



Department of Civil and Environmental Engineering Graduate Student Manual



Fall 2016

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Section 1: Department Overview

The Department of Civil and Environmental Engineering (CEE) is one of the largest graduate programs in the College of Engineering. It has 25 faculty and offers four graduate degrees in Hydraulics and Water Resources (HWR), Environmental Engineering and Science (EES), Structures, Mechanics and Materials (SMM), and Transportation Engineering (TE). The department typically has about 70 graduate students in our program and about 250 undergraduates. Our faculty and students are engaged in high-impact, scholarly research on topics as diverse as flood mitigation, radionuclide detection, carbon sequestration, water treatment, and digital human modeling. Yearly, we conduct over \$9 million dollars in external research and publish more than 70 journal articles. We recently welcomed four new faculty to our department – Corey Markfort (2014), Ricardo Mantilla (2014), and Gregory LeFevre (2015), and Ibrahim Demir (2016). They bring valuable expertise in environmental fluid mechanics, wind energy, hydrology, hydroinformatic, flood forecasting, pollutant fate, and storm water management. We are thrilled to have you join our CEE graduate program and are excited to see what you can accomplish during your time with us.

If you have any questions, students are encouraged to contact the Director of Graduate Studies, Prof. Gabriele Villarini, and Graduate Program Administrator, Kim Lebeck. Prof. Villarini oversees all graduate student-related issues within the department and is a good resource for information related to both departmental and Graduate College regulations. Kim Lebeck maintains student files, ensures that all paperwork is completed, and can advise students on procedural issues related to obtaining their degrees.

1.1. CIVIL AND ENVIRONMENTAL ENGINEERING FACULTY

Environmental Engineering and Science (EES)



Michelle Scherer, Professor and **Chair**, michelle-scherer@uiowa.edu
Research Interests: Environmental geochemistry; nanoparticles in air, water and soil; redox chemistry at the mineral-water interface; fate of heavy metals, such as arsenic, uranium and mercury



Craig Just, Assistant Professor and **EES Graduate Program Coordinator**, craig-just@uiowa.edu
Research Interests: Use of sensors to measure water quality at rapid intervals; Use of mussels as living biosensors; Fate of pharmaceuticals in non-conventional wastewater treatment systems; Human exposure to PCBs resulting from industrial dredging operations



David Cwiertny, Associate Professor, david-cwiertny@uiowa.edu
Research Interests: Materials-based treatment strategies for water and wastewater; Chemical transformation pathways for emerging contaminant classes in a natural aquatic system



Keri Hornbuckle, Professor, keri-hornbuckle@uiowa.edu
Research Interests: Modeling and measuring the deposition of organic compounds to lakes; Uptake of airborne chemicals by leaves and needles; Long range transport of pollutants; Behavior of SOCs at terrestrial and aquatic interfaces



Gregory LeFevre, Assistant Professor, gregory-lefevre@uiowa.edu
Research Interests: Emerging contaminant fate; microbial and plant transformation of pollutants; engineered natural treatment systems; nonpoint source pollutants; stormwater quality; bioremediation; resilient water infrastructure.



Tim Mattes, Associate Professor, tim-mattes@uiowa.edu
Research Interests: Characterization of alkene monooxygenase and epoxide degradation enzyme systems for bioremediation and biocatalysis applications; Functional genomics and proteomics of vinyl chloride and cis-dichloroethene oxidizing bacteria; Chlorinated solvent acclimation mechanisms



Patrick O'Shaughnessy, Professor, patrick-oshaughnessy@uiowa.edu
Research Interests: Generation and analysis of nanoparticles; Use of mathematical models to determine the spatial variability of pollutants both indoors with the use of a computational fluid dynamics software package and outdoors with the use of plume dispersion model; Investigation of sampling devices for both gases and aerosols



Jerald Schnoor, Professor, gerald-schnoor@uiowa.edu
Research Interests: Phytoremediation; Water quality modeling; Groundwater; Risk assessments; Sustainable development; Impact of carbon emissions on global change



Richard Valentine, Professor, richard-valentine@uiowa.edu
Research Interests: Water treatment and the remediation of contaminated soils; Photodegradation of humic substances as related to the formation of trace gases; The chemistry of disinfectants in drinking water; Mineral dissolution processes; Use of metal oxides as adsorbents in drinking water treatment; Reactions of hydrogen peroxide in the subsurface environment; Treatment and detoxification of contaminated soils; Role of the pipe-water interface in the determination of drinking water quality

Hydraulics and Water Resources (HWR)



Gabriele Villarini, Associate Professor, **CEE Director of Graduate Studies** and **HWR Graduate Program Coordinator**
gabriele-villarini@uiowa.edu
Research Interests: Hydrometeorology; Climatology; Extreme events; Climate change; Hurricanes; Atmospheric rivers; Seasonal forecast; Applied statistics; Remote sensing of rainfall; Uncertainty modeling



Allen Bradley, Professor; allen-bradley@uiowa.edu
Research Interests: Flood hydrology; Hydroclimatology of extreme rainstorms; Rainfall-runoff modeling



George Constantinescu, Associate Professor, george-constantinescu@uiowa.edu
Research Interests: Computational fluid dynamics (CFD) and applications in fluid dynamics; Environmental/water resources and coastal engineering; Turbulence dynamics and modeling; Large-Eddy Simulation (LES) techniques for single and multi-phase flows; Detached-Eddy Simulation (DES) algorithms for numerical simulation of complex flows on structured and unstructured meshes; Eulerian-Lagrangian methods for simulation of particle laden flows;

Pump-intake flows; River hydraulics; Computational aeroacoustics;
Parallel and large scale computing



Ibrahim Demir, Assistant Professor, Ibrahim-demir@uiowa.edu
Research Interests: Hydroinformatics, Environmental information systems, Data analytics, Scientific visualization, Data management, Cyberinfrastructure systems, Web technologies



William Eichinger, Professor, william-eichinger@uiowa.edu
Research Interests: Hydrology and fluid mechanics in the environment; Atmospheric pollution control and remediation; Optical remote sensing; Lidar (laser radar); Nuclear physics



Witold Krajewski, Professor, witold-krajewski@uiowa.edu
Research Interests: Radar hydrometeorology; Stochastic hydrology; Remote sensing



Ricardo Mantilla, Assistant Professor, ricardo-mantilla@uiowa.edu
Research Interests: Hydrology; Hydraulics; Applied Mathematics; Statistics; River Network Hydrology; Flood Forecasting and Prediction; Multiscale processes and transport in River Networks; Fractal River Networks; Hydroclimatology



Corey Markfort, Assistant Professor, corey-markfort@uiowa.edu
Research Interests: Environmental fluid mechanics; Turbulence; Atmospheric boundary layer; Renewable energy and wind engineering; Biosphere-atmosphere exchange; Hydrology; Water resources engineering; Physical Limnology; Earth systems dynamics and change



Jacob Odgaard, Professor, jacob-odgaard@uiowa.edu
Research Interests: River meandering and channel stability; Sediment management in rivers using Iowa Vanes and other structures; Fish diversion structures; Hydroinformatics



Larry Weber, Professor and Director of IIHR-Hydrosience & Engineering, larry-weber@uiowa.edu
Research Interests: Combining hydro-dynamic data and biological data of fish response; Applying computational fluids dynamics codes to natural river reaches and hydraulic structures; Fundamental principles of plunging jets and combining open channel flows

Structures, Mechanics, and Materials (SMM)



Salam Rahmatalla, Associate Professor and **SMM Graduate Program Coordinator**, salam-rahmatalla@uiowa.edu
Research Interests: Biomechanics of Human Motion; Design and Control of Structures; Multi-body Dynamics; Structural topology design of materials and structures



Jasbir Arora, Professor, jasbir-arora@uiowa.edu
Research Interests: Optimal design of structural and mechanical systems; Optimization algorithms



Asghar Bhatti, Professor, mabhatti@uiowa.edu
Research Interests: Optimization based computer-aided design of structural systems with emphasis on systems subjected to dynamic loads



Christopher Stoakes, Lecturer, christopher-stoakes@uiowa.edu
Research Interests: Behavior and Design of Steel Structures; Fatigue and Fracture of Structural Materials; Computational Analysis of Structures and Materials; Earthquake Structural Engineering



Colby Swan, Professor, colby-swan@uiowa.edu
Research Interests: Development of constitutive models for fiber reinforced structural composites; Structural topology design of materials and structures; Modeling of seepage induced earthen slope failures; Experimental/computational studies of bone adaptation phenomena

Transportation Engineering (TE)



Paul Hanley, Associate Professor and **TE Graduate Program Coordinator**, paul-hanley@uiowa.edu
Research Interests: Transportation Planning and Engineering; Agent-based Simulation Modeling; Urban Infrastructure



Hosin David Lee, Professor, hlee@engineering.uiowa.edu
Research Interests: Asphalt pavement recycling; Evaluation of MEMS sensor for rail infrastructure; Long-term pavement performance; Development of automated pavement distress data collection and automatic crack analysis



Richard Fosse, Lecturer, rick-fosse@uiowa.edu
Research Interests: Resilient and sustainable infrastructure; Emergency preparation, response and recovery

1.2. Research Centers and Campus Initiatives Involving CEE Faculty

IIHR Hydrosience & Engineering (IIHR) (www.iihr.uiowa.edu):

IIHR—Hydrosience & Engineering is a world-renowned center for education, research, and public service focusing on hydraulic engineering and fluid mechanics. Based in the C. Maxwell Stanley Hydraulics Laboratory, a five-story red brick building on the banks of the Iowa River, IIHR is a unit of the University of Iowa's College of Engineering. At IIHR, students, faculty members, and research engineers work together to understand and manage one of the world's greatest resources—water. Students from around the world benefit from IIHR's comprehensive multidisciplinary approach, which includes basic fluid mechanics, laboratory experimentation, and computational approaches.

Iowa Flood Center (IFC) (iowafloodcenter.org):

The IFC is engaged in flood projects in several Iowa communities and employs several graduate and undergraduate students participating in flood-related research. The IFC strives to develop hydrologic models for physically-based flood frequency estimation and real-time forecasting of floods, including hydraulic models of flood plain inundation mapping; to establish community-based programs to improve flood monitoring and prediction along Iowa's major waterways and to support ongoing flood research; to share resources and expertise of the Iowa Flood Center; to assist in the development of a workforce in the state knowledgeable regarding flood research, prediction, and mitigation strategies; to conduct the activities required by this chapter in cooperation with various state and federal agencies.

Center for Global and Regional Environmental Research (CGRER) (www.cgrer.uiowa.edu):

The Center for Global and Regional Environmental Research (CGRER) is a state-funded institute devoted to studying and bettering our environment. The Center promotes interdisciplinary research on the many aspects of global environmental change. Areas of focus include regional effects on natural ecosystems, environments, and resources, and effects on human health, culture, and social systems. To accomplish its missions, CGRER awards seed grants, fosters interdisciplinary courses, provides state-of-the-art research facilities, and holds seminars and symposia. Through these activities, CGRER assists Iowa's agencies, industries, politicians, and citizens as they prepare for accelerated environmental change.

Center for Health Effects of Environmental Contamination (CHEEC) (www.cheec.uiowa.edu):

The University of Iowa Center for Health Effects of Environmental Contamination (CHEEC) is a multidisciplinary environmental health research center dedicated to supporting and conducting research to identify, measure and prevent adverse health outcomes related to exposure to environmental toxins. CHEEC is comprised of faculty and researchers located in the University of Iowa Colleges of Public Health, Engineering, and Liberal Arts and Sciences, and State Hygienic Laboratory.

