Civil Engineering Masters and Environmental Science and Engineering Doctoral Programs

Graduate Orientation

ADOLFO MATAMOROS, PH.D., PE, FACI
GRADUATE ADVISOR
DIRECTOR OF CE PH.D. PROGRAM
COLLEGE OF ENGINEERING

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INTERIM DEPARTMENT CHAIR
CIVIL AND ENVIRONMENTAL ENGINEERING

Purpose of Session

Program Familiarization
Student Resources
Faculty Research
Question & Answers
Graduate Programs

Masters in Civil Engineering
- MS
- MCE

PhD
- Environmental Science and Engineering
- Civil Engineering

Objectives of Masters Programs

MS Student Outcomes
- Specialized knowledge in technical areas related to Civil or Environmental Engineering
- Develop research skills
- Excellent oral and written skills.

MCE Student Outcomes
- Specialized knowledge in technical areas related to Civil or Engineering
- Excellent oral and written skills.

The objectives of the MS program is to produce graduates who:
- Can assume leadership roles in their chosen employment field.
- Are capable of conducting original research (Particularly for MS)
- Are specialized in a specific technical area in civil engineering
Technical Areas

- Environmental
- Geotech
- Structures
- Transportation
- Water Resources

Environmental Engineering

www.wonderfulengineering.com
Transportation Engineering

www.bestenggsite.blogspot.com
Geotechnical Engineering

www.writeopinions.com

Water Resources Engineering

Water-Resources Engineering
Third Edition
David A. Chin
CE MS Program

Master of Science: Civil Engineering

Admission Requirements:
- An undergraduate degree in Civil Engineering or a closely related field or proof of equivalent training at a foreign institution.
- A satisfactory score, as evaluated by the Civil Engineering Studies Committee or GRE Test of English a Foreign Language (TOEFL) minimum scores of 79 or 550 for Internet or paper versions.
- A statement of research/specialization interest and
- A favorable recommendation by CE Graduate Studies Committee.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term Credits</th>
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<tbody>
<tr>
<td>CE 5073</td>
<td>Advanced Civil Engineering Statistics</td>
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</tr>
<tr>
<td>CE 5103</td>
<td>Environmental Statistics</td>
<td>3</td>
</tr>
<tr>
<td>CE 5123</td>
<td>Numerical Methods in Civil Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives
- Master’s Thesis: (9 semester credit hrs) includes comprehensive examination.

<table>
<thead>
<tr>
<th>Term</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>1</td>
<td>5981</td>
<td>Master’s Thesis</td>
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<tr>
<td>2</td>
<td>5982</td>
<td>Master’s Thesis</td>
</tr>
<tr>
<td>3</td>
<td>5982</td>
<td>Master’s Thesis</td>
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</tbody>
</table>

Total Hrs: 30
MCE Requirements

- 6 hrs Core Courses
  - Statistics
  - Numerical Methods

- 27 hrs Elective Courses

- 1 hr Seminar

- 34 credit hours beyond BS

Master CE Program

Masters of Civil Engineering:

Admission Requirements: an undergraduate degree in Civil Engineering or a closely related field or proof of equivalent training at a foreign institution.

A satisfactory score, as evaluated by the Civil Engineering Studies Committee or GRE

Test of English as a Foreign Language (TOEFL) minimum scores of 79 or 550 for Internet or paper versions

A statement of research/specialization interest and

A favorable recommendation by CE Graduate Studies Committee

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Term</th>
<th>Grade</th>
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<tbody>
<tr>
<td>A. Degree Core Curriculum (6 Semester Credit Hrs)</td>
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<tr>
<td>CE 5043</td>
<td>Advanced Civil Engineering Statistics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE STA 5303</td>
<td>Applied Statistics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE ES 5023</td>
<td>Environmental Statistics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE ES 5433</td>
<td>Numerical Methods in Civil Eng</td>
<td></td>
<td></td>
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<tr>
<td>B. Electives (21 Semester Credit Hrs):</td>
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<td></td>
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<tr>
<td>CE 5991</td>
<td>Graduate Seminar</td>
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</table>

4. Graduate Seminar

(1 semester credit hrs): Includes comprehensive examination.

