength of Materials</td>
<td>3</td>
</tr>
<tr>
<td>CE 526</td>
<td>Finite Element Method in Structural Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 527</td>
<td>Structural Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following SEM Behavior and Design courses:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CE 522</td>
<td>Theory and Design Of Prestressed Concrete</td>
<td></td>
</tr>
<tr>
<td>CE 523</td>
<td>Theory and Behavior Of Steel Structures</td>
<td></td>
</tr>
<tr>
<td>CE 524</td>
<td>Analysis and Design Of Masonry Structures</td>
<td></td>
</tr>
<tr>
<td>CE 528</td>
<td>Structural Design in Wood</td>
<td>3</td>
</tr>
<tr>
<td>CE 529</td>
<td>FRP Strengthening and Repair of Concrete Structures</td>
<td>3</td>
</tr>
<tr>
<td>CE 726</td>
<td>Advanced Theory Of Concrete Structures</td>
<td></td>
</tr>
<tr>
<td>CE 794</td>
<td>Advanced Topics in Structures and Mechanics</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Select two of the following additional SEM courses: 6

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>CE 525</td>
<td>Structural Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>CE 721</td>
<td>Matrix and Finite Element Structural Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CE 530</td>
<td>Properties of Concrete and Advanced Cement-Based Composites</td>
<td>3</td>
</tr>
<tr>
<td>CE 714</td>
<td>Stress Waves</td>
<td>3</td>
</tr>
<tr>
<td>CE 718</td>
<td>Constitutive Modeling of Engineering Materials</td>
<td>3</td>
</tr>
<tr>
<td>CE 730</td>
<td>Mechanics and Failure of Quasi-Brittle Materials</td>
<td>3</td>
</tr>
<tr>
<td>CE 723</td>
<td>Advanced Structural Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>CE 724</td>
<td>Probabilistic Methods Of Structural Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 725</td>
<td>Earthquake Structural Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 522</td>
<td>Theory and Design Of Prestressed Concrete</td>
<td>3</td>
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<tr>
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<td>CE 721</td>
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<td>3</td>
</tr>
<tr>
<td>CE 530</td>
<td>Properties of Concrete and Advanced Cement-Based Composites</td>
<td>3</td>
</tr>
<tr>
<td>CE 714</td>
<td>Stress Waves</td>
<td>3</td>
</tr>
<tr>
<td>CE 718</td>
<td>Constitutive Modeling of Engineering Materials</td>
<td>3</td>
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<td>CE 730</td>
<td>Mechanics and Failure of Quasi-Brittle Materials</td>
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<td>Advanced Structural Dynamics</td>
<td>3</td>
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<td>CE 725</td>
<td>Earthquake Structural Engineering</td>
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<tr>
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<td>CE 726</td>
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</tr>
<tr>
<td>CE 794</td>
<td>Advanced Topics in Structures and Mechanics</td>
<td>1-3</td>
</tr>
</tbody>
</table>
Transportation Materials and Systems Specialization

