

Graduate Student Handbook



Master of Science in Civil Engineering • Master of Science in Environmental Engineering
Doctor of Philosophy in Civil Engineering

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Graduate Degrees Offered

The University of Alabama's Department of Civil, Construction, and Environmental Engineering offers the following graduate degrees and options:

- Master of Science in Civil Engineering (MSCivE)
 - Research Thesis Option (Plan I)
 - Paper/Report Option (Plan II)
- Master of Science in Environmental Engineering (MSEnvE)
 - Research Thesis Option (Plan I)
 - Paper/Report Option (Plan II)
- Doctor of Philosophy in Civil Engineering (PhD)

In addition, the department offers the following dual degree programs:

- University Scholars Program (dual BS/MS for UA undergraduates only)
- Master of Science in Civil Engineering (MSCivE) and Masters of Business Administration (MBA)
- Master of Science in Civil Engineering (MSCivE) and Juris Doctor (JD)
- Dual MSCivE/PhD and MSEnvE/PhD

Admission Requirements

Regular Admission – An applicant is eligible for regular admission who meets the following criteria: (1) a grade point average, based on a 4.0 scale, of 3.0 overall, for the last 60 semester hours in a degree program, or for a completed graduate degree program; and (2) an acceptable score on the Graduate Record Exam (300 on the revised GRE or 1000 on the GRE general test). International graduate applicants must also submit an acceptable score on one of the TOEFL (550 pBT or 79 iBT), IELTS (6.5) or PTE (59).

Conditional Admission – An applicant may be considered for conditional admission if he or she meets either the GPA requirement ($GPA \geq 3.0$) or the GRE requirement (a score ≥ 300 on the revised GRE or ≥ 1000 on the GRE general test), but not both. A member of the graduate faculty in the department must also write a letter recommending admission of the student.

Applicants Without an Undergraduate Engineering Degree – Applications will be accepted from students who do not have an undergraduate degree in engineering. The student may be required to take prerequisite coursework based on their academic background and area of intended study. Typically, a student without an undergraduate degree in engineering will need to have or will be required to successfully complete mathematics through differential equations and two of the following courses, including all prerequisites: CE 320 Introduction to Environmental Engineering, CE 331 Introduction to Structural Engineering, CE 340 Geotechnical Engineering, CE 350 Introduction to Transportation, CE 366 Introduction to Construction Engineering, and CE 378 Water Resources Engineering. The student's graduate advisor may require other prerequisite courses.

Navy Civil Engineering Corps Graduate Program – The GRE is not required for applicants from the Navy Civil Engineering Corps (CEC) Graduate Program if the applicant has a bachelors degree in engineering from an ABET/EAC-accredited program with a GPA of at least 3.0.

University Scholars Program – The GRE requirement is waived for applicants participating in the University Scholars Program. While the exam requirement is waived, students are strongly encouraged to take the GRE so that they may be considered for departmental financial support.

Dual Degree Programs with Business and Law – Students must apply separately and be admitted to both graduate programs (that is, to both the MSCivE and MBA or both the MSCivE and JD). The GMAT is required admission test for the MBA, and the LSAT is required for the JD. The GMAT or LSAT is accepted in lieu of the GRE for students applying for the dual MSCivE/MBA or MSCivE/JD program, respectively.

Graduate Advisor

Regardless of which degree a student is seeking, each student must have a graduate advisor who helps guide the student throughout his or her program of study. The graduate advisor must be a full member of the graduate faculty in the department. The graduate advisor also serves as the chair of the supervisory committee for the MSCivE and MSEnvE research thesis options and for the PhD. Co-graduate advisors are allowed, but both must be full members of the graduate faculty in the department.

The selection of a graduate advisor is based on the student's planned area of study and is done in agreement with both the graduate advisor and student. If a faculty member is funding a student off contracts or grants, that faculty member will typically serve as the student's graduate advisor. Often times, the student's graduate advisor is identified at the time of admission; if not, then a temporary advisor is assigned. When a temporary graduate advisor is assigned, a permanent graduate advisor must be identified during a master student's first semester or a doctoral student's first year.

Master of Science Degree Requirements

The department offers two masters degrees, the MSCivE and MSEnvE. Both require a minimum of 30 semester hours of approved coursework and both include two options: Research Thesis (Plan I) and Paper/Report (Plan II).

Research Thesis Versus Paper/Report – A master's research thesis and a master's paper/report are very different things, but there are also some commonalities. While they both involve considerable writing effort and a lot of research, the scope and emphasis differ significantly. With a research thesis, students commit a significant amount of time and effort over multiple semesters to conduct and report original research. With a paper or report, the emphasis may or may not be traditional research (e.g., design projects or policy and practice papers are acceptable), and the scope of the work is more focused. The difference in scope (or expected effort) is reflected in the credit hours associated with a research thesis (6 credit hours) versus a paper/report (3 credit hours). Students should consult with their graduate advisor about which option best supports their career objectives.