Center for Computer Aided Design (CCAD) (www.ccad.uiowa.edu):

The Center for Computer-Aided Design (CCAD) at The University of Iowa was founded in 1981. CCAD conducts basic and applied research in modeling and simulation. With over 150 scientists, faculty members, graduate and undergraduate students, CCAD is organized into six research units: NADS (National Advanced Driving Simulator), OPL (Operator Performance Laboratory), VSR (Virtual Soldier Research program), MIMX (Musculoskeletal Imaging, Modeling, and Experimentation), RSPS (Reliability and Sensory Prognostic Systems Group),

and BioMOST (BioMechanics of Soft Tissues). CCAD has sustained substantial growth over the past seven years and has created many strategic partnerships with government and corporate entities. Funding agencies and companies include the US Army, Air Force, Navy, Marine Corps, and companies such as Ford, General Motors, Chrysler, Rockwell Collins, John Deere, Caterpillar, National Aeronautics and Space Administration, and many others. With over 16 laboratories and specialized research facilities, CCAD offers our partners and clients with a significant value add to R&D efforts.

Center for Biocatalysis and Bioprocessing (<http://www.uiowa.edu/~biocat/>):

For more than 20 years, the Center for Biocatalysis and Bioprocessing (CBB) has been combining first-class scientific faculty with cutting-edge facilities to reshape and define new technologies for chemical, pharmaceutical, nutritional and agrochemical industries. Located at the University of Iowa Research Park, the CBB consists of a growing number of more than 50 faculty members and more than 300 researchers, including graduate and undergraduate students, postdoctoral scientists, technicians, and visiting faculty and industrial scientists. Its faculty members come from eight different departments, and we are home to more than 20 predoctoral fellows. The principal areas of study within the CBB include biocatalyst fundamental properties, bioremediation, bioprocessing, new biocatalyst discovery, novel biocatalyst applications, biosensing technology, and reactive agent development.

Public Policy Center (ppc.uiowa.edu):

The Public Policy Center (PPC) is an interdisciplinary academic research center in the Office of the Vice President for Research that investigates the most important issues affecting our daily lives. Its research is focused on Iowa and beyond. The PPC assists other researchers with their research and serve to bring the resources and expertise of the University to policy makers, and the public. Its mission is to provide policymakers and the public with information to make communities thrive in sustainable ways through academic research.

Water Sustainability Initiative (watersustainability.uiowa.edu):

Motivated by one of 14 Grand Challenges from the National Academy of Engineering -- "provide access to clean water" -- the University has established a Water Sustainability Initiative (WSI) to advance research, education, and outreach on sustainability. The WSI expands existing strength at UI in interdisciplinary research on water including its availability, quality, reuse, health impacts, and its relationship to a changing climate. Economics, policy, and law as well as the natural sciences and engineering are all engaged to solve the problems of water. The faculty alliance on water sustainability encompasses the Colleges of Liberal Arts and Sciences, Public Health, Law, Engineering, the Graduate College, and the Public Policy Center. Among the various resources already developed to advance the initiative are the Iowa Flood Center, the UI Office of Sustainability, and the undergraduate Certificate in Sustainability.

Iowa Superfund Research Program (<http://www.uiowa.edu/~isbrp/>):

The Superfund research program at The University of Iowa (ISRP) is a joint endeavor involving basic, mechanistic and applied projects in biomedical and non-biomedical research areas. The program's overall theme is the consequences of atmospheric sources and exposures to semi-volatile Polychlorinated Biphenyls (PCBs), and it deals with volatilization, transport and exposure of lower halogenated PCBs, especially those PCBs that are associated with contaminated waters, former industrial sites, other atmospheric sources, and the consequences of exposure to them. The ISRP brings together 15 scientists representing four colleges in Iowa, Illinois and Kentucky. Working together, they measure sources, transport and environmental exposure of PCBs; their distribution, metabolism and toxicity in animals and humans; and novel methods of phytoremediation.

Section 2: Civil and Environmental Engineering Graduate Requirements

2.1. Overview

The graduate program in Civil and Environmental Engineering (CEE) is one of the largest programs at the University of Iowa. The department offers both Masters of Science (MS) and Doctor of Philosophy (PhD) degrees in Civil and Environmental Engineering.

Students may pursue an MS and/or PhD degree in one of four Graduate Programs in the department:

- Environmental Engineering and Science (EES)
- Hydraulics and Water Resources (HWR)
- Structures, Mechanics and Materials (SMM)
- Transportation Engineering (TE)

The following outlines the graduate requirements common to all four programs.

2.2. Prerequisites

Prospective graduate students must hold a bachelor's degree or its equivalent from an accredited institution with preparation appropriate to advanced study in the proposed major field. A minimum undergraduate grade point average (GPA) of 3.0 is required for admission. Students who do not have an undergraduate BS degree in civil & environmental engineering, but who have adequate training in mathematics or science, may be admitted for graduate study in CEE. However, certain undergraduate courses may need to be taken without graduate credit (although such undergraduate courses can be taken with the pass/no pass grading option). The undergraduate courses (or equivalents) that may be required by a specific Graduate Program are described in the Graduate Program sections.

2.3. Course Requirements

MS Degree

The MS degree requires a minimum of 30 hours of credit beyond the basic undergraduate degree. The MS degree may be earned on either a thesis or a non-thesis basis. Each Graduate Program in CEE has curriculum requirements for the MS degree, which include core courses (required courses within the Program), elective courses, seminar participation, and thesis research (if applicable). Please refer to the Graduate Program sections to find the specific requirements for that program.

Grading Requirements for MS Degree Coursework and Research Credit

For students pursuing an MS degree with thesis option, up to 3 semester hours of research can be completed for a letter grade. All other research credits must be taken on a satisfactory/unsatisfactory (S/U) basis. All hours of credit for graduate coursework, including

both core courses and electives within each graduate program, must be taken for a letter grade. Undergraduate courses taken to fulfill pre-requisites for graduate curricula may be taken on a pass/no pass (P/N) basis.

Requirement in Engineering Ethics

All MS/Thesis Option students must enroll in and complete the College of Engineering's course in Engineering Ethics. The registration number is ENGR:7270. This is a one semester course that will meet weekly (requiring approximately 15 hours of attendance per semester for 1 semester hour) that is required for all first-year graduate students in the College of Engineering. Through the use of case studies, presentations, and discussions with visiting speakers, a range of topics in the responsible conduct of research in engineering and the sciences will be discussed. The course will provide a good introduction to many of the practical issues associated with being a responsible scientist. The course is designed to conform to the mandates set by the Office of the Vice President for Research and the Graduate College to train graduate students in the responsible conduct of research.

The course grade will be S/U based on class attendance and class participation. Attendance and participation are required for all classes since federal requirements mandates that all the training topics must be covered and that every student completes all training areas. Excused absences are accepted for professional travel (e.g., professional conferences), illness or other unavoidable circumstances; however, students must contact the course director to make arrangements to complete the training for the topic(s) missed.

Requirement in Professional Development Workshops

All MS/Thesis option students are required to participate in a least one professional development workshop offered through the Graduate College (see <https://www.grad.uiowa.edu/professional-development>) over their time in the CEE graduate program.

Grade Point Average Requirements

The Graduate College has established a minimum grade point average (GPA) requirement to remain in good standing (see <http://www.grad.uiowa.edu/manual-part-1-section-iv-academic-standing-probation-and-dismissal>). MS degree students are expected to maintain a 2.75 or better GPA. A student with less than a 2.75 GPA after 9 or more semester hours of graded graduate work at the University of Iowa will be placed on academic probation by the Graduate College. If, after completing 9 more semester hours of graded graduate work, the student's GPA remains below 2.75, the student will be dismissed and denied permissions to reregister within any Graduate College degree program; otherwise the student will be restored to good standing.

Within CEE, MS degree students must have a 2.75 or better GPA for graduation. Students with a GPA below 2.75 upon completion of their studies will not be permitted to take a final examination for the MS degree.

PhD Degree

The PhD degree requires a minimum of 72 hours of credit beyond the basic undergraduate degree. Each Graduate Program in CEE has curriculum requirements for the PhD degree,

which include core courses (required courses within the Program), elective courses, seminar participation, and dissertation research. Please refer to the Graduate Program sections to find the specific requirements for that program.

PhD students with an MS degree may be able to apply up to 24 semester hours from their MS degree towards the PhD course requirements.

Grading Requirements for PhD Degree Coursework and Research Credit

For students pursuing a PhD degree, up to 6 semester hours of research (including any completed while an MS student) can be completed for a letter grade. All other research credits must be taken on a satisfactory/unsatisfactory (S/U) basis. All hours of credit for graduate coursework, including both core courses and electives within each graduate program, must be taken for a letter grade. Undergraduate courses taken to fulfill pre-requisites for graduate curricula may be taken on a pass/no pass (P/N) basis.

Requirement in Engineering Ethics

All PhD students must enroll in and complete the College of Engineering's course in Engineering Ethics. The registration number is ENGR:7270. This is a one semester course that will meet weekly (requiring approximately 15 hours of attendance per semester for 1 semester hour) that is required for all first-year graduate students in the College of Engineering. Through the use of case studies and presentations and discussions with visiting speakers, a range of topics in the responsible conduct of research in engineering and the sciences will be discussed. The course will provide a good introduction to many of the practical issues associated with being a responsible scientist. The course is designed to conform to the mandates set by the Office of the Vice President for Research and the Graduate College to train graduate students in the responsible conduct of research.

The course grade will be S/U based on class attendance and class participation. Attendance and participation are required for all classes since federal requirements mandates that all the training topics must be covered and that every student completes all training areas. Excused absences are accepted for professional travel (e.g., professional conferences), illness or other unavoidable circumstances; however, students must contact the course director to make arrangements to complete the training for the topic(s) missed.

Doctoral students who completed the Engineering Ethics requirement at Iowa as part of an earlier MS degree do not need to retake this course as part of their doctoral thesis requirement.

Requirement in Technical Writing

All PhD students must enroll in and complete a class focused on technical communication. This requirement must be fulfilled within the first two years of study in the CEE graduate program. Approved options for this technical writing requirement include Public Speaking for Academics (RHET 7900) and Writing in the Disciplines (RHET 7930).

Requirement in Professional Development Workshops

All PhD students are required to participate in at least two professional development workshops offered through the Graduate College (see <https://www.grad.uiowa.edu/professional-development>) over their time in the CEE graduate program.

Grade Point Average Requirements

The Graduate College has established a minimum grade point average (GPA) requirement to remain in good standing (see <http://www.grad.uiowa.edu/manual-part-1-section-iv-academic-standing-probation-and-dismissal>). PhD degree students are expected to maintain a 3.0 or better GPA. A student with less than a 3.0 GPA after 9 or more semester hours of graded graduate work at the University of Iowa will be placed on probation by the Graduate College. If, after completing 9 more semester hours of graded graduate work, the student's GPA remains below 3.0, the student will be dismissed and denied permissions to reregister within any Graduate College degree program; otherwise the student will be restored to good standing.

Within CEE, PhD degree students must have a 3.0 or better GPA for graduation. A student with a GPA below 3.0 upon completion of their studies will not be permitted to take a final examination for the PhD degree.

Residence Requirement

The Graduate College also maintains a minimum on-campus residence requirement that all PhD students must satisfy. See Section XII (Doctor's Degrees) of the [Manual of Rules and Regulations of the Graduate College](#) (Part C).

MS Degree during PhD Studies

PhD students without an MS degree may apply for a MS degree (either with the thesis or non-thesis option) after they have completed 30 hours of graduate credit, presented their research in a Graduate Seminar, and passed the PhD Comprehensive Exam.