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<tr>
<th>Term</th>
<th>Grade</th>
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</table>

Total hrs: 34
Expectations for Master Studies

First Semester, MS and MCE
- Identify an Advisor
- Identify Technical Track
  - Water Resources
  - Transportation
  - Geotechnical
  - Environmental
  - Structures
- Develop a Plan of Study

End of Second Semester MS
- Assemble A Thesis Committee

End of Second Year MS and MCE
- Graduate if Full-time

Civil Engineering PhD

Civil Engineering PhD Areas

- Structures
- Geotechnical
- Water Resources
- Transportation
Program Degree Requirements

60 credit hours beyond MS*

Oral or Written Qualifier
Taken by the end of the second semester

Oral Comprehensive
Taken within two semesters after written qualifier

Dissertation

Final Exam

* 15 additional credit hours for students with only a BS degree

Course Requirements

28 hrs Elective Courses

15 hrs Doctoral Research

2 hrs Graduate Seminar

60 credit hours beyond MS

15 hrs Doctoral Dissertation
Milestones PhD

1st Semester
- Identify an advisor
- Create plan of study

End of Year 1
- Take qualifying exam (oral or written)
- Assemble dissertation committee

End of Year 2
- Complete dissertation proposal
- Take comprehensive exam (oral)

End of Year 3
- Dissertation defense

Environmental Science and Engineering
Established 2007, Administered by CEE

ESE PhD Tracks

Environmental Science
Environmental Engineering
Civil Engineering
Program Degree Requirements

- **60 credit hours beyond MS***
- **Written Qualifier**
  - Taken by the end of the second semester
- **Oral Qualifier**
  - Taken within two semesters after written qualifier

**Dissertation**

**Final Exam**

* 15 additional credit hours for students with only a BS degree

Course Requirements

- **60 credit hours beyond MS**
- **18 hrs Elective Courses**
- **10 hrs Core Courses**
- **2 hrs Graduate Seminar**
- **15 hrs Doctoral Research**
- **15 hrs Doctoral Dissertation**
### Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>CE 5001</td>
<td>Process and Ethics in Thesis/Dissertation Research</td>
<td>1 hrs</td>
</tr>
<tr>
<td>CE 5043</td>
<td>Advanced Civil Engineering Statistics or ES 5023 Environmental Statistics</td>
<td>3 hrs</td>
</tr>
<tr>
<td>CE 5013</td>
<td>Civil Engineering Systems Analysis or ES 5233 Experimental Design and Analysis</td>
<td>3 hrs</td>
</tr>
<tr>
<td>CE 6113</td>
<td>Global Change</td>
<td>3 hrs</td>
</tr>
</tbody>
</table>

### PhD Program of Study

**Degree Core Curriculum: 10 hrs**
- CE 5001 Process and Ethics in Thesis/Dissertation Research Development
- One of the following: CE 5043 Advanced Civil Engineering Statistics or ES 5023 Environmental Statistics
- One of the following: CE 5013 Civil Engineering Systems Analysis or ES 5233 Experimental Design and Analysis
- One of the following: CE 6113 Global Change, ES 5043 Global Change, or GEO 5043 Global Change

**Track Electives (12 hrs)**
- Environmental Science
- Environmental Engineering
- Civil Engineering
PhD Program of Study (Cont’d)

Other Electives (6 hrs)
Seminar (2 hrs) – take it twice
Doctoral Research (15hrs) – can take after pass qualifying exam
Doctoral Dissertation (15hrs) – can take after passing oral qualifier
Total: 60hrs

