CIVIL ENGINEERING, MS

The department offers programs leading to the Master of Science in civil engineering, Master of Science in engineering (environmental engineering) and Doctor of Philosophy degrees in civil engineering. Research programs in the department include environmental quality and water resources; management and safety of transportation systems; structural engineering including assessment, renewal, and protection of infrastructure; and construction engineering and management. Laboratory facilities are provided for graduate research and instruction in these and other areas.

Admissions

In addition to the minimum Graduate School admission requirements, to be considered for regular admission, an applicant should have enrolled in a baccalaureate degree from an institution accredited by the Engineering Accreditation Council (EAC) of ABET Inc. Applications from a non-EAC/ABET-accredited program will also be considered. The requirements for regular admission include

- enrolled in a Bachelor’s degree in civil, construction, environmental engineering, or related fields at the time of application. A completed bachelor's degree is required prior to enrollment in the graduate program.
- A combined verbal and quantitative GRE requirement of 300 or greater (see below for exceptions). Applicants with three or more years of field-related post-Bachelor's work experience may inquire about a GRE waiver request by contacting the Graduate Program Director after submitting a complete application with a detailed resume. There is no minimum score on the writing section of the GRE for admission to the MS Program.
- A current Resume.
- A concise Statement of Purpose. This short document should describe the reasons for pursuing an advanced degree as well as possible research interests.
- Three letters from recommenders. These recommenders may be previous faculty or supervisors.
- A TOEFL/IELTS/DUOLINGO/PTE score for non-native English speakers who are required to submit an English Language test score (as per graduate school requirements)

See the Admission Criteria section of this catalog for more information.

Curricular Requirements

The Master of Science in Civil Engineering (MCV) program is offered with both a thesis option (Plan I) as well as a non-thesis option (Plan II). The designation of the selected program is not required or expected at the time of application. All MCV students on teaching or research assistantships in the department are generally expected to pursue the thesis degree option. However, the Plan-II option is also allowed for students on teaching or research assistantships. All students must complete a total of 30 credit hours to meet the MCV requirements.

Master of Science—Thesis Option (Plan I): 30 Credit Hours

Candidates for the master’s degree under Plan I must earn a minimum of 24 semester hours of credit in coursework and write a thesis (a minimum of six semester hours of thesis research, CE 599, is required).

- A minimum of 24 credit hours of coursework is required. The student is required to have a minimum of 15 credit hours of CE-prefixed courses.
- A minimum of 6 credit hours of thesis research (CE 599) is required.
- The graduate advisory committee may require additional prerequisite courses for those students without an ABET or EAC-accredited degree.
- A student’s thesis must be approved by the student’s graduate advisory committee. The student must pass a final comprehensive examination, which is typically a presentation and defense of the thesis. A student is given a maximum of two attempts to defend their thesis successfully. In addition, the student must satisfy all university requirements defined in the current edition of the University of Alabama Graduate Catalog.

All graduate students in civil engineering are required to take "core courses" based on the student's area of study interest. All M.S. students are required to take a total of nine credits of core courses, including six credits of area-specific core classes and three credits of data science classes.