Research Thesis Option (Plan I) – The thesis option is a research-focused program, which includes conducting original research, writing a research thesis, and defending the thesis to the student's graduate supervisory committee. The research thesis option degree requirements are as follows:

- A minimum of 30 credit hours, including
 - 21 credit hours of approved coursework, including
 - 9 credit hours of core graduate coursework
(See later section for additional information regarding the graduate core)
 - A maximum of 6 hours of approved 400-level courses
(Use Graduate School's "Approval of 400-Level Cours for Master's Credit" form)
 - A minimum of 15 hours of CE-prefix courses
(See Appendix I for a schedule for all CE-prefix courses offered by the department)
 - 3 hours of CE 593 or CE 693 Practicum
 - Taken with permission under the supervision of the student's graduate advisor
(See later section for additional information regarding Practicum)
 - 6 hours of CE 599 Thesis Research
 - Taken with permission under the supervision of the student's graduate advisor
 - The graduate advisor must be a full member of the department's graduate faculty
 - Once taken, CE 599 must be taken every term until graduation
- Completion of thesis, approved by a supervisory committee (as part of CE 599 Thesis Research)
 - A thesis evidencing research capacity, independent thought, and the ability to interpret materials is required of all master's degree candidates
 - The format of the thesis must meet the requirements of the graduate school and be approved by the student's supervisory committee
 - A "journal-format thesis" is allowed by the Graduate School and would follow the format of a particular journal in which the student and advisor want the thesis to be published

- Final oral defense of the thesis
 - The Thesis Defense is open and, at the discretion of the advisor, may be advertised (See Appendix V for information on advertising and conduct of the defense)
 - All members of the supervisory committee are required to participate in real time; virtual attendance video or teleconference is only permitted for off-campus committee members
 - A student may attempt the final defense only twice
 - All members of the supervisory committee are required to complete an assessment of the student's attainment of the program's student learning outcomes; other faculty and students attending the final defense may also complete the assessment form (see Appendix II)
- The supervisory committee, chaired by the student's graduate advisor, must consist of at least three members of the graduate faculty, including student's graduate advisor and at least one graduate faculty member from outside the department; the majority of the supervisory committee must be full members of the graduate faculty from the department

Paper/Report Option (Plan II) – The paper/report (a.k.a., non-thesis) option requires a research paper, a policy and practice paper, or equivalent culminating experience, which is graded by the student's graduate advisor. The paper/report option requirements are as follows:

- A minimum of 30 credit hours, including
 - 27 credit hours of approved coursework
 - 9 credit hours of core graduate coursework (See later section for additional information regarding the graduate core)
 - A maximum of 6 hours of approved 400-level courses (Use Graduate School's "Approval of 400-Level Course for Master's Credit" form)
 - A maximum of 3 hours of CE 593 or CE 693 Practicum (See later section for additional information regarding Practicum)
 - A minimum of 18 hours of CE-prefix courses (See Appendix I for a schedule for all CE-prefix courses offered by the department)
 - 3 credit hours of CE 501 Masters Capstone Project – Plan II
 - 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
 - Requires completion a research paper, a policy and practice paper, or equivalent report with the topic, scope, and format preapproved by the student's advisor
 - Must be taken the semester the student plans to graduate
- Completion of an approved research paper, policy and practice paper, or equivalent report (as part of CE 501 Masters Capstone Project – Plan II)
- The graduate advisor grades the paper/report and records the grade for CE 501
 - The graduate advisor is required to complete an assessment of the student's attainment of the program's student learning outcomes; other faculty and students who may read the paper/report may also complete the assessment form (see Appendix II)
- A supervisory committee is not required for the paper/report option

Transfer of Credit – With the approval of the department and the dean of the Graduate School, 12 credit hours of acceptable coursework may be transferred from another institution.

Time Limit – All credit toward the master's degree, including transfer credit, must have been earned during the six years immediately preceding the date on which the master's degree is to be awarded.

Degree Checklist – A checklist, which includes the necessary and required steps to assure appropriate progress towards degree, is provided in Appendix III.

Grade Point Average Requirements – Each student must have an overall graduate grade point average (GPA) of 3.0 or better for all graduate courses undertaken at The University of Alabama. **Grades below "C" are counted in computing scholastic averages, but they do not carry credit toward a degree.**

Special Requirements for the University Scholars Program (Dual BS/MS) – The University Scholars Program is designed specifically for highly motivated and qualified undergraduates who wish to pursue a masters degree. Any undergraduate student pursuing a degree offered by the department (BSCivE, BSConE, BSArchE, or BSEnvE) with at least a 3.3 overall GPA is eligible for the University Scholars

Program. Students must apply and be admitted to the Graduate School during their junior year. Once accepted, students then may take up to 9 credit hours of approved graduate level coursework that will count towards both their BS and MS degrees. Interested students should consult with a faculty member or the department's graduate program assistance. Students may apply for either the MSCivE or MSEnvE as part of the University Scholars Program.

Special Requirements for the Dual MSCivE/MBA Program – The dual MSCivE/MBA (Master of Business Administration) program is offered in collaboration with the Culverhouse College of Commerce. It allows students to double count 6 credit hours of approved graduate civil engineering coursework from the MSCivE towards the MBA and 12 credit hours of approved graduate business coursework from the MBA towards the MSCivE. The student's graduate advisors from each program will determine which courses double count as part of the dual program, noting that ST 509 Statistics for Business is permitted in lieu of CE 573 Statistical Applications in Civil Engineering, which is a required course for all department graduate programs (see later section on Core Graduate Course Requirements).