Milestones PhD

1st Semester
• Identify an advisor
• Create plan of study

End of Year 1
• Take qualifying exam
• Assemble dissertation committee

End of Year 2
• Complete dissertation proposal
• Take qualifier

End of Year 3
• Dissertation defense
Written Qualifier

Offered in May of each year
No more than two attempts to pass the written qualifying examination are permitted

Structure
- **Part I:** Must be taken by all students and it will be two questions: one on ethics and one on the interface of engineering and science.
- **Part II:** Is separated into 3 tracks (Environmental Science, Environmental Engineering, and Civil Engineering) before getting the exam the students will decide which track they want to take. Each track has different topic areas that the questions for that track will be based on. They must complete 3 questions from the track they choose.

Written Qualifier (Cont’d)

- **Environmental Science**
  - Geology
  - Spatial Science (e.g. Remote sensing, GIS, etc.)
  - Ecosystems/Ecology
  - Environmental Chemistry
  - Statistics
Written Qualifier (Cont’d)

- **Environmental Engineering**
  - Environmental Engineering (e.g. Water & Wastewater treatment, air pollution, risk analysis, etc.)
  - Water Resources
  - Spatial Science (e.g. Remote sensing, GIS, etc.)
  - Environmental Chemistry
  - Statistics

Written Qualifier (Cont’d)

- **Civil Engineering**
  - Structural Engineering
  - Transportation Engineering
  - Geotechnical Engineering
  - Water Resources
  - Statistics
Oral Qualifier

Should be completed 2 semesters after qualifying exam

Must form your dissertation committee
- 5 members including the chair (advisor)
- At least 1 member must be from COS and COE

Dissertation proposal should describe the topic, the literature review, the proposed methodology and experimental approach, as well as highlight the novelty and potential contribution of the topic to the scientific field

No more than two attempts to pass the oral qualifying examination are permitted

Dissertation Defense

- Should be completed by 3 years after starting the program
- Format of the dissertation must follow the doctoral degree regulations of the Graduate School
- Must notify the Graduate School in writing two weeks prior to the final scheduled oral defense
- Final oral defense consists of a public presentation of the dissertation, followed by a closed oral defense
Publication; Where and How?

- **Conference presentations**
  - Local/regional conferences
  - National conferences

- **Peer reviewed journals**
  - Expect at least 1 publication for MS and 2 publications for PhD by graduation

Elective Courses in Structures

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CE 5033</td>
<td>Advanced Structural Analysis</td>
</tr>
<tr>
<td>CE 5053</td>
<td>Dynamics and Vibrations</td>
</tr>
<tr>
<td>CE 5103</td>
<td>Advanced Steel Design</td>
</tr>
<tr>
<td>CE 5123</td>
<td>Bridge Engineering</td>
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<tr>
<td>CE 5133</td>
<td>Non-Linear Finite Element Analysis</td>
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<tr>
<td>CE 5153</td>
<td>Prestressed Concrete</td>
</tr>
<tr>
<td>CE 5163</td>
<td>Design for Nuclear Facilities I</td>
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<tr>
<td>CE 5173</td>
<td>Design for Nuclear Facilities II</td>
</tr>
<tr>
<td>CE 5203</td>
<td>Experimental Stress Analysis</td>
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<tr>
<td>CE 5303</td>
<td>Design of Buildings for Lateral Loads</td>
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<tr>
<td>CE 5413</td>
<td>Elasticity</td>
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<tr>
<td>ME 5013</td>
<td>Non-Destructive Evaluation</td>
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<tr>
<td>ME 5413</td>
<td>Continuum Mechanics</td>
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<tr>
<td>ME 5543</td>
<td>Probabilistic Engineering Design</td>
</tr>
<tr>
<td>ME 5713</td>
<td>Mechanical Behavior of Materials</td>
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</tbody>
</table>
Elective Courses in Geotech