2.4. Examination Process

MS Degree

A final examination is required to obtain an MS degree. **One semester prior to the anticipated final examination date/graduation date, students should meet with their advisor for a degree audit.** This audit is to monitor degree progress and should represent a "go/no go" decision point for scheduling the MS Final Examination. In particular for students pursuing the MS/Thesis option, this check point is when the advisor and student must determine whether a defensible thesis can be prepared in a timely fashion (i.e., within the upcoming semester) and in accordance with stated Graduate College standards and deadlines (see below). If within these constraints the production of a defensible thesis is deemed unlikely, then the student must use the remaining semester to enroll in sufficient coursework to achieve the additional semester hours of credit necessary for the non-thesis MS degree. Financial support from the advisor

while completing this coursework is not guaranteed. **For a degree objective change from the MS/Thesis to MS/Non-Thesis Option, semester research hours earned for thesis credit (typically 6 s.h.) cannot be counted toward the 30 s.h. required for the non-thesis MS degree.**

MS Final Examination: The final examination for the MS degree is carried out in accordance with Section X (Master's Degrees) of the Manual of Rules and Regulations of the Graduate College (Parts J and K) (<http://www.grad.uiowa.edu/manual-part-1-section-x-masters-degrees>).

The Examining Committee consists of at least three faculty members selected according to the following specifications:

- At least two of the faculty members must hold appointments in CEE and be members of the University of Iowa tenure-track faculty.
- At least one faculty member must have a primary appointment in CEE.
- Permission can be requested from the Graduate Dean to replace one of the three members by a recognized scholar of professional rank from another academic institution, national laboratory, or federal agency.

The format of the MS final examination is established by each of the four Graduate Programs. In general, the final examination will consist of an oral defense of the student's thesis for the MS/Thesis Option. For the MS/Non-thesis Option, the final examination may include the review and approval of the student's program of study, the review and approval of a student report, or a written and/or oral examination. Please refer to the Graduate Program sections to find the specific requirements for that program.

MS/Thesis Option candidates should refer to thesis guidelines in Section X (Master's Degrees) of the Manual of Rules and Regulations of the Graduate College (Parts H) (<http://www.grad.uiowa.edu/manual-part-1-section-x-masters-degrees>) and linked materials on Theses and Dissertations on the Graduate College web site (<http://www.grad.uiowa.edu/theses-and-dissertations>) on the format of the dissertation document. **Students preparing for their final examination are advised to be aware of first thesis deposit and final thesis deposit deadlines of the Graduate College (<http://www.grad.uiowa.edu/deadlines>).** Information on these deadlines can be obtained through Graduate Program Administrator, Kim Lebeck, in the CEE department office (4105 SC).

Check List for Students for the MS Final Examination

It is the student's responsibility to ensure that all work is performed and all forms are submitted, in a timely manner to obtain his or her MS degree. The forms and timelines originate from the Graduate College, which ultimately confers the degree, not the department.

All students planning to take the MS Final Examination must:

- Meet with their advisor one semester prior to the anticipated examination date for a degree audit to ensure sufficient progress toward degree and timely production of all materials required for the final examination. The advisory must send a memo/email to the Graduate Program Administrator (Kim Lebeck) indicating the audit's outcome.
- Upon a satisfactory degree audit, notify the Graduate Program Administrator (Kim Lebeck) of their intent to graduate and complete required forms
- Apply for a degree from the Graduate College by the appropriate deadline (<http://www.grad.uiowa.edu/deadlines>)
- Select committee members in consultation with their advisor

Student submitting an MS Thesis for graduation must:

- Follow all guidelines for thesis preparation as posted on the Theses and Dissertation page of the Graduate College web site.
- Submit a first deposit of the thesis electronically to the Graduate College by the deadline

Student submitting an MS Thesis or Report for graduation must:

- Complete the thesis or report with sufficient time for review by advisor
- Print and send copies of the thesis report to advisor and committee members at least two weeks prior to examination

Students taking an oral MS Final Examination must:

- Determine potential examination date with the advisor
- Schedule examination date with advisor and committee members
- Schedule examination location through the Graduate Program Administrator (Kim Lebeck) in the CEE office.

After the examination, MS Thesis students must:

- Obtain committee signatures on thesis signature page
- Submit a final deposit of the dissertation electronically to the Graduate College by the deadline, as per instructions on the Graduate College website.

PhD Degree

Three examinations are required to obtain a PhD degree:

1. PhD Qualifying Exam
2. PhD Comprehensive Exam
3. PhD Final Exam

1. PhD Qualifying Examination: The purpose of the PhD qualifying examination is to evaluate a student's potential for success in graduate level studies and research. The examination may require demonstration of sufficient academic ability, and written and oral technical communication skills. The PhD qualifying examination is an early milestone in the PhD degree program, and usually takes place sometime near or after the end of the student's first academic year. The format and timing of the PhD qualifying examination is established by each of the four Graduate Programs. Please refer to the Graduate Program sections to find the specific requirements for that program.

If the PhD qualifying examination is passed, a memo/email must be sent by the advisor to the Graduate Program Administrator (Kim Lebeck) indicating the successful exam result. This memo will be placed in the student's file.

If the PhD qualifying examination is failed, the Graduate Program will decide on the appropriate course of action. Options include dismissal from the program, retaking the examination, retaking portions of the examination, or additional activities/requirements in order to remedy deficiencies. If the student is allowed to take the PhD qualifying examination a second time, a second failure would result in dismissal from the program.

Exam 1: Check List for Students for the PhD Qualifying Examination

All students planning to take the PhD qualifying examination must:

- Notify the Program Coordinator of intent to take the examination at its scheduled offering
- Provide any documents and information requested by the Program Coordinator prior to the examination

If the PhD qualifying examination has an oral examination by committee, the student must:

- Select committee members in consultation with the advisor
- Determine potential examination date with the advisor
- Schedule examination date with advisor and committee members
- Finalize examination location with the Graduate Program Administrator (Kim Lebeck).

All PhD students must take the PhD qualifying examination within the timeline established by the Graduate Program (typically at the conclusion of their first year; see timeline information described in the Examination Process section for the Program). Failure to take the qualifying examination within the required timeline — without first obtaining a signed waiver from your advisor and the Program Coordinator — is sufficient cause for dismissal from the PhD program.

2. PhD Comprehensive Examination: The comprehensive exam for the PhD degree is carried out in accordance with Section XII of the Manual of Rules and Regulations of the Graduate College (Part K and P) (www.grad.uiowa.edu/manual-part-1-section-xii-doctors-degrees).

The comprehensive is an oral examination administered by the student's PhD Examining Committee, and it is expected to be completed within one year of passing the PhD qualifying examination. The Examining Committee must consist of at least five members selected according to the following specifications:

- At least 4 of the faculty members must be members of University of Iowa tenure track faculty
- At least 2 of the faculty members must be tenure track faculty from CEE
- Permission can be requested from the Graduate Dean to replace one of the five members by a recognized scholar of professional rank from another academic institution, national laboratory, or federal agency.

The comprehensive exam addresses knowledge expected of any doctoral candidate in our program and also includes a defense of a proposed research plan for the PhD degree. This examination, administered only on campus, is intended to be an inclusive evaluation of the candidate's mastery of the major and related fields of study, including the tools of research in which competence has been certified. Students preparing for the comprehensive examination should obtain the associated forms required by the Graduate College from the Graduate Program Administrator, Kim Lebeck, in the CEE department office (4105 SC) at least two weeks prior to the expected examination date.

The Examining Committee will report the outcome of the examination (satisfactory, satisfactory with reservations, or unsatisfactory) to the Graduate College. If there are reservations, the committee will stipulate conditions to be satisfied. The candidate will not be admitted to the final oral examination until such conditions have been satisfied. If the examination is unsatisfactory, the Examination Committee may grant the student permission to take the examination for a second (and final) time. The reexamination must be completed within a time frame determined by the student's advisor.

Exam 2: Check List for Students for the PhD Comprehensive Examination

Admission to the comprehensive examination is granted upon the recommendation of the department, the filing of the Plan of Study, and the approval of the dean of the Graduate College. It is the student's responsibility to ensure that all work is performed, and all forms are submitted, in a timely manner.

All students planning to take the PhD Comprehensive Examination must:

- Notify the Academic Graduate Program Administrator (Kim Lebeck) of intent to take the comprehensive exam and obtain required forms
- Select committee members in consultation with the advisor
- Provide completed forms to the Graduate Program Administrator
- Determine potential exam date with the advisor
- Schedule examination date with advisor and committee members
- Finalize examination location with the Graduate Program Administrator
- Complete the PhD dissertation proposal or prospectus with sufficient time for review by advisor (in the format outlined by the Graduate Program)
- Print and send copies of the proposal or prospectus to advisor and committee members prior (typically two weeks) to the examination

3. PhD Final Exam: The final exam is an oral defense of the PhD dissertation. The oral dissertation defense is administered by the student's Examining Committee. The committee consists of at least five faculty members:

- At least 4 of the faculty members must be members of University of Iowa tenure track faculty
- At least 2 of the faculty members must be tenure track faculty from CEE
- Permission can be requested from the Graduate Dean to replace one of the five members by a recognized scholar of professional rank from another academic institution, national laboratory, or federal agency.

The PhD dissertation is prepared in writing and distributed to the committee members at least two weeks prior to the exam, or by arrangement with each committee member. PhD candidates should refer to dissertation guidelines in Section XII (Doctor's Degrees) of the Manual of Rules and Regulations of the Graduate College (Parts M) (<http://www.grad.uiowa.edu/manual-part-1-section-xii-doctors-degrees>) and linked materials on Theses and Dissertations on the Graduate College web site (<http://www.grad.uiowa.edu/theses-and-dissertations>) on the format of the dissertation document. Students preparing for their final examination are advised to be aware of first thesis deposit and final thesis deposit deadlines of the Graduate College (<http://www.grad.uiowa.edu/deadlines>). Information on these deadlines can be obtained through the Graduate Program Administrator, Kim Lebeck, in the CEE department office (4105 SC).

Exam 3: Check List for Students for the PhD Final Examination

It is the student's responsibility to ensure that all work is performed and all forms are submitted in a timely manner to obtain the degree. The forms and timelines originate from the Graduate College, which ultimately confers the degree, not the department.

All students planning to take the PhD Final Examination must:

- Notify the Graduate Program Administrator (Kim Lebeck) of intent to graduate and complete required forms
- Apply for a degree from the Graduate College by the appropriate deadline (<http://www.grad.uiowa.edu/deadlines>)
- Determine potential examination date with their advisor
- Schedule examination date with advisor and committee members
- Finalize examination location with the Graduate Program Administrator
- Follow all guidelines for dissertation preparation as posted on the [Theses and Dissertation](#) page of the Graduate College web site.
- Submit a first deposit of the dissertation electronically to the Graduate College by the deadline
- Complete the dissertation with sufficient time for review by advisor
- Print and send copies of the dissertation to advisor and committee members at last two weeks prior to examination

After the examination, PhD students must:

- Obtains committee signatures on thesis signature page
- Submit a final deposit of the dissertation electronically to the Graduate College by the deadline

2.5. BS/MS Degree Program

In an effort to serve the most able undergraduate engineering students at The University of Iowa, CEE and the College of Engineering support a combined bachelor of science and master of science degree program (BS/MS). Students admitted to this program will be allowed to: apply three engineering courses (9 s.h.) towards both the B.S. and M.S. degree requirements; take an additional 3 s.h. of graduate coursework before completing their BS; and attend and participate in the departmental graduate seminar. The intent of the program is to allow an early entrance to graduate school for our most able students. Students applying for the BS/MS program with the MS/Non-thesis option must hold a GPA of 3.0 at the time of their application to be admitted into the program. Those intending to pursue the MS/Thesis option through the BS/MS program must have a GPA of 3.25 at the time of their application to the program.