Special Requirements for the Dual MSCivE/JD Program –The dual MSCivE/JD (Juris Doctor) program is offered collaboratively with the Law School. It allows students to double count 12 credit hours of approved graduate civil engineering coursework from the MSCivE towards the JD and 12 credit hours of approved law coursework from the JD towards the MSCivE. The student's graduate advisors from each program will determine which courses double count as part of the dual program; a listing of pre-approved courses that may double count is provided in Appendix IV.

Special Requirements for the Dual MSCivE/PhD and MSEnvE/PhD Programs – The dual MS/PhD programs are designed for students who do not have an earned MS degree in civil engineering or environmental engineering and who wish to pursue the PhD. The degree requirements for the doctorate include most of the degree requirements of the masters; all graded coursework from the MS program may apply towards the PhD. Students will apply for and be admitted into the PhD program and earn the MS along the way. Typically, students will do the masters paper/report option (Plan II) in this program, but the research thesis option (Plan I) is an option.

Doctor of Philosophy Degree Requirements

The Doctor of Philosophy (PhD) is a research-focused degree program and is granted on the basis of scholarly competence, distinctive achievement in a specialty field, and proven capacity for independent and original research investigation. The first two criteria are evaluated through coursework and examination. The third criterion is met through a doctoral dissertation in which the student must present clearly and effectively the results of substantial research. A combination of these accomplishments, rather than the mere accumulation of residence and course credits, is the essential consideration in awarding the PhD degree.

Field of Specialization – A defined field of specialization is required of all candidates for the doctor of philosophy degree. The Graduate School requires a minimum of 48 credit hours of non-dissertation coursework. The doctoral coursework as a whole must be unified and all its parts must contribute to an organized plan of study and research. Students must work with their graduate advisor and supervisory committee to develop a coherent plan of study that supports a defined field of specialization and dissertation research.

Plan of Study – A plan of study must be developed, submitted, and approved by the supervisory committee before 30 credit hours, including transfer credit, are completed towards degree. The requirements for the doctoral plan of study are as follows:

- A minimum of 72 credit hours, including
 - 45 credit hours of approved coursework
 - May include applicable coursework taken as part of a masters degree
 - 9 credit hours of core graduate coursework
(See later section for additional information regarding the graduate core)
 - 400-level courses are not permitted in a PhD plan of study
 - See Appendix I for a schedule for all CE-prefix courses offered by the department

- 3 credit hours of CE 593 or CE 693 Practicum
 - Taken with permission under the direction of the student's graduate advisor (See later section for additional information regarding Practicum)
- 24 credit hours of CE 699 Dissertation Research
 - 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
 - Once taken, CE 699 must be taken every term until graduation

Supervisory Committee – A supervisory committee will provide oversight and be responsible for confirming that the plan of study supports the student's field of specialization and ensuring that the scope, quality, and rigor of the research is appropriate for the dissertation. The composition of the supervisory committee is as follows:

- The student's graduate advisor, or research advisor, must be full graduate faculty member from the department and will serve as the chair of the supervisory committee
- The supervisory committee must consist of a minimum of five members of the university's graduate faculty, including the committee chair (graduate advisor)
- The majority of the committee must be full graduate faculty from the department with at least one full graduate faculty member from outside the department

Doctoral Examinations – The department requires successful completion of three examinations

- Qualifying Exam: The "qualifier" is taken in the second semester of study and includes a written component with possible oral follow-up. It is administered by a department committee including at least two faculty members from the student's area of study (i.e., core course area)
- Preliminary Exam: The "prelim" is administered by the student's supervisory committee and requires both a written and oral component. Also included in the prelim is a written dissertation research proposal along with a presentation and defense of the proposal.
 - All members of the supervisory committee are required to participate in real time; virtual attendance video or teleconference is only permitted for off-campus committee members
 - All members of the supervisory committee are required to present and to complete an assessment of the student's attainment of the program's student learning outcomes; other faculty and students attending the preliminary exam and proposal defense may also complete the assessment form (see Appendix II)
- Dissertation Defense: The "defense" is also administered by the student's supervisory committee and focuses on the dissertation research. The presentation is to be publically announced and open for fellow students and faculty to attend.
 - The student is responsible to advertise the Dissertation Defense, including dissertation title, short abstract, graduate advisor(s) name(s), time, and location, to all faculty and graduate students (see Appendix V for information on advertising and conduct of the defense)
 - All members of the supervisory committee are required to participate in real time; virtual attendance video or teleconference is only permitted for off-campus committee members
 - All members of the supervisory committee are required to complete an assessment of the student's attainment of the program's student learning outcomes; other faculty and students attending the defense may also complete the assessment form (see Appendix II)
- Each doctoral exam is allowed to be taken a maximum of two times

Dissertation Proposal – The dissertation proposal is intended to define the appropriateness, scope, manageability and significance of the proposed research. The proposal normally includes an introduction giving an overview and stating the significance of the proposed research, review of the literature, and proposed methodology. The student formally presents the written proposal to the supervisory committee and defends as part of the preliminary exam. A revised proposal may be required as part or all of a second attempt, based on the direction of from the supervisory committee.

Dissertation – A dissertation that illustrates the ability to conduct independent research, synthesize results, and organize, write and present the research is required. It must constitute an original contribution to knowledge in the field of specialization. The supervisory committee, with the graduate advisor as chair, provides oversight in the preparation of the dissertation. The format of the dissertation must meet the requirements of the Graduate School and be approved by the student's supervisory committee. The Graduate School allows an "article-style dissertation". This style entails a unified dissertation that

includes several distinct but related studies of research, each of which is of publishable quality. Each article would follow the format of a particular journal in which the student and advisor want the thesis to be published.