CE 5463 Foundation Engineering  
CE 5473 Advanced Soil Mechanics  
CE 5293 Geographic Information Systems  
CE 5403 Advanced Characterization of Highway Materials  
CE 5423 Advanced Pavement Analysis and Design  
CE 5483 Retaining Structures  
CE 5493 Slope Stability  
CE 6043 Non-Linear Finite Element Analysis  
CE 6103 Fate and Transport of Contaminants in the Environment  
CE 6343 Remediation Geotechnics  
CE 5643 Sustainable Energy Systems  
CE 6053 Earthquake Engineering  
ME 5413 Elasticity  
ME 5453 Advanced Strength of Materials  
ME 6043 Continuum Mechanics

Elective Courses in Transportation

CE 5293 Geographic Information Systems  
CE 6343 Transportation Planning  
CE 5063 Experimental Stress Analysis  
CE 5403 Advanced Characterization of Highway Materials  
CE 5413 Pavement Sustainability  
CE 5423 Advanced Pavement Analysis and Design  
CE 5443 Pavement Management  
CE 5463 Foundation Engineering  
CE 6043 Non-Linear Finite Element Analysis  
CE 6103 Fate and Transport of Contaminants in the Environment  
CE 6363 Bridge Management  
CE 5433 Advanced Geometric Design  
CE 5463 Transportation Engineering  
CE 6043 Continuum Mechanics  
CE 6303 Airport Engineering  
CE 6313 Traffic Theory  
CE 6323 Railway Engineering  
CE 6333 Highway Transportation Economics  
CE 6353 Signalized Intersections  
ME 5453 Advanced Strength of Materials  
ME 6043 Continuum Mechanics
### Elective Courses in Water Resources

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CE 5303</td>
<td>Hydrometeorology</td>
</tr>
<tr>
<td>CE 5293</td>
<td>Geographic Information Systems (GIS)</td>
</tr>
<tr>
<td>CE 5513</td>
<td>Water Resources Systems Analysis</td>
</tr>
<tr>
<td>CE 5213</td>
<td>Biological Phenomena in Environmental Engineering</td>
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<tr>
<td>CE 5503</td>
<td>Advanced Open Channel Hydraulics</td>
</tr>
<tr>
<td>CE 5523</td>
<td>Water Resources Planning and Management</td>
</tr>
<tr>
<td>CE 5533</td>
<td>Risk Analysis of Environmental Systems</td>
</tr>
<tr>
<td>CE 5543</td>
<td>Control of Floods and Droughts</td>
</tr>
<tr>
<td>CE 5613</td>
<td>Environmental Chemistry</td>
</tr>
<tr>
<td>CE 5623</td>
<td>Advanced Water Treatment</td>
</tr>
<tr>
<td>CE 5643</td>
<td>Sustainable Energy Systems</td>
</tr>
<tr>
<td>CE 5653</td>
<td>River Science</td>
</tr>
<tr>
<td>CE 5663</td>
<td>River Mechanics and Engineering Applications</td>
</tr>
<tr>
<td>GEO 5053</td>
<td>Remote Sensing</td>
</tr>
<tr>
<td>GEO 5083</td>
<td>Remote Sensing Image Processing and Analysis</td>
</tr>
<tr>
<td>GEO 5093</td>
<td>Remote Sensing in Hydrology</td>
</tr>
<tr>
<td>GEO 5483</td>
<td>Environmental Hydrogeology</td>
</tr>
<tr>
<td>GEO 5603</td>
<td>Physical Hydrogeology</td>
</tr>
<tr>
<td>GEO 5713</td>
<td>Groundwater Modeling</td>
</tr>
<tr>
<td>ME 5613</td>
<td>Advanced Fluid Mechanics</td>
</tr>
<tr>
<td>ME 5653</td>
<td>Computational Fluid Dynamics</td>
</tr>
</tbody>
</table>

### Objectives and Outcomes

**Student Outcomes**
- Specialized knowledge in technical areas related to Civil Engineering, Environmental Engineering, or Environmental Science
- Develop research skills
- Excellent oral and written skills.