The deadline to apply for the BS/MS program is **May 1 of the student's junior year**. The BS/MS program is primarily intended for students interested in pursuing the MS/Non-thesis degree option. However, the MS/Thesis degree option can be pursued in those instances where (i) a student has been conducting research under the supervision of a CEE faculty member since (at least) the summer following the student's junior year and (ii) a CEE faculty member is willing to provide RA support during (at least) the student's second year in the BS/MS program.

Graduation Requirements

Successful completion of the graduate degree requires advice and approval from the student's graduate advisor. For MS/Non-thesis option students, the graduate advisor is typically the appropriate Graduate Program Coordinator.

A student in the joint BS/MS degree program must complete all the graduation requirements of both the undergraduate program and the graduate program in CEE. However, 9 semester hours of upper level courses may be counted toward both the BS and MS degrees, and an additional 3 semester hours of graduate courses may be taken before BS graduation. Thirty semester hours (30 s.h.) of graduate courses are required, depending on the area of study. Students entering the BS/MS degree program are required to enroll in a graduate seminar (CEE 5091; CEE 5092; CEE 5093; CEE 5094) once they have completed their BS degree.

Students in the combined BS/MS program are required to meet program specific requirements, which may include to produce and defend a scholarly product in the form of a manuscript submitted to a peer-reviewed scientific archival journal, a completed design report, or an MS thesis. The research work associated with this product, if applicable, usually requires 10-20 hours per week throughout the years of enrollment.

The MS must be completed within 2 years from completing the BS degree. If a student withdraws from the joint BS/MS joint degree program, or does not complete the MS two years after completing the BS, no graduate credit will be given for any portion of the semester hours eligible for joint counting that have been completed. The hours will be applied as undergraduate electives.

Tuition and Fees

Tuition is assessed at the undergraduate level for seven semesters (112 s.h.) of undergraduate study. The final semester, tuition will be assessed at the graduate level. Thereafter, tuition will be assessed at the graduate level.

Research and/or Teaching Assistantships and other forms of financial aid are not routinely provided to BS/MS students. However, students are encouraged to discuss this with their graduate advisor.

Example Plans of Study: CEE BS/ CEE MS

The following tables are examples of coursework by former BS/MS graduates of CEE. Graduate courses often change. The current offering of graduate required and elective courses may not include courses in the tables below. See ISIS.uiowa.edu for up to date information.

Table 1. Example curriculum for a BS/MS degree in EES.

BS s.h.	MS s.h.	Course Number	Course Name
3	3	CEE:4159	Air Pollution Control Technology
3	3	CEE:5156	Physical-Chemical Processes
3	3	CEE:4102	Groundwater
	3	CEE:5154	Environmental Microbiology
	3	CEE:4385	International Perspectives in Engineering
	3	CEE:5155	Biological Treatment Processes
	3	CEE:5153	Environmental Chemistry Laboratory
	3	GEOS:3360	Soil Genesis and Geomorphology
	3	CEE:4103	Water Quality
	3	CEE:5999	MS Research
	0	CEE:5092	EES Grad Seminar each semester

Table 2. Example curriculum for a BS/MS degree in SMM.

BS s.h.	MS s.h.	Course Number	Course Name
3	3	CEE:4539	Foundations of Structures
3	3	CEE:5540	Intermed. Mechanics of Deformable Bodies
3	3	CEE:5090	Research Project
	3	CEE:6543	Continuum Mechanics & Elasticity
	3	CEE:4511	Numerical Calculations
	3	CEE:5154	Intermed Kinematics & Dynamics
	3	CEE:4512	Engineering Design Optimization
	3	CEE:4515	Computer Aided Engineering
	3	CEE:5532	Fundamentals of Vibrations
	0	CEE:5091	SMM Grad Seminar each semester

Table 3. Example curriculum for a BS/MS degree in HWR.

BS s.h.	MS s.h.	Course Number	Course Name
3	3	CEE:4157	Environmental Engineering Design
3	3	CEE:4374	Water Resources Design
3	3	CEE:4119	Hydrology
	3	CEE:5188	Computational Methods in Water Resources
	3	CEE:4118	Probabilistic Methods in Hydrosience
	3	CEE:5374	Environmental Fluid Dynamics
	3	CEE:4378	Hydrometeorology
	3	CEE:4146	Multiscale Hydrology
	3	CEE:4370	Flow in Open Channels and Sediment Transport
	0	CEE:5093	HWR Grad Seminar each semester

Table 4. Example curriculum for a BS/MS degree in TE.

BS s.h.	MS s.h.	Course Number	Course Name
3	3	CEE:4762	Design of Transportation Systems
3	3	CEE:4763	Traffic Engineering
3	3	CEE:4764	Winter Highway Maintenance
	3	CEE:4167	Public Transit Operations and Planning
	3	CEE:4160	Introduction to Bridge Engineering
	3	CEE:4176	Transportation Demand Analysis
	3	CEE:4131	Impacts of the Technological Singularity
	3	CEE:6763	Application Simulation to Transportation
	3	CEE:4568	Civil Infrastructure
	3	CEE:5090	Readings in CEE
	0	CEE:5094	TE Grad Seminar each semester

2.6. Joint BS/MS Degree Programs with other academic departments

BS (CBE)-MS (CEE)

In an effort to serve the most able undergraduate engineering students at The University of Iowa, the Department of Chemical & Biochemical Engineering (CBE) and CEE support a combined Bachelor of Science and Master of Science degree program to serve students planning a BS in CBE and an MS in Environmental Engineering and Science from CEE (BS-CBE/MS-CEE). Students admitted to this program will be allowed to: apply three engineering courses (9 s.h.) towards the requirement from both the B.S. in CBE and M.S. in CEE; take an additional 3 s.h. of graduate coursework before completing their BS; and attend and participate in the departmental graduate seminar.

Graduation Requirements: Successful completion of the graduate degree requires advice and approval from the student's graduate advisor. A student in the joint BS-CBE/MS-CEE degree program must complete all the graduate requirements of both the undergraduate program in CBE and the graduate program in CEE. However, 9 s.h. of upper level courses may be counted toward both the BS and MS degrees and an additional 3 s.h. of graduate courses may be taken before BS graduation. Thirty semester hours of graduate courses are required. Students entering the BS-CBE/MS-CEE degree program in environmental engineering are required to

enroll in the environmental engineering graduate seminar each semester (CEE:5092) and may be excused from Professional Seminar upon request to CBE.

Students in the combined BS-CBE/MS-CEE program may be required (at the advisor's discretion) to produce and defend a scholarly product in the form of a manuscript submitted to a peer-reviewed scientific archival journal, a completed design report, or an M.S. thesis. The research work associated with this product usually requires 10-20 hours per week throughout the years of enrollment.

The MS must be completed within 2 years from completion of the BS degree. If a student withdraws from the joint BS-CBE/MS-CEE joint degree program, or does not complete the MS two years after completing the BS, no graduate credit will be given for any portion of the semester hours eligible for joint counting that have been completed. The hours will be applied as undergraduate electives.

Additional information can be found at <http://www.cbe.engineering.uiowa.edu/undergrad-program/> and <http://www.cee.engineering.uiowa.edu/gradprogram.php/>

Tuition and Fees: Tuition is assessed at the undergraduate level for seven semesters (112 s.h.) of undergraduate study. The final semester, tuition will be assessed at the graduate level. Thereafter, tuition will be assessed at the graduate level.

Research and/or Teaching Assistantships and other forms of financial aid are not routinely provided to BS-CBE/MS-CEE students. However, students are encouraged to discuss this with their graduate advisor.

Example Plans of Study: The following table is an example of coursework for the BS-CBE/MS-CEE. Graduate courses often change. The current offering of graduate required and elective courses may not include courses in the table below. See ISIS.uiowa.edu for up to date information.

Table 5. Example curriculum for a BS-CBE/MS-CEE (non-thesis) degree.

BS s.h.	MS s.h.	Course Number	Course Name
3	3	CHEM:3120	Analytical Chemistry II
3	3	CEE:5150	Environmental Chemistry
3	3	CEE:4158	Solid and Hazardous Waste
	3	CEE:4102	Groundwater
	3	CEE:4157	Environmental Engineering Design
	3	CEE:5154	Environmental Microbiology
	3	CEE:5153	Environmental Chemistry Laboratory
	3	CEE:4371	Water Resources Engineering
	3	CEE:5156	Physical-Chemical Processes
	3	CEE:5155	Biological Treatment Processes
	0	CEE:5092	EES Grad Seminar each semester

BS (MIE)-MS (CEE)

In an effort to serve the most able undergraduate engineering students at the University of Iowa, the Department of Mechanical & Industrial Engineering (MIE) and the Department of Civil & Environmental Engineering (CEE) support a combined Bachelor of Science and Master of Science degree program to serve students planning a BS in MIE and an MS in Environmental Engineering and Science from CEE (BS-MIE/MS-CEE). Students admitted to this program will be allowed to: apply three engineering courses (9 s.h.) towards the requirement from both the B.S. in MIE and M.S. in CEE; take an additional 3 s.h. of graduate coursework before completing their BS; and attend and participate in the departmental graduate seminar. The intention of the program is to enhance the opportunities for graduate study for our most able students.

Graduation Requirements: Successful completion of the graduate degree requires advice and approval from the student's graduate advisor. A student in the joint BS-MIE/MS-CEE degree program must complete all the graduate requirements of both the undergraduate program in MIE and the graduate program in CEE. However, 9 s.h. of upper level courses may be counted toward both the BS and MS degrees and an additional 3 s.h. of graduate courses may be taken before BS graduation. Thirty semester hours of graduate courses are required. Students entering the BS-MIE/MS-CEE degree program in environmental engineering are required to enroll in the environmental engineering graduate seminar each semester (CEE:5092 and may be excused from Professional Seminar upon request to MIE.

Students in the combined BS-MIE/MS-CEE program may be required (at the advisor's discretion) to produce and defend a scholarly product in the form of a manuscript submitted to a peer-reviewed scientific archival journal, a completed design report, or an M.S. thesis. The research work associated with this product usually requires 10-20 hours per week throughout the years of enrollment.

The MS must be completed within 2 years from completing the BS degree. If a student withdraws from the joint BS-MIE/MS-CEE joint degree program, or does not complete the MS two years after completing the BS, no graduate credit will be given for any portion of the semester hours eligible for joint counting that have been completed. The hours will be applied as undergraduate electives.

Tuition and Fees: Tuition is assessed at the undergraduate level for seven semesters (112 s.h.) of undergraduate study. The eighth semester, tuition will be assessed at the graduate level. Thereafter, tuition will be assessed at the graduate level.

Research and/or Teaching Assistantships and other forms of financial aid are not routinely provided to BS-ME/MS-CEE students. However, students are encouraged to discuss this with their graduate advisor.

Example Plans of Study: The following table is an example of coursework for the BS-MIE/MS-CEE. Graduate courses often change. The current offering of graduate required and elective courses may not include courses in the table below. See ISIS.uiowa.edu for up to date information.

Table 4. Example curriculum for a BS-MIE/MS-CEE (non-thesis) degree.