Doctoral Residency – The residency requirement is that the student must spend an academic year in continuous residence on the campus of the University of Alabama as a full-time student in the Graduate School. An academic year is any two consecutive regular semesters (i.e., fall and the following spring, or spring and following fall). A full summer with at least 9 credit hours in the 13 weeks from Interim through the end of Summer II may also be used with the immediately proceeding spring or following fall to satisfy residency.

Transfer of Credit – With the approval of the department and the dean of the Graduate School, up to one-half of the required coursework (24 credit hours) for a doctoral degree may be transferred from another institution.

Time Limit – All credit requirements for the doctoral degree must be completed within seven years following admission to the doctoral program if the student has a masters degree; an additional year (eight years total) is allowed if the student does not have a masters degree. Previous graduate credit may be applied to the doctoral degree if the credit was earned during a six-year period prior to admission to the doctoral program. Such credit must be identified clearly on the plan of study and requires Graduate School approval.

Degree Checklist – A checklist, which includes the necessary and required steps to assure appropriate progress towards degree, is provided in Appendix III.

Grade Point Average Requirements – Each student must have an overall graduate grade point average (GPA) of 3.0 or better for all graduate courses undertaken at The University of Alabama. ***Grades below "C" are counted in computing scholastic averages, but they do not carry credit toward a degree.***

RISE Doctoral Research Enhancement Grants Program – The Resilient Infrastructure and Sustainable Environment (RISE) Doctoral Research Enhancement Grants Program is intended to provide doctoral students who are active in their dissertation research an opportunity to supervise/mentor an undergraduate research assistant. Up to four RISE Grants will be awarded to qualified doctoral students each year. Each award will be for a maximum duration of 12 months (no extensions) and have a budget of up to \$7000. Call for RISE proposals will be issued in January with proposals due by April 1.

Special Requirements for the Dual MSCivE/PhD and MSEnvE/PhD Programs – The dual MS/PhD programs are designed for students who do not have an earned MS degree in civil engineering or environmental engineering and who wish to pursue the PhD. The degree requirements for the doctorate include most of the degree requirements of the masters; most importantly, all the graded coursework from the MS program may apply towards the PhD. Students will apply for and be admitted into the PhD program and earn the MS along the way. Typically, students will do the masters paper/report option (Plan II) in this program, but the research thesis option (Plan I) is an option.

Thesis and Dissertation Defenses

As noted previously, it is the student's responsibility to properly, professionally, and widely advertise his/her thesis or dissertation defense. At a minimum, all faculty, graduate students, and research support staff in the department must be made aware of and invited to attend thesis and dissertation defenses. It is further expected that graduate students within an area attend all thesis and dissertation defenses of fellow students in their area. Whether or not they are serving on a student's supervisory committee, faculty members within the student's area are also expected to attend all dissertation defenses in their area as well.

Practicum (CE 593 and CE 693)

A practicum is a graduate level course in the student's field of specialization. The intent of the course is to provide students an opportunity to be exposed to and to demonstrate the practical application of

previously or concurrently studied material. The specific activities, scope and focus of practicum is determined by the student's graduate advisor and is appropriate to the student's field of specialization and the credit hours of CE 593 or CE 693 the student is registered for that semester.

- Practicum is taken by permission and under the direction of the student's graduate advisor
- Practicum is a variable credit course, 1 to 3 credit hours is permitted per term
- 3 credit hours of CE 593 or CE 693 is required in an MS thesis option plan of study
- 3 credit hours of CE 593 or CE 693 may be included in an MS paper/report option plan of study
- 3 credit hours of CE 593 or CE 693 is required in a PhD plan of study
- Students appointed on a graduate teaching or graduate research assistantship must register for at least 1 credit hour of CE 593 or CE 693

Core Graduate Course Requirements

The faculty has defined core course requirements in four areas. Each student's plan of study is required to include one of the following sets of core graduate courses:

Construction Engineering and Management Core Coursework (MSCivE, PhD):

- CE 573 Statistical Applications in Civil Engineering
- CE 567 Construction Accounting and Finance
- CE 568 Construction Scheduling

Environmental and Water Resources Engineering Core Coursework (MSCivE, MSEnvE, PhD):

- CE 573 Statistical Applications in Civil Engineering
- CE 575 Hydrology
- CE 626 Physical and Chemical Processes

Structural Engineering and Materials Core Coursework (MSCivE, PhD):

- CE 573 Statistical Applications in Civil Engineering
- CE 534 Advanced Structural Mechanics
- CE 531 Structural Dynamics

Transportation Systems Engineering Core Coursework (MSCivE, PhD):

- CE 573 Statistical Applications in Civil Engineering
- CE 559 Pavement Design and Rehabilitation
- CE 655 Sustainable Transportation

If a student previously took a core graduate course as an undergraduate (either at the 400- or 500-level) at UA or elsewhere, the student is not required to repeat the course.

CE 573 is common to and required for all areas because of the importance statistics has in quantifying risks and uncertainties. Students in the dual MSCivE/MBA program may substitute ST 509 for CE 573; taking both courses is also allowed.

