

CIVIL ENGINEERING, PH.D.

During the pursuit of a Doctor of Philosophy (PhD) degree in civil engineering, students engage in a multifaceted academic journey. They enroll in graduate-level courses, actively participate in research under the guidance of a faculty advisor, develop instructional skills and competencies, and witness how these endeavors contribute to significant engineering innovations and their societal impacts within the civil engineering field. The Civil, Construction, and Environmental Engineering (CCEE) Department, equipped with cutting-edge computational and experimental resources, conducts dynamic research programs across various disciplinary groups, including Architectural Engineering, Construction Engineering and Management, Structural Engineering and Materials, Environmental (water quality), Water Resources (water quantity), and Transportation Systems Engineering. Faculty members not only instruct graduate-level courses but also engage in research activities within these specialized areas. The comprehensive range of graduate courses, spanning these domains and supplemented by core graduate coursework, lays the foundation for attaining a PhD in civil engineering.

Furthermore, students pursuing this degree must demonstrate their expertise in their chosen field of study through qualifying exams, the presentation of a research proposal, and the successful defense of a research-oriented dissertation.

Additionally, qualified undergraduate students enrolled in the department's programs at the University of Alabama have the opportunity to pursue early admission into the PhD program via the Accelerated Masters Program (AMP). This unique program permits students to concurrently count up to 9 hours of graduate credit toward their undergraduate degree, facilitating a seamless transition into advanced studies at the PhD level.

Admissions

To be eligible for regular admission, beyond meeting the basic admission criteria set by the Graduate School, an applicant should have enrolled in or earned a baccalaureate degree from an institution accredited by the Engineering Accreditation Council (EAC) of ABET Inc. However, applications from individuals who have enrolled in or graduated from programs not accredited by EAC/ABET will also be considered.

Regular Admission Requirements

For regular admission to the graduate program in the Civil, Construction, and Environmental Department, by the time of enrollment, prospective graduate students should have:

- Bachelor's degree or Master's degree in civil, construction, environmental engineering, or a related field from an ABET-accredited program. Applications from graduates of a non-EAC/ABET-accredited program will be considered.
- Grade point average of at least 3.0 on a 4.0 scale
- We normally require a combined verbal and quantitative GRE requirement of 300 or greater. There is no minimum score on the writing section of the GRE for admission to the Ph.D. program.
- The GRE is not required for applicants who are already in the University of Alabama graduate program.
- Applicants, who at the time of enrollment will have a Master's degree in Civil, Construction, or Environmental Engineering or closely related fields and two or more years of field-related work experience may inquire about a GRE waiver request by contacting the Graduate Program Director **after** the application and detailed resume are submitted. Applicants are encouraged to include "GRE Waiver

Request" in the subject line and provide application information (application number, date of application, etc.) and a detailed resume when contacting the program director.

- Applicants with a Bachelor's degree in Civil, Construction, or Environmental Engineering and four or more years of post-BS field-related work experience may inquire about a GRE waiver request by contacting the Graduate Program Director **after** the application and detailed resume are submitted. Applicants are encouraged to include "GRE Waiver Request" in the subject line and provide application information (application number, date of application, etc.) and a detailed resume when contacting the program director.
- A short Statement of Purpose describing possible research or study interests
- Resume/CV
- Two to three letters of recommendation.

Admission with Permission to Continue

Admission with Permission to Continue may be granted to applicants who do not meet these requirements, for example, those who have degrees in related fields or a GPA below 3.0.

Please see the Graduate School website for more details.

Admission Requirements for Applicants Without a Civil, Construction, Environmental, or Construction-Related Degree

Applicants without a civil, construction, environmental engineering, or related field bachelor's or master's degree may be admitted. However, such students will be required to complete a few basic civil engineering courses, which will be decided by the graduate program director with input from the faculty advisor and faculty members in the student's specific area of interest. Successful completion requires a "B" or better in each course.

Application Deadlines

There are no formal deadlines for graduate applications. Once an application is complete, the internal review process typically takes a few weeks. However, **international applicants** should consider the time required to obtain any necessary visa documents.

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

Curricular Requirements

A total of 54 hours is required for the degree, including a minimum of 36 hours of coursework with a letter grade beyond the baccalaureate and 18 hours of dissertation research (CE 699). Students must be Ph.D. candidate (after successfully completing the preliminary exam; see below) before they can register for CE 699. Any UA coursework with Pass/Fail as an outcome cannot be used towards the 36-hour coursework requirement. Up to 18 hours of transfer credit may be permitted, subject to approval by both the department and the Graduate School. This approval is sought through the 'Request for Transfer of Graduate Credit' form. The Request for Transfer of Graduate Credit form must be initiated by the student.

Students need to contact the department office for the submission of the plan of study (POS) and candidacy forms.

Core Course Requirements

All graduate students are required to meet Core Course requirements. The department requires three "core" graduate courses. The three core

courses are comprised of two required area-specific courses plus one Data Science elective course.