Code and Title

<table>
<thead>
<tr>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Coursework (6 credits of area specific coursework + 3 credits of Data Science coursework)</td>
</tr>
<tr>
<td>The students must take 6 credits of area specific classes from the courses listed for specific program areas and must take 3 credits of Data Science from the Data Science Course list provided.</td>
</tr>
<tr>
<td>Area Specific Core Coursework (6 credits required)</td>
</tr>
<tr>
<td>Architectural Engineering</td>
</tr>
<tr>
<td>CE 566 Sustainable &amp; Lean Constr.</td>
</tr>
<tr>
<td>ME 516 Fnd Energy Conserv &amp; Mgt</td>
</tr>
<tr>
<td>ME 542 Multiscale Material Design</td>
</tr>
<tr>
<td>ME 575 Control Systems Analysis</td>
</tr>
<tr>
<td>Construction Engineering and Management</td>
</tr>
<tr>
<td>CE 567 Constr. Accounting &amp; Finance</td>
</tr>
<tr>
<td>CE 568 Construction Scheduling</td>
</tr>
<tr>
<td>Environmental Engineering (Water Quality)</td>
</tr>
<tr>
<td>CE 521 Environ Eng Microbiology</td>
</tr>
<tr>
<td>CE 522 Solid Hazardous Waste Management</td>
</tr>
<tr>
<td>CE 524 Water &amp; Wastewater Treatment</td>
</tr>
<tr>
<td>CE 526 Groundwater Mechanics</td>
</tr>
<tr>
<td>CE 575 Hydrology</td>
</tr>
<tr>
<td>Structural Engineering and Materials</td>
</tr>
<tr>
<td>CE 531 Structural Dynamics</td>
</tr>
<tr>
<td>CE 534 Advanced Structural Mechanics</td>
</tr>
<tr>
<td>Transportation Systems Engineering</td>
</tr>
<tr>
<td>CE 553 Intelligent Transportation Sys</td>
</tr>
<tr>
<td>CE 554 Urban Transportation Planning</td>
</tr>
<tr>
<td>CE 555 Traffic Flow Theory</td>
</tr>
<tr>
<td>CE 558 Traffic Engineering</td>
</tr>
<tr>
<td>Water Resources Engineering (Water Quantity)</td>
</tr>
<tr>
<td>CE 526 Groundwater Mechanics</td>
</tr>
<tr>
<td>CE 570 Open Channel Flow</td>
</tr>
</tbody>
</table>
CE 574  Paleohydrology
CE 575  Hydrology
CE 576  Process Hydrology

Data Science Coursework (3 credits required)  3
CE 573  Statistical Applications
CE 515  Transportation Data Science
CE 586  GIS for Civil Engineers
PH 551  Machine Learning
GY 518  Spatial and Geostats
ST 560  Statistical Methods

Elective Coursework  15
These are commonly taken elective courses. More elective options are available and can be taken with consultation/approval of the faculty advisor.

Construction Engineering and Management
CE 514  Information Systems Design
CE 517  Advanced Project Management
CE 518  Engineering Managment
CE 561  Horizontal Construction Method
CE 563  Construction Cost Estimating
CE 564  Safety Engineering
CE 581  Legal Asp. of Eng and Const.
CE 562  Vertical Construction Methods

Structural Engineering and Materials
CE 530  NDT of Structures
CE 532  Matrix Analysis of Structures
CE 535  Concrete Materials
CE 536  Wood Structural Design
CE 537  Reinforced Concrete Struct II
CE 538  Struct Steel Design II
CE 543  Prestressed Concrete Design
CE 544  Foundation Engineering
CE 591  Special Problems
CE 632  Structural Reliability

Environmental and Water Resources
CE 522  Solid Hazardous Waste Managmnt
CE 525  Air Pollution
CE 526  Groundwater Mechanics
CE 529  EWR Proposal Writing
CE 576  Process Hydrology
CE 585  Constructn Site Erosion Contr

Transportation Systems Engineering
CE 551  Roadway/Intersection Design
CE 552  Traffic Safety and Security
CE 553  Intelligent Transportation Sys
CE 554  Urban Transportation Planning
CE 555  Traffic Flow Theory
CE 558  Traffic Engineering

Thesis Research Requirements  6
CE 599  Thesis Research

Total Hours  30

- Only 400-level courses without 500-level counterparts are allowed and must be approved prior to taking the class. A maximum of 6 hours of approved 400-level courses can be used for coursework requirements. Students should complete Graduate School's "Approval of a 400-Level Course for Master's Credit" form.
- Students are responsible for all forms and must route all forms through the department prior to submission to UA's Graduate School.

Master of Science-Non-Thesis Option (Plan II): 30 Credit hours
Candidates for the master's degree under Plan II must earn a minimum of 30 credit hours of credit, including 27 credits of approved coursework, and complete a 3-credit class (CE 501) for the culminating experience.