With approval of the student's graduate advisor, a student may petition for an alternative graduate core based on unique, extenuating circumstances. The alternative graduate core would need to be justified and approved by the department's graduate studies committee.

Students Without an Undergraduate Engineering Degree – Graduate students who do not have an undergraduate degree in engineering may be required to take prerequisite coursework based on their academic background and area of intended study. Typically, a student without an undergraduate degree in will need to have or will be required to successfully complete mathematics through differential equations and two of the following courses, including all prerequisites: CE 320 Introduction to Environmental Engineering, CE 331 Introduction to Structural Engineering, CE 340 Geotechnical Engineering, CE 350 Introduction to Transportation, CE 366 Introduction to Construction Engineering, and CE 378 Water Resources Engineering. The selection of the specific two 300-level CE courses is based on the student's area of study and must be approved by the student's graduate advisor. The student's graduate advisor may require other prerequisite courses.

Financial Assistance

Students may be considered for financial assistance, which is awarded on a competitive basis. The primary forms of support are graduate teaching and research assistantships. There are a limited number of graduate scholarships and hourly positions available. Except for fellowships and most scholarships, students receiving financial assistance will be expected to perform appropriate duties. Faculty also nominates students for Fellowships offered by the University Graduate School. Depending on the funding source, faculty groups or individual faculty members decide or recommend students for funding. *Students seeking funding should contact faculty in the area of study to discuss their interests and potential for funding.*

Graduate Teaching Assistantships (GTA) – A typical GTA appointment is for 20 hours per week and will include various teaching support duties. These duties can include but are not limited to grading homework, holding office hours, teaching recitations and help sessions, and teaching lab sections. Students showing interest in an academic career and promise as an instructor may be allowed to teach a full course. Most teaching assistantships are for the academic year only; a very limited number of summer teaching assistantships are available. All graduate teaching assistants will receive the College of Engineering's minimum stipend.

Graduate Research Assistantships (GRA) – A typical GRA appointment is for 20 hours per week and carries with it the responsibility to perform research consistent with the source of funding. Most research assistantships are funded through research contract and grants, and faculty who secured the contact or grant will hire students directly onto their project. University research centers may have assistantships to support center research activities. The director of the center, in consultation with center faculty, will hire students based on research needs and interests. The department, on occasion, will offer research assistantships to select students based on recommendations from the faculty. Graduate research assistants will receive a minimum stipend based on a department scale. Masters students and doctoral students without a master's degree will receive the College of Engineering minimum rate. Doctoral students with a master's degree will receive a higher stipend. After passing the qualifying exam, doctoral students will receive an automatic increase in their stipend. Faculty may pay higher than the department minimum stipend.

Fellowships – A variety of graduate fellowships are available, both internal and external to the University. The Graduate School offers a limited number of Graduate Fellowships. Eligible and qualified students are nominated for these fellowship opportunities by a faculty member and endorsed by the department. Most fellowships do not stipulate any responsibilities to perform particular duties.

Scholarships – A limited number of graduate scholarships are available through the department. These scholarships are typically awarded to highly deserving students who do not receive other forms of financial assistance. Often, but not exclusively, these scholarships are awarded to deserving students in one of the department's dual degree programs who do not have other financial assistance. Some scholarships include modest levels of responsibility to perform duties associated and consistent with the scholarship funds.

Hourly Appointments – The department, research centers, and individual faculty also hire graduate students on hourly appointments. Students with a graduate teaching or research assistantship are not eligible for hourly appointments. Hourly appointments typically range from 10 to 20 hours per week and carry the responsibility to perform instructional support, research, or other duties consistent with the source of funding.

Appendix I: CE Graduate Course Listing

400-Level Courses Offered By The Department (MS only) – The following 400-level CE courses are allowed for credit towards the MS degree. Students must take the 500-level versions of any courses that is slash listed (400/500); the following 400-level courses do not have a 500-level version so they are allowed to count towards a graduate degree. A limited number of 400-level courses are offered in the summer. Check the official course schedule for actual course offerings each term.

Course No.	Course Title	Fall	Spring
CE 420	Environmental Measurements		Annually
CE 433	Reinforced Concrete Structures I	Annually	
CE 434	Structural Steel Design I		Annually
CE 439	Wood and Masonry Structures		Odd Years
CE 451	Geometric Design of Roadways	Annually	
CE 458	Traffic Engineering		Annually
CE 470	Water Resources in the European Alps	Summer (Study Abroad)	

500-Level Courses Offered By The Department – The department offers the following 500-level courses for consideration in a plan of study. A limited number of 500-level courses are offered in the summer. Check the official course schedule for actual course offerings each term.