**The objectives of the PhD program is to produce graduates who:**
- Are capable of conducting original research
- Can assume leadership roles in their chosen employment field.
DOCTORAL STUDENTS

We Seek Those

- Are committed and skilled in innovation and change
- Are sensitively competent to engage in diverse and complex environments
- Are enthusiastic, curious and passionate about their area of study
- Are dedicated and committed to their studies
**Dept Faculty**

**CEE Faculty**

*Alberto Arroyo* Professor  
Areas of Interest: Structures/forensic analysis.

*Sazzad Bin-Shafique* Professor  
Areas of Interest: Beneficial use of wastes and industrial by-products, solidification and stabilization of soil and waste, waste geotechnics, remediation geotechnics, leachability testing and groundwater & contaminant transport modeling.

*Samer Dessouky* Professor  
Areas of Interest: Asphalt pavement materials.
CEE Faculty (Cont’d)

Manuel Diaz Professor
Areas of Interest: Structures, nuclear plans, design, evaluation and management of bridges.

Wassim Ghannoum Associate Professor
Area of Interest: Infrastructure, concrete materials, earthquake engineering

Marcio Giacomoni Associate Professor
Area of Interest: Water resources systems analysis, Water resources management and planning, Application of Geographic Information Systems (GIS) and remote sensing to water resources and environmental engineering.

CEE Faculty (Cont’d)

Jie Huang Associate Professor
Areas of Interest: Geotechnical Engineering, Full scale instrumentation and numerical modeling.

Drew Johnson Professor
Areas of Interest: Research and development of novel membrane separation and transfer processes for air and water systems, research and development of biological, physical and chemical processes for water, wastewater and waste treatment, water

Vikram Kapoor Assistant Professor
Areas of Interest: environmental microbiology, biological remediation,
CEE Faculty (Cont’d)

Adolfo Matamoros Professor
Areas of Interest: Design and behavior of reinforced concrete members, Fatigue repair in structural steel bridges, Earthquake engineering

A.T. Papagiannakis Professor
Areas of Interest: Pavement-vehicle interaction, pavement traffic loading and micromechanical analysis of asphalt concretes.

Hatim Sharif Professor
Areas of Interest: Hydrologic analysis, modeling, and prediction, land-atmosphere interactions, remote sensing application in hydrometeorology, application of geographic information systems (GIS) in water resources, water quality and contaminant transport modeling.

CEE Faculty (Cont’d)

Amit Kumar Assistant Professor
Areas of Interest: Traffic engineering, autonomous vehicles

Arturo Montoya Associate Professor
Finite element modeling, corrosion, fatigue, fracture mechanics

Heather Shipley Professor
Areas of Interest: Fate, transport and reactivity of chemicals in natural systems/contaminant adsorption/desorption involving nanoparticles.

Jose Weissmann Professor
Areas of Interest: Transportation infrastructure management and pavement materials.
Important Resources

Masters Programs
http://engineering.utsa.edu/ce/programs/grad/index.html

PhD Program
http://engineering.utsa.edu/ce/programs/doctoral/

Important Resources (Cont’d)

International Office
http://international.utsa.edu/

Scholarships
http://engineering2.utsa.edu/graduate-studies/scholarships/

Writing Resources
Tomas Rivera Center (TRC) for Student Success
The Writing Center
The Teaching & Learning Center (TLC)
Contacts:

Program Coordinator: Ruben Arciniega
- x7069
- Ruben.Arciniega@utsa.edu

Masters and Doctoral Program GAR
- x7851
- Adolfo.Matamoros@utsa.edu

Administrative Manager: Marivel Guerrero
- x7517
- Marivel.Guerrero@utsa.edu

Dept. Chair: Manuel Diaz, Ph.D.
- x7517
- Manuel.Diaz@utsa.edu

Questions?