- A minimum of 27 credit hours of approved coursework, including a minimum of 18 hours of CE-prefix classes.
- Students are required to take a total of nine credits of core courses, including six credits of area-specific core classes and three credits of data science classes.
- must complete a 3-credit-hour MS Capstone Project Plan-II course (CE 501).
- Culminating Experience or Capstone (CE 501): This must be taken during the graduating semester. This requires the student to develop a research paper, a policy and practice paper, or an equivalent culminating experience which is graded by the student's graduate advisor. This is taken with permission under the direction of the student's graduate advisor. The graduate advisor must be a full member of the department's graduate faculty.
- Only 400-level courses without 500-level counterparts are allowed and must be approved prior to taking the class. A maximum of 6 hours of approved 400-level courses can be used for coursework requirements. Students should complete the Graduate School's "Approval of a 400-Level Course for Master's Credit" form.

Code and Title      Hours

Core Coursework (6 credits of area specific coursework + 3 credits of Data Science coursework)
The students must take 6 credits of area specific classes from the courses listed for specific program areas and must take 3 credits of Data Science from the Data Science Course list provided.

Area Specific Core Coursework  6

Architectural Engineering
CE 566  Sustainable & Lean Constr.
ME 516  Fnd Energy Conserv & Mgt
ME 542  Multiscale Material Design
ME 575  Control Systems Analysis

Construction Engineering and Management
CE 567  Constr. Accounting & Finance
CE 568  Construction Scheduling

Environmental Engineering (Water Quality)
CE 521  Environ Eng Microbiology
CE 522  Solid Hazardous Waste Managmnt
CE 524  Water & Wastewater Treatment
CE 526  Groundwater Mechanics
CE 575  Hydrology

Structural Engineering and Materials
CE 531  Structural Dynamics
### Civil Engineering, MS

#### Transportation Systems Engineering
- CE 552: Traffic Safety and Security
- CE 553: Intelligent Transportation Systems
- CE 554: Urban Transportation Planning
- CE 555: Traffic Flow Theory
- CE 558: Traffic Engineering

#### Water Resources Engineering (Water Quantity)
- CE 526: Groundwater Mechanics
- CE 570: Open Channel Flow
- CE 574: Paleohydrology
- CE 575: Hydrology
- CE 576: Process Hydrology

#### Data Science Coursework (3 credits required)
- CE 573: Statistical Applications
- CE 515: Transportation Data Science
- CE 586: GIS for Civil Engineers
- PH 551: Machine Learning
- GY 518: Spatial and Geostats
- ST 560: Statistical Methods

#### Elective Coursework
- CE 573: Statistical Applications
- CE 515: Transportation Data Science
- CE 586: GIS for Civil Engineers
- PH 551: Machine Learning
- GY 518: Spatial and Geostats
- ST 560: Statistical Methods

These are commonly taken elective courses. More elective options are available and can be taken with consultation/approval of the faculty advisor.

#### Structural Engineering and Materials
- CE 530: NDT of Structures
- CE 532: Matrix Analysis of Structures
- CE 535: Concrete Materials
- CE 536: Wood Structural Design
- CE 537: Reinforced Concrete Structural II
- CE 538: Steel Structural Design II
- CE 543: Prestressed Concrete Design
- CE 544: Foundation Engineering
- CE 591: Special Problems
- CE 632: Structural Reliability

#### Environmental and Water Resources
- CE 522: Solid Hazardous Waste Management
- CE 525: Air Pollution
- CE 526: Groundwater Mechanics
- CE 529: EWR Proposal Writing
- CE 576: Process Hydrology
- CE 585: Construction Site Erosion Control

#### Transportation Systems Engineering
- CE 551: Roadway/Intersection Design

---

See the Master’s Degrees Graduate School Requirements section of this catalog for additional information.

### Transfer Credit

12 hours maximum of approved transfer credit. Additional information on Transfer Credit.

### Accelerated Master’s Program

AMP (BS/MS) information on the Accelerated Master’s Program.

### Time Limits for Degree Completion Requirements

Maximum of 6 years to complete all degree requirements. Graduate School information on Time Limits.

### Student Progress Requirement

Graduate School information on Student Progress.

### Academic Misconduct Information

Graduate School information on Academic Misconduct.

### Withdrawals and Leave of Absence Information

Graduate School information on Withdrawals and Leave of Absence.

### Academic Grievances Information

Graduate School information on Academic Grievances.

### Grades and Academic Standing

Graduate School information on Grades and Academic Standing.

### Graduate School Deadlines Information

Graduate School information on Graduate School Deadlines.

### Application for Graduation Information

Application for Graduation.