Course No.	Course Title	Fall	Spring
CE 501*	Masters Capstone Project	Annually*	Annually*
CE 514	Information Systems Design	Even Years	
CE 517	Advanced Project Management	Annually	
CE 518	Engineering Management		Annually
CE 521	Environmental Engineering Microbiology	Annually	
CE 522	Solid and Hazardous Waste Management		Annually
CE 524	Water and Wastewater Treatment	Annually	
CE 525	Air Quality Engineering		Annually
CE 531	Structural Dynamics	Annually	
CE 532	Matrix Analysis of Structures		Annually
CE 533	Structural Loads	Annually	
CE 534	Advanced Structural Mechanics	Annually	
CE 535	Concrete Materials		Annually
CE 536	Wood Structural Design	As Needed	
CE 537	Reinforced Concrete Structures II		Annually
CE 538	Structural Steel Design II	Annually	
CE 541	Wind and Earthquake Engineering		Annually
CE 542	Waste Containment Facilities	As Needed	
CE 543	Prestressed Concrete Structures	As Needed	
CE 544	Foundation Engineering	Odd Years	

*CE 501 is offered in the fall, spring and summer terms. MS Plan II (paper/report option) students should take CE 501 in their last term in the program. With permission of their advisor, students graduating in the summer may take CE 501 in the spring.

Course No.	Course Title	Fall	Spring
CE 553	Intelligent Transportation Systems	As Needed	
CE 554	Urban Transportation Planning	Annually	
CE 556	Transportation System Analysis		Annually
CE 559	Pavement Design and Rehabilitation		Odd Years
CE 560	Front End Planning	Annually	
CE 561	Horizontal Construction Methods	Annually	
CE 562	Vertical Construction Methods		Annually
CE 563	Construction Cost Estimating		Annually
CE 564	Safety Engineering		Annually
CE 567	Construction Accounting and Finance		Annually
CE 568	Construction Scheduling	Annually	
CE 570	Open Channel Flow		Annually
CE 573	Statistical Applications		Annually
CE 575	Hydrology	Annually	
CE 580	Forensic Engineering	Annually	
CE 581	Legal Aspects of Engineering & Construction		Annually
CE 585	Construction Site Erosion Control	Summers	
CE 586	GIS for Civil Engineers	As Needed	
CE 591	Special Problems	As Needed	
GES 501	Operations Research	Annually	

600-Level Courses Offered By The Department – The department offers the following 600-level courses for consideration in a plan of study. A limited number of 600-level courses are offered in the summer. Check the official course schedule for actual course offerings each term.

Course No.	Course Title	Fall	Spring
CE 616	Advanced Information Systems	Odd Years	
CE 624	Water Quality Engineering	Odd Years	
CE 626	Physical and Chemical Processes		Annually
CE 631	Experimental Structural Dynamics	As Needed	
CE 633	Structural Reliability		Even Years
CE 635	Analytical Methods in Cement and Concrete	As Needed	
CE 636	Advanced Infrastructure Materials		Even Years
CE 640	Earthquake Engineering	As Needed	
CE 641	Wind Engineering	As Needed	
CE 655	Sustainable Transportation	Even Years	
CE 656	Transportation Demand and Network Modeling	Odd Years	
CE 658	Traffic Flow Theory		Even Years
CE 671	Hydrologic Modeling	Annually	
CE 686	Advanced GIS	As Needed	
CE 691	Special Problems	As Needed	

Appendix II: Assessment Forms

To maintain institutional accreditation, the University requires each academic department to implement an outcome assessment process for each degree program offered. Included in this appendix are the department's graduate student learning outcome assessment forms. Depending on the degree, the assessment of the program's student learning outcomes is assessed using one of the following assessment forms:

Masters Student Learning Outcome Assessment – This form is used for both the MSCivE and MSEnvE, and for both the research thesis option and paper/report option. For the research thesis option (Plan I), all members of the supervisory committee are required to complete this form. Other faculty and students attending the final defense may also complete the assessment form. For the paper/report option (Plan II), the graduate advisor is required to complete the assessment form. Other faculty and students who may read the paper/report may also complete the assessment form.

Doctoral Student Learning Outcome Assessment– There are two forms for assessing doctoral student learning outcomes. The first form is for use during the preliminary exam and defense of the dissertation proposal. All members of the supervisory committee are required to complete this assessment form. Other faculty and students attending the preliminary exam and proposal defense may also complete the assessment form. The second form is for use at the final dissertation defense. All members of the supervisory committee are required to complete and other faculty and students attending the final defense may also complete this assessment form.

Electronic and hard copies of the assessment forms are available on the department's graduate website and from the Department Graduate Program Assistant.

Masters Student Learning Outcome Assessment

Student: _____

Date: _____

Degree: (please circle one)
MSCE **MSEnvE**

Plan: (please circle one)
Plan I – Research Thesis Option **Plan II – Paper/Report Option**

Evaluator: (please circle one)
Committee Chair **Committee Member** **Other Faculty** **Student**

On a scale of 1 to 5, with 1 being not at all and 5 being thoroughly, how well do you think the student demonstrated the ability to:

Outcome 1: “Synthesize advanced technical knowledge in a specialized area of civil or environmental engineering?”				
1	2	3	4	5
Unsatisfactory		Satisfactory		Exceeds Expectations

Outcome 2: “Identify, formulate, and solve complex civil or environmental engineering problems?”				
1	2	3	4	5
Unsatisfactory		Satisfactory		Exceeds Expectations

Doctoral Student Learning Outcome Assessment
PhD Preliminary Exam and Proposal Defense

Student: _____

Date: _____

Evaluator: (please circle one)
Committee Chair Committee Member Other Faculty Student

On a scale of 1 to 5, with 1 being not at all and 5 being thoroughly, how well do you think the student demonstrated the ability to:

<u>Outcome 1:</u> "Develop and evaluate new, advanced technical knowledge in a specialized area of civil engineering?"				
1	2	3	4	5
Unsatisfactory		Satisfactory		Exceeds Expectations