BS s.h.	MS s.h.	Course Number	Course Name
3	3	CBE:3160	Eng. Analysis Alternative Energy Systems
3	3	CEE:4159	Air Pollution Control Tech
3	3	IE:4550	Wind Power Management
	3	CEE:4102	Groundwater
	3	CEE:4157	Environmental Engineering Design
	3	CEE:5154	Environmental Microbiology
	3	CEE:5153	Environmental Chemistry Laboratory
	3	CEE:4371	Water Resources Engineering
	3	CEE:5156	Physical-Chemical Processes
	3	CEE:5155	Biological Treatment Processes
	0	CEE:5092	EES Grad Seminar each semester

2.7. Additional Requirements

A mentoring team consisting of the advisor, another faculty member from the graduate program, and a senior graduate student or a staff member in the graduate program, will be assigned to each graduate student. This mentoring program is not intended to be focused on research activities. Rather, it is to provide the students with multiple individuals with which they can routinely discuss and gather feedback about their progress in the CEE graduate program.

Section 3. Degree Program Information

3.1. Environmental Engineering and Science (EES) Graduate Program

3.1.1. Program Description

The graduate program in Environmental Engineering and Science (EES) at The University of Iowa prepares students for positions in academia, consulting, and private enterprise by producing capable graduates with a well-rounded set of career skills. Environmental engineering and science training offers opportunities to work in any aspect of environmental protection. The major areas include air pollution control, hazardous waste management, toxic materials control, water supply, wastewater management, storm water management, solid waste disposal, industrial hygiene, radiation protection, public health, and land management. Environmental engineers are also leaders in the development, planning and implementation of environmental sustainability, including waste reduction, alternative energy, and life-cycle analysis. Within each of these major categories are many sub-specialties.

At the MS level, the program of study is designed to develop a fundamental knowledge of environmental chemistry and microbiology, and its application in natural environmental systems, water supply and pollution control processes and in solid and hazardous waste management. PhD degree programs require the development of a high level of competence in environmental engineering and science through a combination of course work and research. The degree programs are more individualized to emphasis a specific environmental area and also develop special expertise in a related science or engineering area. Typical outside areas are modeling, chemistry, microbiology, chemical engineering, hydrology and water resources, and environmental health and toxicology.

3.1.2. Prerequisites

The EES Graduate Program offers options in Environmental Science (Option 1) and Environmental Engineering (Option 2). Students with an undergraduate degree in the sciences or mathematics may pursue either option if remedial courses are completed, or otherwise satisfied, as outlined below. Students seeking to qualify for the Fundamentals of Engineering (FE) exam, on the path toward the Principles and Practice of Engineering (PE) exam, should pursue the Environmental Engineering option.

- **Environmental Science (Option 1):** College-level chemistry, physics, statistics, and calculus I & II are required. Students lacking coursework on “reactor theory” should take Water Quality Engineering (CEE:3155) for graduate credit. Students lacking statistics coursework should take Statistics for Experimenters (OEH:4540) for graduate credit. Deficiencies in chemistry, physics, and/or calculus can be remediated (pass/no pass grading option) while enrolled in the EES program with the approval of the research advisor and EES Program Coordinator.
- **Environmental Engineering (Option 2):** Statics, Thermodynamics, Fluid Mechanics, Hydrology & Hydraulics or Groundwater, math through Differential Equations, and Probability & Statistics are required in addition to the Environmental Science option

requirements. Recommended courses for the FE exam include Mechanics of Deformable Bodies, Dynamics, and Computer Programming.

Typically, a professional licensing board, from any state, will deny an application to sit for the FE exam or the PE exam if the applicant does not have an undergraduate engineering degree from an accredited institution. The Environmental Engineering graduate option should satisfy this requirement in most cases for students with non-engineering undergraduate degrees. Details about Iowa's professional examination process can be found here: <https://plb.iowa.gov/engineering-applications-and-forms>. Details about the FE and PE exams, in general, can be found here: www.ncees.org.

3.1.3. Course Requirements

MS Degree

A total of 30 semester hours is required to earn the MS non-thesis or MS with-thesis degree. The non-thesis option requires all 30 semester hours be obtained from coursework. The with-thesis option requires a minimum of 24 semester hours of coursework with the remaining 6 semester hours obtained through MS thesis research (CEE:5999) credit.

- **MS Core Courses:** For the MS Degree, these courses are required:
 - Environmental Engineering Design (CEE:4157)*
 - Environmental Chemistry (CEE:5150)
 - Fundamentals of Environmental Sampling and Analysis (CEE:5153)
 - Environmental Microbiology (CEE:5154)
 - Biological Treatment Process (CEE:5155)
 - Physical-Chemical Process Fundamentals (CEE:5156)
 - Communication Skills: Writing and Presenting (CEE:6225)**

*CEE:4157 is only required for the Environmental Engineering designation (i.e. it is not required for the Environmental Science designation). Students with previous equivalent coursework can petition to substitute CEE:4157 (see Section 3.1.5) for a suitable elective.

**CEE:6225 is available for with-thesis option students only. Non-thesis option students must work with their academic advisor to find a suitable writing- and presentation-intensive course alternative.

- **Elective Courses:** For the MS non-thesis option, all elective courses, except one, must be EES courses. Non-EES electives must be approved by the EES Program Coordinator. If an insufficient number of EES electives are available, students may petition for additional course substitutions (see Section 3.1.5). For the MS with-thesis option, elective courses may be chosen, in consultation with the research advisor, from any academic area, especially if EES electives do not provide the necessary training to fully support a student's research topic.
- **Seminar:** All students are required to register for, and participate in, CEE:5092 Environmental Engineering Seminar when registered full-time (at least 9 semester hours). Each MS with-thesis option student will present one seminar, typically on their thesis topic.

- **Thesis:** A thesis can receive up to 6 semester hours of MS research credit (CEE:5999), three of which may be taken for a letter grade.

Please read the Course Requirements section within the CEE Graduate Requirements for additional Graduate College and departmental requirements for the MS degree program (Section 2.3).

PhD degree

A total of 72 semester hours of coursework beyond the basic undergraduate degree is required for a PhD degree. A minimum of 42 semester hours must be obtained through coursework and a maximum of 30 semester hours of PhD dissertation research (CEE:7999) may be counted toward the total requirement. Up to 24 semester hours of MS academic credit from the EES program, or from another qualified graduate program, may be applied toward the PhD coursework requirement.

- **Core Courses:** For the PhD degree, the MS Core Courses must be satisfied.
- **Elective Courses:** Elective courses may be chosen from any academic area and should strengthen the student's knowledge of environmental engineering and science and provide needed research topic training. Independent study (CEE:5998) is not considered a suitable elective. Plans of study must be approved by the advisor in coordination with the EES Program Director.
- **Seminar:** All PhD students are required to register for, and participate in, CEE:5092 Environmental Engineering Seminar when they are registered at full-time (either with at least 9 semester hours, or after completing the Comprehensive Exam). Each PhD student is required to present two seminars on their PhD dissertation topic(s).
- **Dissertation:** Students must complete a PhD Dissertation, for up to 30 hours of PhD dissertation research credit (CEE:7999), six of which may be taken for a letter grade.

Please read the Course Requirements section within the CEE Graduate Requirements for additional Graduate College and departmental requirements for the PhD degree program (Section 2.3).

3.1.4. Examination Process

MS Degree

A final examination is required to obtain an MS degree:

MS Final Examination: For details and requirements for the MS Final Examination, see the Examination Process section within the CEE Graduate Requirements (Section 2.4). In the EES Program, for the MS non-thesis option, the final examination will be an exit interview with the EES Program Director. For the with-thesis option, the final examination will consist of an oral defense of the student's thesis. In all examinations, the student's academic record will be reviewed for completion and adherence to all stated degree requirements.

PhD Degree

Three examinations are required to obtain a PhD degree: the PhD Qualifying Examination, the PhD Comprehensive Examination, and the PhD Final Examination.

PhD Qualifying Examination: All PhD students must pass the PhD qualifying exam within their first year of study. Failure to take the exam before the conclusion of your second full semester - without first obtaining a signed waiver from your advisor and the EES Program Director - is sufficient cause for dismissal from the PhD program.

The Ph.D. qualifying exam requires successful demonstration of academic ability, written technical communication, and oral technical communication. The examination will be conducted by a Qualifying Examination Committee, which includes your advisor, the EES Graduate Program Director, and a third EES faculty member. The examination is conducted in two steps: (1) a review of examination materials submitted by the student, and (2) an examination meeting with the student.

To initiate the examination process, students will provide the EES Graduate Program Director with electronic copies of the following materials:

1. A current resume or CV.
2. An unofficial copy of your University of Iowa transcript.
3. A Plan of Study.
4. An example of written technical communication, the topic of which is determined in consultation with the student's advisor. For example, the student may elect to submit a literature review on a subject chosen by the student and his/her advisor, especially if this literature review may serve as the introduction for future research conducted as part of their PhD dissertation. There are no strict rules on format, but the review should be on the order of 5 (single-spaced) or 10 (double-spaced) pages, not including references and figures.

Alternatively, if the student has recently completed a manuscript of a journal article or conference proceedings on which they are lead author, the student may submit this as their writing sample (with advisor's approval).

5. A list of oral presentations the student has made (if any), including seminars, workshops, and technical conferences.
6. Copies of a graded exam from all core courses taken or currently taking. Select one exam for each course.

After review of this material, the student, in collaboration with their advisor and the Program Director, will meet with their PhD Qualifying Exam committee (typically in late June or early July). The examination meeting will involve a discussion of the student's research plans and qualifications with the committee. The meeting should include a short (25-minute) presentation related to the writing assignment in item (4) above, as well as a brief summary of the student's research progress to date. The final slide(s) of the presentation should include an outline of the research proposal plan that will be defended in the subsequent PhD Comprehensive Examination. This outline should include a tentative title for your thesis, as well as the overall objective, overriding hypothesis, general approach, and key outcomes and benefits of the work to be formally proposed. At the conclusion of the presentation, the committee will lead a discussion of topics related to your writing assignment and research plans, and the student will be expected to answer oral questions on their academic preparation.

After the examination, the Qualifying Examination Committee will meet to determine whether the exam is passed or failed. If the exam is failed, the outcome will either be dismissal from the PhD program, or you may be granted permission to take the examination for a second (and final) time. If the exam is passed, the advisor must send a memo noting the successful examination to the Graduate Program Administrator, Kim Lebeck, to be added to the student's file.

PhD Comprehensive Examination: For details and requirements for the PhD Comprehensive Examination, see the Examination Process section within the CEE Graduate Requirements. In the EES Program, the PhD comprehensive examination requires a research proposal plan and oral presentation. The research proposal plan is prepared in writing and distributed to the committee members at least two weeks prior to the exam, or by arrangement with each committee member. The written proposal is limited to 15 pages and should include a short literature review providing the motivation and rationale for the work, a testable hypothesis (or hypotheses), objectives, an experimental plan with an appropriate description of methods, timeline for research progress, and preliminary results. Required components of the proposal not included in the 15 page limit are a one page abstract summarizing the key aspects of the proposed plan of research, the list of references cited, and a two page CV of the candidate. During proposal preparation, students are encouraged to follow the guidelines for proposal structure and content put forth by the National Science Foundation. This information can be found at <http://www.nsf.gov/funding/preparing/>.

The structure of the oral exam includes a 30 minute presentation of the research plan followed by questions from each of the committee members. The oral exam is also an opportunity to discuss collaborations (including potential authorship on publications resulting from the research), additional coursework, or skills that the committee recommends for successful completion of the research.

PhD Final Examination: For details and requirements for the PhD Final Examination, see the Examination Process section within the CEE Graduate Requirements (Section 2.4).

3.1.5 General EES Administrative Procedures

Filing a Petition to the EES faculty

A formal, written petition is required to substitute a required EES course with an equivalent class taken previously and for MS non-thesis students to get approval for substituting an elective course offered outside of EES. In certain cases, students may also petition to substitute an EES core course with another course offering at UI, so long as the proposed course is deemed by the faculty advisor and EES faculty to be of critical importance to the student's doctoral thesis research.