• 30-31 graduate credit hours
• 24/30 credits at 500-level or higher

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 501</td>
<td>Transportation Systems Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 502</td>
<td>Traffic Operations</td>
<td>3</td>
</tr>
<tr>
<td>CE 503</td>
<td>Highway Design</td>
<td>3</td>
</tr>
<tr>
<td>CE 504</td>
<td>Airport Planning and Design</td>
<td>3</td>
</tr>
<tr>
<td>CE 506</td>
<td>Transportation Engineering Data Collection and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CE 509</td>
<td>Highway Safety</td>
<td>3</td>
</tr>
<tr>
<td>CE 594</td>
<td>Special Topics in Structures and Mechanics (Nondestructive Testing)</td>
<td>1-6</td>
</tr>
<tr>
<td>CE 595</td>
<td>Special Topics in Transportation Engineering (Asphalt/Bituminous Materials)</td>
<td>1-6</td>
</tr>
<tr>
<td>CE 595</td>
<td>Special Topics in Transportation Engineering (Sensors and Instrumentation)</td>
<td>1-6</td>
</tr>
<tr>
<td>CE 595</td>
<td>Special Topics in Transportation Engineering (Railroad Engineering)</td>
<td>1-6</td>
</tr>
<tr>
<td>CE 595</td>
<td>Special Topics in Transportation Engineering (Unconventional Intersection and Interchange Design)</td>
<td>1-6</td>
</tr>
<tr>
<td>CE 701</td>
<td>Urban Transportation Planning</td>
<td>3</td>
</tr>
<tr>
<td>CE 702</td>
<td>Traffic Flow Theory</td>
<td>3</td>
</tr>
<tr>
<td>CE 705</td>
<td>Intelligent Transportation Systems</td>
<td>3</td>
</tr>
<tr>
<td>CE 706</td>
<td>Advanced Traffic Control</td>
<td>3</td>
</tr>
<tr>
<td>CE 707</td>
<td>Transportation Policy and Funding</td>
<td>3</td>
</tr>
<tr>
<td>CE 755</td>
<td>Highway Pavement Design</td>
<td>3</td>
</tr>
<tr>
<td>CE 757</td>
<td>Pavement Management Systems</td>
<td>3</td>
</tr>
<tr>
<td>CE 759</td>
<td>Inelastic Behavior Of Construction Materials</td>
<td>3</td>
</tr>
<tr>
<td>CE 795</td>
<td>Advanced Topics in Transportation Engineering (Transportation Economics)</td>
<td>1-3</td>
</tr>
<tr>
<td>CE 795</td>
<td>Advanced Topics in Transportation Engineering (Transportation Logistics)</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Thesis Research
Select up to six credit hours 1-6

Accelerated Bachelor's/Master's Degree Requirements

Faculty

Full Professors
Sankarasubramanian Arumugam
Morton A. Barlaz
John W. Baugh Jr.
Emily Zechman Berglund
Francis Lajara De Los Reyes III
Joel Ducoste

Assistant Professors
Alex Albert
Tarek Aziz
Eleni Bardaka
Ashly Margot Cabas Mijares

Associate Professors
Cassandra Alison Castorena
Joseph F. DeCarolis
Joel Casey Dietrich
Andrew P. Grieshop
Jeremiah Johnson
Brina Mortensen Montoya
Mohammad Pour-Ghaz
Benjamin Shane Underwood

Henry C. Frey
Mohammed Awad Gabr
Murthy N.Guddati
Abhinav Gupta
Tasnim Hassan
Edward J. Jaselskis
Youngsoo R. Kim
Detlef R. Knappe
Mervyn J. Kowalsky
George F. List
Min Liu
Gnanamanikam Mahinthakumar
James M. Nau
Margery F. Overton
Ranji Ranjithan
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Douglas Franklin Call
Fernando Garcia Menendez
Ali Hajbabaie
Kook Han
Angela Rose Harris
Jordan Kern
Daniel R. Obenour
Jason Fredrick Patrick
Giorgio Talotti Proestos

Practice/Research/Teaching Professors
Florentino Banaag De La Cruz
Billy L. Edge
Meagan Kittle Autry
James William Levis
Gregory W. Lucier
Elizabeth J. Sciaudone

Emeritus Faculty
Michael Amein
William L. Bingham
Robert C. Borden
Roy H. Borden
Earl Downey Brill Jr
Allen C. Chao
John F. Ely
John S. Fisher
Ajaya K. Gupta
John M. Hanson
Kerry S. Havner
Clinton L. Heimbach
Yasuyuki Horie
David West Johnston
Narendra P. Khosla
Michael Lloyd Leming
Vernon C. Matzen

Stephens W. Nunnally
M. Shamimur Rahman
Sami Rizkalla
J. C. Smith
John R. Stone
Chi C. Tung
Harvey E. Wahls
Paul Z. Zia

Adjunct Faculty
Amin Kamal Akhnoukh
Leta Huntsinger