<u>Outcome 2:</u> "Explain the relevance and application of new, advanced technical knowledge in both technical and non-technical terms?"				
1	2	3	4	5
Unsatisfactory		Satisfactory		Exceeds Expectations

**Doctoral Student Learning Outcome Assessment
PhD Dissertation Defense**

Student: _____

Date: _____

Evaluator: (please circle one)
Committee Chair Committee Member Other Faculty Student

On a scale of 1 to 5, with 1 being not at all and 5 being thoroughly, how well do you think the student demonstrated the ability to:

<u>Outcome 1:</u> "Develop and evaluate new, advanced technical knowledge in a specialized area of civil engineering?"				
1	2	3	4	5
Unsatisfactory		Satisfactory		Exceeds Expectations

<u>Outcome 2:</u> "Explain the relevance and application of new, advanced technical knowledge in both technical and non-technical terms?"				
1	2	3	4	5
Unsatisfactory		Satisfactory		Exceeds Expectations

Appendix III: Degree Checklists

Master of Science in Civil Engineering and Master of Science in Environmental Engineering

Research Thesis Option (Plan I) and Paper/Report Option (Plan II)

When You Arrive on Campus

- Check in with the Department Graduate Program Assistant
Ms. TBD, Graduate Program Assistant
- Make appointment to meet with Area Graduate Program Coordinator
Dr. Robert Batson, Construction Engineering and Management (CEM)
Dr. Glenn Tootle, Environmental and Water Resources (EWR)
Dr. Andrew Graettinger, Structural Engineering and Materials (SEM)
Dr. Jay Lindly, Transportation Systems Engineering (TSE)
- Make appointment to meet with your Graduate Advisor
- Register for classes

During Your First Semester

- Research Thesis Option (Plan I): Work with your Graduate Advisor to establish your Thesis Committee
- Research Thesis Option (Plan I): Submit your completed Appointment of Masters Thesis Committee form to the Department Graduate Program Assistant
- Research Thesis Option (Plan I): Work with your Graduate Advisor and Thesis Committee to develop your Plan of Study
- Paper/Report Option (Plan II): Work with your Graduate Advisor to develop your Plan of Study
- All Students: If you have transfer credit, complete and submit the Request for Transfer of Credit form to the Department Graduate Program Assistant
- All Students: Submit approved Plan of Study to the Department Graduate Program Assistant
- All Students: Check the Graduate School website (graduate.ua.edu) for all deadlines

During the Semester You Plan to Graduate

- All Students: Apply for Graduation
- All Students: Check the Graduate School website (graduate.ua.edu) for all deadlines
- Research Thesis Option (Plan I): Schedule your Thesis Defense (Comprehensive Exam) with your Thesis Committee
- Research Thesis Option (Plan I): See Department Graduate Program Assistant to reserve a room for your Thesis Defense
- Research Thesis Option (Plan I): Advertise your Thesis Defense, including thesis title, short abstract, graduate advisor(s) name(s), time, and location, to all faculty and graduate students
- Paper/Report Option (Plan II): Register for CE 501 and complete a research paper, a "policy and practice" paper, or equivalent experience in agreement with your Graduate Advisor.

Doctor of Philosophy in Civil Engineering

When You Arrive on Campus

- Check in with the Department Graduate Program Assistant
Ms. TBD, Graduate Program Assistant
- Make appointment to meet with Department Director of Graduate Programs
Dr. Andrew Graettinger, Director of Graduate Programs
- Make appointment to meet with Area Graduate Program Coordinator
Dr. Robert Batson, Construction Engineering and Management (CEM)
Dr. Glenn Tootle, Environmental and Water Resources (EWR)
Dr. Andrew Graettinger, Structural Engineering and Materials (SEM)
Dr. Jay Lindly, Transportation Systems Engineering (TSE)
- Make appointment to meet with your Graduate Advisor
- Register for classes

During Your First Semester

- Work with your Graduate Advisor and Area Graduate Program Coordinator to schedule the Qualifying Exam, which is taken during your second semester and administered by the faculty in your planned area of study

During Your Second Semester

- Prepare for and complete the Qualifying Exam, which is administered by the faculty in your planned area of study

Before Completing 30 Hours of Graduate Coursework

- Check the Graduate School website (graduate.ua.edu) for all deadlines
- Work with your Graduate Advisor on initial scope and goals of your dissertation research
- Work with your Graduate Advisor to establish your Supervisory (Dissertation) Committee, complete the Graduate School's Dissertation Committee Form, and submit the completed form to the Department Graduate Program Assistant
- Work with your Graduate Advisor and Supervisory Committee to develop your Plan of Study, complete the Graduate School's PhD Plan of Study form, and submit the completed for to the Department Graduate Program Assistant
- If you have transfer credit, complete and submit the Request for Transfer of Credit form to the Department Graduate Program Assistant

At Least Two Semesters After the Qualifier and At Least Two Semesters Before Graduating

- Work with your Graduate Advisor to schedule and prepare for the Preliminary Exam and Dissertation Proposal Defense
- See Department Graduate Program Assistant to reserve a room for your Defense
- Complete the Preliminary Exam and submit all required forms to the Department Graduate Program Assistant