For each of the cases above, a formal petition should consist of:

- A signed cover letter clearly describing and briefly justifying the course substitution being proposed. This should include the name (and number, if available) of the substitute course, as well as the name (and number, if available) of the course that is being replaced.
- Whenever possible, a syllabus for the substitute course should be provided.

All petitions should be submitted via email to the EES Program Coordinator.

3.2. Hydraulics and Water Resources (HWR) Graduate Program

3.2.1. Program Description

The graduate program in Hydraulics & Water Resources at The University of Iowa prepares students for careers in hydraulics, hydrology, and water resources by providing a strong theoretical and applied foundation, and a broad-based academic background, necessary for positions in engineering design, research, and academia. The program combines hydraulics, fluid mechanics, hydrology, and water resources, with elements from environmental engineering, meteorology, remote sensing and systems analysis, and related disciplines such as economics, geology, geographical information systems (GIS), mathematics, statistics, electrical and computer science engineering, operations research, law, sociology, and urban and regional planning. Graduates find positions in consulting firms and government agencies, university and research labs, and private enterprise, with opportunities to work advanced and emerging topics in engineering.

At the MS level, the program of study is designed to develop a fundamental knowledge of fluid mechanics, hydraulics, hydrology, and water resources, its applications to such areas as hydraulic infrastructure, sediment transport and stream restoration, flood and drought assessment, and land-atmosphere interactions. The PhD degree requires the development of a high level of competence in Hydraulics and Water Resources through a combination of course work and research. The PhD degree is more individualized to emphasize a specific area, and also develop special expertise in related areas of science and engineering.

3.2.2. Prerequisites

For graduate students admitted to the HWR Program who do not have an undergraduate BS degree in civil and environmental engineering, certain undergraduate courses may need to be taken without graduate credit. Undergraduate courses (or suitable equivalents) that may be required by the Program are:

- Principles of Chemistry I
- Engineering Math I: Single Variable Calculus
- Engineering Math II: Multi-Variable Calculus
- Engineering Math III: Matrix Algebra
- Engineering Fundamentals I: Statics
- Introductory Physics I
- Introductory Physics II
- Engineering Fundamentals II: Electrical Circuits
- Engineering Fundamentals III: Thermodynamics
- Engineering Math IV - Differential Equations
- Dynamics
- Fluid Mechanics
- Probability & Statistics for Engineering & Physical Sciences
- Soil Mechanics
- Principles of Structural Engineering
- Principles of Hydraulics & Hydrology
- Principles of Environmental Engineering
- Principles of Transportation Engineering

- Water Resource Design
- Project Design & Management-Civil Engineering

3.2.3. Course Requirements

MS Degree

The MS degree may be earned on either a thesis or a non-thesis basis. The thesis option requires a minimum of 30 hours of credit — 24 semester hours of course work plus 6 semester hours of MS thesis research (CEE:5999) credit. The non-thesis option requires a minimum of 30 semester hours of course work.

A program of core courses plus electives is required:

- **Core Courses:** For the MS Degree, there are six core Hydraulics & Water Resources Courses:
 - Probabilistic Methods in Hydrosience (CEE:4118)
 - Computational Methods in Water Resources (CEE:5188)
 - Environmental Fluid Dynamics (CEE:5374)
 - Flow in Open Channels and Sediment Transport (CEE:4370)
 - Multiscale Hydrology (CEE:4146)
 - Hydrometeorology (CEE:4378)
- **Program Electives:** At least 3 semester hours will be selected from the Hydraulics & Water Resources program electives. The remaining 3 semester hour course that are outside of the program electives can be selected subject to the approval of the student's advisor and Program Director.
- **Seminar:** All students are required to participate in CEE:5093 Hydraulics, Hydrology and Water Resources Seminar and register for the seminar when they are registered at full-time course fees (at least 9 semester hours). Attendance is mandatory and every missed seminar will have to be substituted by attending the next seminar offered by any of the other CEE Programs (EES, SMM or TE; evidence of attendance is required). Each student is required to present one seminar during their MS degree program, normally on their thesis or report topic.
- **Thesis:** Students may opt to complete a Master's Thesis. This project will count for 6 semester hours of credit. Students who choose the non-thesis option must take an additional 6 semester hours of free elective credit.

Please read the Course Requirements section within the CEE Graduate Requirements for additional Graduate College and departmental requirements for the MS degree program (Section 2.3).

PhD Degree

The PhD degree requires a minimum of 72 hours of credit beyond the basic undergraduate degree. Up to 18 semester hours of PhD dissertation research (CEE:7999) credit may be applied towards this total.

- **Core Courses:** For the PhD Degree, there are six core Hydraulics & Water Resources Courses:
 - Probabilistic Methods in Hydrosience (CEE:4118)
 - Computational Methods in Water Resources (CEE:5188)
 - Environmental Fluid Dynamics (CEE:5374)
 - Flow in Open Channels and Sediment Transport (CEE:4370)
 - Multiscale Hydrology (CEE:4146)
 - Hydrometeorology (CEE:4378)
- **Program Electives:** Students must take 9 semester hours of credit from the Hydraulics & Water Resources program electives. Students may substitute upper level courses in CEE or Mechanical Engineering (ME) with the approval of the student's advisor and Program Director.
- **Sciences Electives:** Students must take 12 semester hours of credit from approved sciences electives. Students may substitute upper level courses from the departments of Mathematics (MATH), Statistics and Actuarial Science (ACTS), Physics (PHYS) or Computer Science (CS) with the approval of the student's advisor and Program Director.
- **Free Electives:** Students must take 15 semester hours of elective credit. Courses selected are subject to the approval of the student's advisor and/or advisory committee.
- **Seminar:** Students in Hydraulics and Water Resources are expected to register continuously for CEE:5093 HWR Graduate Seminar, and attend the weekly seminars. Attendance is mandatory and every missed seminar will have to be substituted by attending the next seminar offered by any of the other CEE Programs (EES, SMM or TE; evidence of attendance is required). Students are required to present yearly seminars during their PhD degree program, normally on their thesis or report topic and after the Comprehensive Examination. Students who are no longer registered for course or research credits are not required to register for the seminar, but are still required to continue their attendance.
- **Dissertation:** Students must complete a PhD Dissertation, for which they may receive up to 18 hours of credit.

PhD students with an MS degree may be able to apply up to 24 semester hours from their MS degree towards the PhD course requirements.

Please read the Course Requirements section within the CEE Graduate Requirements for additional Graduate College and departmental requirements for the PhD degree program (Section 2.3).

Core and Electives Courses

The six core courses offered by the Hydraulics and Water Resources Program are:

- Probabilistic Methods in Hydrosience (CEE:4118)
- Computational Methods in Water Resources (CEE:5188)
- Environmental Fluid Dynamics (CEE:5374)
- Flow in Open Channels and Sediment Transport (CEE:4370)
- Multiscale Hydrology (CEE:4146)
- Hydrometeorology (CEE:4378)

The program electives offered by the Hydraulics and Water Resources Program are:

- Groundwater (CEE:4102)
- Field Measures for Water Quantity and Quality (CEE:4103)*
- Remote Sensing (CEE:4317)
- Water Resources Engineering (CEE:4371)
- Experimental Method in Fluid Mechanics & Heat Transfer (CEE:5372)
- Fundamentals of Atmospheric Science (CEE:4180)
- Intro to Computational Flow in Pipes and Channels (CEE:5083)
- Contemporary Topics in Civil & Environmental Engineering (CEE:4995)
- Environmental Dispersion Processes (CEE:6372)
- Viscous Flow (CEE:6376)
- Turbulent Flows (ME:7268)
- Hydrology (CEE:4119)*
- Hydroclimatology (CEE:4123)
- International Perspective in Water Science and Management (CEE:4385)
- Environmental Boundary Layers (CEE:6223)

* Class allowed for graduate credits pending the approval of the adviser.

A list of approved science electives, and recommended free electives, is provided on the HWR program website.

3.2.4. Examination Process

MS Degree

A final examination is required to obtain an MS degree:

MS Final Examination: For details and requirements for the MS Final Examination, see the Examination Process section within the CEE Graduate Requirements (Section 2.4).

In the HWR Program, the final examination will consist of an oral defense of the student's thesis for the MS/Thesis Option. For the MS/Non-thesis Option, the final examination will be an oral comprehensive examination of courses taken in the student's MS program. Evidence of presentation during an HWR seminar is required.

PhD Degree

Three examinations are required to obtain a PhD degree: (1) the PhD Qualifying Examination, (2) the PhD Comprehensive Examination, and (3) the PhD Final Examination.

PhD Qualifying Exam: All PhD students must pass the PhD qualifying exam within their first year of study. Exceptions to this deadline require approval by the student's advisor and the Program Director. The PhD qualifying exam requires successful demonstration of academic ability, written technical communication, and oral technical communication.

The examination will be conducted by the Qualifying Examination Committee, which includes the student's advisor, the Program Director, and a third HWR faculty member. To begin the process, the student will provide the Program Director with:

- 1) A current resume.
- 2) A copy of the student's transcript and a plan of study.
- 3) Copies of graded assignments and examinations from core and program electives. Examples must include work from courses taken within the past 12 months.
- 4) As an example of written technical communication, a literature review on a subject chosen by the advisor and student.
- 5) A list of oral presentations made by the student, including seminars, workshops, and technical conferences.

For students who first enroll in the summer or fall session, the deadline for submission of materials is the subsequent spring session (the first Monday in April). For students who first enroll in the spring session, the deadline for submission is the subsequent fall session (the first Monday in November).

The committee will make a preliminary review of the student materials, then schedule a PhD Qualifying Exam meeting with the student. At least two weeks prior to the meeting, the committee will tell the student (in written form) what to prepare for the examination meeting. Normally, the student will be asked to prepare a short presentation that describes any research to date and a summary of ideas for a PhD dissertation. The student may also be asked to prepare to answer oral questions on material from one or more core courses or program electives.

After the meeting with the student, the Qualifying Examination Committee will meet to determine whether the exam is passed or failed. If the exam is failed, the student will either be dismissed, or granted permission to take the examination for a second (and final) time.

For additional details and requirements for the PhD Qualifying Examination, see the Examination Process section within the CEE Graduate Requirements (Section 2.4).

PhD Comprehensive Examination: For details and requirements for the PhD Comprehensive Examination, see the Examination Process section within the CEE Graduate Requirements.

The purpose of the comprehensive examination is to determine the student's background and ability to successfully undertake research in the topic area he/she has chosen for the PhD dissertation. The oral examination focuses on topics from the student's written dissertation prospectus and related areas. Copies of the dissertation prospectus shall be submitted to the Examination Committee no later than two weeks before the date of the examination. The scope

and format of the written review should be determined in collaboration with the student's advisor. The Comprehensive examination will take place within one year of the Qualifying Exam.

In the HWR Program, the PhD comprehensive examination requires a research proposal plan and oral presentation. The research proposal plan is prepared in writing and distributed to the committee members at least two weeks prior to the exam, or by arrangement with each committee member. The written proposal is limited to 15 pages and should include a short literature review providing the motivation and rationale for the work, a testable hypothesis (or hypotheses), objectives, a plan with an appropriate description of methods, timeline for research progress, and preliminary results. Required components of the proposal not included in the 15 page limit are a one page abstract summarizing the key aspects of the proposed plan of research, the list of references cited, and a resume of the candidate.