Code and Title	Hours
Core Coursework (6 credits of area specific coursework + 3 credits of Data Science coursework)	
Students must take 6 credits of area specific courses 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	
CE 534 Advanced Structural Mechanics	
Transportation Systems Engineering	
CE 553 Intelligent Transportation Sys	
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	
CE 573 Statistical Applications	
CE 515 Transportation Data Science	
CE 586 GIS for Civil Engineers	
CE 673 Statistics & Econometrics	
PH 551 Machine Learning	
GY 518 Spatial and Geostats	
ST 560 Statistical Methods	
Elective Coursework 27	
Following 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 Mangement	

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 631	Exper. Mthds in Struc Dynamics
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 Contrl
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
CE 655	Sustainable Transportation
Dissertation Requirements 18	
CE 699	Dissertation Research
Total Hours	54

Transfer Credit

Graduate School information on Transfer Credit.

Doctoral Plan of Study Requirement

The student's adviser and supervisory committee will work with the student to define an appropriate plan of study that meets all degree requirements, including any prerequisite or preparatory work and a core set of courses as required and specified by each specialty area. After approval by the department, the PhD Plan of Study is submitted to the Graduate School for final approval. All doctoral students must have a completed Plan of Study approved by the Graduate School no later than the semester during which the student will complete 30 semester hours of UA and/or transfer credit for the doctoral degree. Otherwise, a "hold" may be placed on future registration.

Additional Graduate School information on the Doctoral Plan of Study.

Comprehensive Examinations

Doctoral Qualifying Exam

Once a student has completed sufficient coursework (at least all three required core courses), the student is expected to take the doctoral qualifying ("qualifier") exam as a first evaluation stage in the doctoral program. Students are required to pass a qualifying examination that may include both written and oral components. The nature of the qualifying exam will be area-specific, and students should contact their advisor for details. The qualifying exam in each area is administered by a faculty committee composed of at least three faculty members. There are two different possible outcomes from the qualifier exam:

- a) **Pass:** Students can continue their progress toward a PhD. Students may be asked to take extra coursework based on the deficiencies identified by the committee.
- b) **Fail:** The student may be given one more chance to successfully complete the qualifying exam at a later date. Financial support beyond this point should not be expected by the student. If the student fails to pass the exam on the second attempt, they may not continue as a doctoral student. The student is expected to work with the advisor to make a plan to finish any ongoing projects. The student will still have the option to complete an M.S. degree if desired.

Ph.D. Candidacy Exam (Preliminary Exam)

The student should plan to give their Ph.D. candidacy exam (1) roughly a year after passing the Ph.D. qualifier exam and (2) after completing at least 30 hours of coursework (including transfer credits). The student should present a research proposal to his or her dissertation committee to provide details of their research topic, an update on research progress, along with a summary of completed course work, presentations, publications, etc. The students are encouraged to provide a written document along with the presentation to the dissertation committee. A detailed research plan for future work must also be included.

- A pass/fail grade will be given. A student who fails the candidacy exam will be provided with written feedback on areas for improvement, and the student will have only one additional attempt to pass, which must be attempted during the following semester. A student that ultimately does not pass the exam will not be able to continue in the Ph.D. program, but the student will still have the option to complete an M.S. degree if desired.

Graduate School Information on Candidacy and Qualifying Examinations.

Admission to Candidacy Requirements

After passing the examinations (Qualifying Exam and Ph.D. Candidacy Exam), the student should complete and submit an Admission to Candidacy for the Doctoral Degree to the department for approval. A department-approved candidacy form will be forwarded to the Graduate School for final approval.

Continuous Enrollment Policy

Graduate School information on the Continuous Enrollment Policy.

Dissertation Requirements

Graduate School information on Dissertations.

Time Limits for Degree Completion 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 Deadline Information

Graduate School information on Graduate School Deadlines.

Application for Graduation Information

Graduate School information on the Application for Graduation.

Financial Support

Normally, Ph.D. students are considered for fellowships or other forms of financial support within the Department of Civil, Construction, and Environmental Engineering. Financial support for graduate students may include teaching assistantships, research assistantships, scholarships, or combinations of these sources. Once a student is admitted into the Ph.D. program, the stipend level is specified, but the source of the financial support may vary during the course of study. As the source of student support may vary from semester to semester, the obligations of the student may also vary. These obligations will normally be communicated to the student at the beginning of the semester, but there may be some variance over the course of the semester.

Continuation of Financial Support

If the faculty advisor judges that the student's research or academic performance is insufficient during a given semester, the faculty member will provide a written warning that funding may be terminated at the end of the semester. If the student is unable to improve performance by the end of the semester, the faculty member (after approval from the department head confirming that adequate warning was provided to the student) may terminate the student's funding. If a faculty advisor terminates funding for a graduate student, there is no obligation on the department to provide any additional funding to the student. Alternately, if a student is not able to pass one of his or her mandatory exams (Ph.D. Qualifier Exam, Annual Review, Candidacy Exam, or Preliminary Exam), the faculty advisor and/or department are under no obligation to continue funding the student in any future semester. If the GPA of a student in a single semester falls below 3.0, the advisor and/or department are under no obligation to continue funding the student in any future semester.

In unusual circumstances, the financial support of a student may be terminated before the end of the semester, but this will only occur if the faculty advisor, department head, and dean of engineering support this decision.