During the Semester You Plan to Graduate

- During the first week of the semester, complete your Application for Degree and submit it to the Department Graduate Program Assistant
- Check the Graduate School website (graduate.ua.edu) for all deadlines
- Schedule your Dissertation Defense with your Graduate Advisor and Supervisory Committee
- See Department Graduate Program Assistant to reserve a room for your Defense
- Advertise your Dissertation Defense, including dissertation title, short abstract, graduate advisor(s) name(s), members of your supervisory committee, time, and location, to all faculty and graduate students
- Complete the Dissertation Defense and submit all required forms to the Department Graduate Program Assistant
- Submit your approved and signed dissertation to the Graduate School at least six weeks prior to the end of the semester.
- Make appointment to meet with Department Director of Graduate Programs

Appendix IV: Approved Dual MSCivE/JD Courses

The dual MSCivE/JD (Juris Doctor) program is offered collaboratively with the Law School. It allows students to double count 12 credit hours of approved graduate civil engineering coursework from the MSCivE towards the JD and 12 credit hours of approved law coursework from the JD towards the MSCivE.

The student's graduate advisors from each program will determine which courses double count as part of the dual program, noting that the following courses have been pre-approved for this dual program:

- CE 515 Advanced Engineering Economics
- CE 517 Advanced Project Management
- CE 518 Engineering Management
- CE 522 Solid and Hazardous Waste Management
- CE 525 Air Pollution
- CE 527 Storm Water Management
- CE 552 Traffic Safety and Security
- CE 553 Intelligent Transportation Systems
- CE 554 Urban Transportation Planning
- CE 564 Safety Engineering
- CE 581 Legal Aspects of Engineering and Construction
- CE 580 Forensic Engineering
- CE 629 Environmental Regulations

- LAW 620 Computers and the Law
- LAW 628 Consumer Protection
- LAW 680 Natural Resources Law
- LAW 690 Water Law
- LAW 691 Construction Law
- LAW 692 Product Liability
- LAW 694 Land Use Planning
- LAW 697 Workers' Compensation Law
- LAW 702 Environmental Law I (NEPA, Air, and Water)
- LAW 704 Employment Law: Occupational Safety and Health
- LAW 705 Alternate Dispute Resolution
- LAW 721 Employment Discrimination Law
- LAW 723 Law and Economics
- LAW 738 Environmental Law and Policy: Coastal Law
- LAW 763 Problems in Environmental Law
- LAW 766 Real Estate Development
- LAW 771 Environmental Law II (Toxins and Hazardous Waste)
- LAW 835 Patent Law

Appendix V: Advertising and Conduct of Defenses

Advertising Thesis and Dissertation Defenses – Masters thesis (Plan I) and doctoral dissertation defense presentations are open to the public. Doctoral students must advertise their dissertation defenses to all faculty and graduate students in the department at least two weeks prior to the defense. Masters students, at the discretion of their graduate advisor, may advertise and invite faculty and graduate students. A template for each is provided on the following pages, and both will be available for download from the department website.

Once you have scheduled your final defense and submitted your dissertation or thesis to your supervising committee for review:

- Download and fill out the appropriate template to advertise your defense
- Post at least one printed copy outside the CCEE department offices in HM Comer Hall.
- Additional copies may be posted around the engineering buildings (e.g. you may wish to post notice in or near faculty and graduate student offices).
- Email your announcement to the Graduate Program Assistant, who will distribute an email to all faculty and graduate students in the department.

Conduct of the Defense – While the exact format is dictated by the graduate advisor and supervisory committee, and the defense itself is administered by the committee, the following recommendations are provided to assure that the defense is conducted in a manner supportive of non-supervisory committee members involvement:

- The defense should include two portions, an open portion and a closed portion
 - Open portion includes all non-supervisory committee members and normally would not exceed 60 minutes
 - Closed portion immediately follows the open session and includes all supervisory committee members and any UA graduate faculty wishing to participate
 - The total defense, including both open and closed portions, normally would not exceed two hours
- The formal presentation of the research is included in the open session and should be limited to a maximum of 40 minutes
- Except for short questions seeking quick clarification, all questions should be held until after the formal presentation is completed
- Visitors (e.g., non-supervisory committee members, graduate students, undergraduate students, and other guests) should be allowed to ask questions first as part of the open portion
- Once the presentation is over and all visitors have had an opportunity to ask questions, guests are thanked for coming, and are asked to leave so the closed portion of the defense may proceed
- Only the student, members of the supervisory committee and UA graduate faculty who wish to participate are permitted for closed-door questioning
- Once the supervisory committee has concluded their questioning, the student is excused to allow the committee to deliberate
- All members of the supervisory committee are required to complete the appropriate graduate student learning outcome assessment form (see Appendix II); faculty and professional (non-student) guests participating in the defense may also complete an assessment form.
- Light refreshments are commonly provided for the supervisory committee and guests, but are not required.

Dissertation Defense

For: John Q Student,
PhD Candidate in Civil Engineering

When: Month Day, Year, Time

Location: Building and Room

Title of Dissertation

Supervising Professor: Dr. Firstname Lastname

Abstract: Text goes here

Thesis Defense

For: John Q Student,
MS Candidate in Civil Engineering

When: Month Date, Year, Time

Location: Building and Room

Title of Thesis

Supervising Professor: Dr. Firstname Lastname

Abstract: Text goes here