If the exam is successfully passed, every following semesters the candidate has to provide an updated resume and plan of study (identifying the classes that have been completed and what classes are remaining with a timeline for taking them). This has to be emailed to the Program Coordinator and to the candidate's adviser by the last Friday of Spring and Fall classes (before finals' week). The HWR faculty members will meet during finals' week, review the material, and discuss the progress. A notification of the outcome of the meeting (satisfactory/non-satisfactory with potential comments and suggestions) will be emailed to the candidate and placed in her/his file.

Every year, the PhD candidate will give a short presentation (~20 minutes plus 5/10 minutes for questions) at the HWR seminar. The candidate will provide the committee members with a two-week notice of this presentation. The committee members will attend the seminar and meet with the candidate at the end of it. A performance evaluation will be provided to the candidate and included in her/his file.

PhD Final Examination: For details and requirements for the PhD Final Examination, see the Examination Process section within the CEE Graduate Requirements.

3.3. Structures, Mechanics and Materials (SMM) Graduate Program

3.3.1. Program Description

The graduate program in Structures, Mechanics and Materials (SMM) at The University of Iowa prepares students for positions in academia, consulting, and private enterprise by producing capable graduates with a well-rounded set of career skills. The MS and PhD programs in SMM are designed for those students interested in developing specialized knowledge and skills in the mechanics of solids and structures that can be applied to Civil Infrastructure Systems (CIS) and other fields as well. The SMM research focus and graduate curriculum are geared toward developing appropriate methodologies for effectively tackling complex and broad issues related to CIS, and also, to educate engineers to implement the developed methodologies in actual practice. Frequently, the technologies developed in SMM program can be applied not only to CIS issues but also in other fields such as biomechanics/biomedicine, the automotive, aerospace industries, new materials development, and microelectronics.

There is a strong interaction between the SMM graduate program and the graduate program in Mechanical & Industrial Engineering (MIE). The SMM faculty's collective areas of broad expertise are structural engineering, solid mechanics, optimization, and computational methods. Within these broad areas, promising technologies in which graduate students can typically make important research contributions are: development of advanced techniques for designing optimized and controlled structural/mechanical systems; development of experimental and computational tools for assessing the residual capacity; human motion capture and analysis; vibration effects on human body; durability and reliability of both degraded and rehabilitated structures and materials; design and development of new high-performance material systems; and multi-scale computer modeling of biomechanical systems.

3.3.2. Prerequisites

For graduate students admitted to the SMM Program who do not have an undergraduate BS degree in civil and environmental engineering, certain undergraduate courses may need to be taken without graduate credit. Undergraduate courses (or suitable equivalents) that may be required by the Program are:

- Engineering Math I: Single Variable Calculus
- Engineering Math II: Multi-Variable Calculus
- Engineering Math III: Matrix Algebra
- Engineering Fundamentals I: Statics
- Introductory Physics I
- Introductory Physics II
- Engineering Math IV - Differential Equations
- Dynamics
- Mechanics of Deformable Bodies
- Civil Engineering Materials
- Soil Mechanics
- Principles of Structural Engineering
- Design of Steel Structures
- Design of Concrete Structures

3.3.3. Course Requirements

MS Degree

The MS degree may be earned on either a thesis or a non-thesis basis. The thesis option requires a minimum of 30 hours of credit — 24 semester hours of course work plus 6 semester hours of MS thesis research (CEE:5999) credit. The non-thesis option requires a minimum of 30 semester hours of course work.

A program of core courses plus electives and thesis research or a report is required:

- ***Core Courses:*** For the MS Degree, 12 credit hours must come from the following core course list:
 - Numerical Calculations (CEE:4511)
 - Engineering Design Optimization (CEE:4512)
 - Mathematical Methods in Engineering (CEE:4513)
 - Fundamental of Vibrations (CEE:5532)
 - Finite Element I (CEE:4533)
 - Intermediate Mechanics of Deformable Bodies (CEE:5540)
 - Continuum Mechanics and Elasticity (CEE:3179)

- ***Elective Courses:*** All electives will be selected from Structures, Mechanics and Materials Course offerings within CEE or from outside the Structures, Mechanics and Materials course offerings if it is closely related to this degree program or the student's thesis research or report investigation. Approval of the advisor is required.

- ***Seminar:*** All students are required to participate in CEE: 5091 Structures, Mechanics and Materials Seminar and register for the seminar when they are registered at full-time course fees (at least 9 semester hours). Each student is required to present one seminar during their MS degree program, normally on their thesis or report topic.

- ***Thesis:*** Students may opt to complete a Master's Thesis. This project will count for 6 semester hours of credit. Students who choose the non-thesis option must take an additional 6 semester hours of elective credit.

Please read the Course Requirements section within the CEE Graduate Requirements for additional Graduate College and departmental requirements for the MS degree program (Section 2.3).

PhD Degree

The PhD degree requires a minimum of 72 hours of credit beyond the basic undergraduate degree. Up to 18 semester hours of PhD dissertation research (CEE:7999) credit may be applied towards this total.

- ***Core Courses:*** PhD students must complete all 21 semester hours of credit from the Structures, Mechanics and Materials core courses.

- **Electives:** The remaining course credit hours must come from elective courses selected from Structures, Mechanics and Materials Course offerings within CEE. In consultation with the academic advisor, graduate level courses from other departments, such as Mathematics, Computer Science, Physics, and others can be taken. A suggested elective course listing is provided on the SMM program website. Plans of study are to be approved by the advisor and/or advisory committee.
- **Seminar:** All PhD students are required to participate in CEE:5091 Structures, Mechanics and Materials Seminar and register for it when they are registered at full-time course fees (either with at least 9 semester hours, or after completing the Comprehensive Exam). Each student is required to present two seminars during their PhD degree program. The last seminar should be on their PhD dissertation topic.

PhD students with an MS degree may be able to apply up to 24 semester hours from their MS degree towards the PhD course requirements.

Please read the Course Requirements section within the CEE Graduate Requirements for additional Graduate College and departmental requirements for the PhD degree program (Section 2.3).

3.3.4. Examination Process

MS Degree

A final examination is required to obtain an MS degree:

MS Final Examination: In the SMM Program, the final examination will consist of an oral defense of the student's thesis for the MS/Thesis Option. For the MS/Non-thesis Option, the final examination will be an oral exam of the student's course work.

For additional details and requirements for the MS Final Examination, see the Examination Process section within the CEE Graduate Requirements (Section 2.4).

PhD Degree

Three examinations are required to obtain a PhD degree: (1) the PhD Qualifying Examination, (2) the PhD Comprehensive Examination, and (3) the PhD Final Examination.

PhD Qualifying Examination: The PhD qualifying exam is given in January each year, and must be completed by the January after the student's first academic year is completed. Exceptions to this deadline require approval by the student's advisor and the Program Director.

The purpose of this qualifier is to insure the student's mastery of essential graduate level concepts. The requirement is satisfied after the student passes the written exam in three core areas selected in consultation with the academic advisor. The grade on each subject exam must be 70% or above.

The exam organizer will notify the student of the results of the exam in writing. In the event of a failing grade, the SMM faculty will decide on the appropriate course of action. This may range from discussing with the professor(s) whose question(s) you failed, taking additional courses in

order to remedy deficiencies, or retaking all or a portion of the exam. In the event of a second failure, the student will be dismissed from the program.

For additional details and requirements for the PhD Qualifying Examination, see the Examination Process section within the CEE Graduate Requirements.

PhD Comprehensive Examination: In the SMM Program, the PhD comprehensive examination requires a research proposal plan and oral presentation. The research proposal plan is prepared in writing and distributed to the committee members at least two weeks prior to the exam, or by arrangement with each committee member. The written proposal contains preliminary results and the plan of study to complete the dissertation. During proposal preparation, students are encouraged to following dissertation guidelines in Section XII (Doctor's Degrees) of the Manual of Rules and Regulations of the Graduate College (Parts M) (<http://www.grad.uiowa.edu/manual-part-1-section-xii-doctors-degrees>) and linked materials on the format of the dissertation document.

The structure of the oral exam includes up to 50 minute presentation of the research plan followed by questions from each of the committee members. The oral exam is also an opportunity to discuss collaborations, additional coursework, or skills that the committee recommends for successful completion of the research.

For additional details and requirements for the PhD Comprehensive Examination, see the Examination Process section within the CEE Graduate Requirements (Section 2.4).

PhD Final Examination: For details and requirements for the PhD Final Examination, see the Examination Process section within the CEE Graduate Requirements (Section 2.4).

3.4. Transportation Engineering (TE) Graduate Program

3.4.1. Program Description

The M.S. and Ph.D. programs in Transportation Engineering (TE) are designed for those graduate students interested in developing specialized knowledge and skills that can be applied to the diverse set of issues associated with transportation infrastructure systems. In the U.S. and other countries as well, TE is emerging as an area urgently needing the combined attention of universities, government, and private industry. The TE research focus and graduate curriculum are geared toward developing appropriate methodologies for effectively solving complex and broad issues related to transportation infrastructure, and also, to educate engineers to implement the developed methodologies in practice.

The TE faculty's collective areas of broad expertise are traffic simulation, infrastructure management system, pavement engineering, advanced construction materials, dynamic load and pavement simulation, intelligent sensors, nondestructive testing, and optimal design. The TE faculty and graduate students have access to Civil and Environmental laboratories, temperature-controlled testing facilities, laser and holographic laboratory, high-performance computing and graphics hardware, infrastructure management software, and civil materials laboratory. Opportunities for TE graduate students to participate in faculty-led research exist at the following research centers and laboratories: Public Policy Center, Center for Computer Aided Design, National Advanced Driving Simulator, Electron Microscopy Center and the Image Analysis Facility.

3.4.2. Prerequisites

For graduate students admitted to the TE Program who do not have an undergraduate BS degree in civil and environmental engineering, certain undergraduate courses may need to be taken without graduate credit. Undergraduate courses (or suitable equivalents) that may be required by the Program are:

- Principles of Chemistry I
- Engineering Math I: Single Variable Calculus
- Engineering Math II: Multi-Variable Calculus
- Engineering Math III: Matrix Algebra
- Engineering Fundamentals I: Statics
- Introductory Physics I
- Introductory Physics II
- Engineering Fundamentals II: Electrical Circuits
- Engineering Math IV - Differential Equations
- Dynamics
- Probability & Statistics for Engineering & Physical Sciences
- Principles of Structural Engineering
- Principles of Hydraulics & Hydrology
- Principles of Environmental Engineering
- Principles of Transportation Engineering
- Design of Transportation Systems
- Project Design & Management-Civil Engineering

3.4.3. Course Requirements

MS Degree

The MS degree may be earned on either a thesis or a non-thesis basis. The thesis option requires a minimum of 30 hours of credit — 24 semester hours of course work plus 6 semester hours of MS thesis research (CEE:5999) credit. The non-thesis option requires a minimum of 30 semester hours of course work.

- **Core Courses:** For the MS Degree, 6 credit hours must come from the following core course list:
 - Design of Transportation Systems (CEE:4762)
 - Traffic Engineering (CEE:4763)
 - Transportation Demand Analysis (CEE:4176)
 - Pavement Engineering (CEE:4560)
 - Introduction to Bridge Engineering (CEE:4160)
- **Elective Courses:** All electives will be selected from Transportation Engineering Course offerings within CEE or from outside the Transportation Engineering course offerings if it is closely related to this degree program or the student's thesis research or report investigation. Approval of the advisor is required.
- **Seminar:** All students are required to participate in CEE:5094 Transportation Engineering Seminar and register for the seminar when they are registered at full-time course fees (at least 9 semester hours). Each student is required to present one seminar during their MS degree program, normally on their thesis or report topic.
- **Thesis:** Students may opt to complete a Master's Thesis. This project will count for 6 semester hours of credit. Students who choose the non-thesis option must take an additional 6 semester hours of elective credit.

Please read the Course Requirements section within the CEE Graduate Requirements for additional Graduate College and departmental requirements for the MS degree program (Section 2.3).

PhD Degree

The PhD degree requires a minimum of 72 hours of credit beyond the basic undergraduate degree. Up to 18 semester hours of PhD dissertation research (53:7999) credit may be applied towards this total.

- **Core Courses:** PhD students must complete 15 semester hours of credit from the Transportation Infrastructure Engineering core courses.

- **Electives:** The remaining course credit hours must come from elective courses selected from Transportation Engineering course offerings within CEE. In consultation with the academic advisor, graduate level courses from other departments, such as Urban and Regional Planning, Industrial Engineering, Geography, and others can be taken. A suggested elective course listing is provided on the TE program website. Plans of study are to be approved by the advisor and/or advisory committee.
- **Seminar:** All PhD students are required to participate in CEE:5094 Transportation Engineering Seminar and register for it when they are registered at full-time course fees (either with at least 9 semester hours, or after completing the Comprehensive Exam). Each student is required to present two seminars during their PhD degree program. The last seminar should be on their PhD dissertation topic.

PhD students with an MS degree may be able to apply up to 24 semester hours from their MS degree towards the PhD course requirements.

Please read the Course Requirements section within the CEE Graduate Requirements for additional Graduate College and departmental requirements for the PhD degree program (Section 2.3).

3.4.4. Examination Process

MS Degree

A final examination is required to obtain an MS degree:

MS Final Examination: For details and requirements for the MS Final Examination, see the Examination Process section within the CEE Graduate Requirements (Section 2.4).

In the TE Program, the final examination will consist of a written examination and/or oral examination. The written examination is based primarily on course work including fundamental prerequisite material. The oral examination includes questions on fundamentals designed to test the student's reasoning ability. For MS/Thesis Option students, the oral examination also includes presentation and defense of the MS thesis. For students wishing to continue their studies for the PhD degree, this final examination may also serve as the PhD qualifying examination, as decided by the examination committee.

PhD Degree

Three examinations are required to obtain a PhD degree: (1) the PhD Qualifying Examination, (2) the PhD Comprehensive Examination, and (3) the PhD Final Examination.

PhD Qualifying Examination: The qualifying examination is intended to test the student's preparation at the MS level and to determine the student's ability to complete successfully the proposed PhD program. The student is required to take the qualifying examination within the first two semesters he/she is enrolled as a PhD student. For students graduating with the MS degree from the Civil and Environmental Engineering Program at The University of Iowa or an equivalent degree program, the MS Final Examination may be regarded as the Qualifying

Examination if the examining committee so decides. If the PhD student has adequate preparation in the view of the examining committee, the qualifying exam may be waived. For additional details and requirements for the PhD Qualifying Examination, see the Examination Process section within the CEE Graduate Requirements (Section 2.4).

PhD Comprehensive Examination: For details and requirements for the PhD Comprehensive Examination, see the Examination Process section within the CEE Graduate Requirements (Section 2.4).

In the TE Program, the comprehensive examination consists of a written examination followed by an oral examination by the committee. This examination will include material from all phases of the student's program. A proposal for the dissertation may be presented in the oral examination. When a proposal is presented, this may be accepted as equivalent to the written examination, as decided by the committee.

PhD Final Examination: For details and requirements for the PhD Final Examination, see the Examination Process section within the CEE Graduate Requirements (Section 2.4).

4. General Student Information

4.1. Student Responsibilities

It is the responsibility of every CEE graduate student to:

- Have a complete Plan of Study listing required courses and electives needed to meet the Graduate College and Departmental degree requirements.
- Meet all degree requirements; including meeting all course requirements, thesis requirements, and meeting Graduate College deadlines for paperwork/forms needed for graduation
- Know the information in the *Manual of Rules and Regulations of the Graduate College*. The Manual can be found on the Graduate College website: <http://www.grad.uiowa.edu/graduate-college-manual>.
- Check their email messages frequently and on campus mailbox regularly as this is how curriculum and departmental information will be communicated.
- Provide the Academic Programs Administrator, Kim Lebeck, with address and telephone changes.

4.2. Expectations of Graduate Students

The following list of expectations was formulated by the Graduate College to enhance the successful degree completion of graduate students.

1. A graduate student has the **primary responsibility for successful completion of his or her degree**. A graduate student should be committed to his or her graduate education and should demonstrate this by efforts in the classroom and in research. A graduate student is expected to maintain a high level of professionalism, self-motivation, engagement, excellence, scholarly curiosity, and ethical standards.
2. A graduate student should **meet regularly with the research advisor** and provide updates on the progress and results of ongoing research.
3. A graduate student should be **knowledgeable of the policies and requirements of the graduate program, the graduate college, and the institution**. The student should strive to meet these requirements, including teaching responsibilities.
4. A graduate student should **work with the research advisor to develop a thesis/dissertation project**. This will include establishing a timeline for each phase of the work. The student should strive to meet the established deadlines.
5. A graduate student should **work with the research advisor to select a thesis/dissertation committee**. The student should meet with this committee at least annually (or more frequently, according to program guidelines) and be responsive to the advice of and constructive criticism from the committee.

6. A graduate student should discuss **policies on authorship and attendance at professional meetings with the research advisor**. The student should work with the advisor to submit all relevant research results that are ready for publication in a timely manner prior to graduation.
7. A graduate student should **attend and participate in meetings, seminars and journal clubs** that are part of the educational program.
8. A graduate student should **contribute to maintaining a research environment that is intellectually stimulating, emotionally supportive, safe, and free of harassment**.
9. A graduate student should **participate in the institution's Responsible Conduct of Research Training Program and practice those guidelines** in conducting thesis/dissertation research. Within the College of Engineering, this course is ENGR:7270 - Engineering Ethics.
10. A graduate student should **discuss policies on work hours, sick leave and vacation with the research advisor or graduate director**. The student should consult with the advisor in advance of any planned absences.
11. A graduate student should **acknowledge primary responsibility to develop a career following the completion of the doctoral degree**. The student should seek guidance from available resources, including the research advisor, career counseling services, thesis/dissertation committee, and any other mentors.
12. A graduate student should **comply with all institutional policies, including academic program milestones**. The student should comply with both the letter and spirit of all best practices and policies of the institution.

4.3. Expectations of Research Advisors

The following list of expectations was formulated by the Graduate College to facilitate graduate student success.

1. The research advisor should be **committed to the education and training of the graduate student as a future member of the research community**.
2. The research advisor should **meet one-on-one with the student on a regular basis**. The advisor should provide timely feedback on the student's written work to facilitate ongoing progress on the thesis/dissertation.
3. The research advisor should be **knowledgeable of the requirements and deadlines of his/her graduate program as well as those of the institution**, including teaching requirements and human resources guidelines. The research advisor should guide the student in these areas to ensure academic and professional success.
4. The research advisor should **help to plan and direct the graduate student's project**, set reasonable and attainable goals, and establish a timeline for completion of the project. The research advisor should anticipate conflicts between the interests of

externally funded research programs and those of the graduate student, and should help keep these interests from interfering with the student's thesis/dissertation research.

5. The research advisor should **help a graduate student select a thesis/dissertation committee**. The advisor should assure that the committee meets at least annually (or more frequently, according to program guidelines) to review the graduate student's progress.
6. The research advisor should **discuss authorship policies regarding papers with the graduate student**. The advisor should acknowledge the graduate student's contributions and work with the graduate student to present and publish his/her work.
7. The research advisor should **encourage the graduate student to attend scientific/professional meetings** and make an effort to secure and facilitate funding for such activities.
8. The research advisor should **provide an environment for his/her graduate students that is intellectually stimulating, emotionally supportive, safe, and free of harassment**.
9. The research advisor should **discuss intellectual policy issues with the student** regarding disclosure, patent rights, and publishing research discoveries.
10. The research advisor should **not require the graduate student to perform tasks unrelated to his/her academic and professional development**.
11. The research advisor should **provide career advice and assist in finding a position** for the graduate student following his/her graduation. The advisor should provide honest letters of recommendation and be accessible for advice and feedback on career goals.
12. The research advisor should **lead by example and facilitate the training of the graduate student in complementary skills needed to be a successful researcher**, such as oral and written communication, grant writing, lab management, animal and human research policies, the ethical conduct of research, and scholarly professionalism. The advisor should encourage the student to seek opportunities in teaching, if not required by the student's program.
13. In disciplines where it is customary, the research advisor should **provide financial resources for the graduate student to facilitate the student's thesis/dissertation research**.

4.4. Advising

When an applicant is admitted to CEE, the student is assigned a faculty advisor (typically indicated in the RA/TA offer letter). If a student wishes to change advisors, the student initiates the change by determining which faculty advisor would be preferred and discussing the possibility with the preferred faculty advisor. Pending approval by the new advisor, the student must then notify the prior advisor, the Department Chair, the Director of Graduate Studies, and their Graduate Program Coordinator. It should be emphasized that the reason for change may be personal or because of the student's interests, and that there is no requirement to remain with the same advisor throughout one's academic career.

A student is initially assigned a faculty advisor upon being admitted to the Department but establishes a research project towards a thesis or dissertation under the direction of possibly another faculty member. In that case, the thesis director will assume the responsibility of also being the student's academic advisor.

In addition to the advisor, two other personnel within the department will provide advice and information when requested: the Director of Graduate Studies, Prof. David Cwiertny, and the Academic Programs Administrator, Kim Lebeck. Prof. Cwiertny oversees all graduate student-related issues within the department and is a good resource for information related to both departmental and Graduate College regulations. Kim Lebeck maintains student files, ensures that all paperwork is completed, and can advise students on procedural issues related to obtaining their degrees.

4.5. Academic Policies

Graduate College Regulations

All CEE graduate degrees are conferred through the Graduate College. Therefore, the Department adheres to the Graduate College rules, regulations, and requirements that are outlined in the *Manual of Rules and Regulations of the Graduate College*. The Manual can be found on the Graduate College website: <http://www.grad.uiowa.edu/graduate-college-manual>. Additional information about the Graduate College can be found at: <http://www.grad.uiowa.edu>.

Registration

Course registration is accomplished through the University of Iowa MAUI registration system on the internet at <http://www.maui.uiowa.edu>. In order to register, students must request that their faculty advisor grant them permission via a checkbox accessible through MAUI. Each student should consult with a faculty advisor before registering.

A student may register for no more than 15 graduate hours per semester during fall and spring semester, or eight hours during the summer session. Nine or more hours constitutes full-time student status.

Adding/Dropping Courses

Changes in registration must be initiated by the student. Students should be aware that failure to drop classes by the established deadline will result in a successively increased percentage of the tuition fee assessment. Significant deadlines for each semester are given on the Registrar's website:

<http://www.registrar.uiowa.edu/Calendars/AcademicDeadlines/tabid/67/Default.aspx>.

Drop and Add forms are available in the department office (4105 SC) and located on the web at: <http://www.registrar.uiowa.edu/Student/FormsforStudents/tabid/79/Default.aspx>.

4.6. Academic Standing

All graduate students in CEE are expected to make progress toward their degree objective on a continuing basis.

One element is to stay in good standing with the Graduate College, by maintaining a minimum grade point average (GPA) in coursework. While pursuing a degree, MS degree students are expected to maintain a 2.75 or better GPA and PhD degree students are expected to maintain a 3.00 or better GPA.

For MS/Thesis Option and PhD students, another element is to make satisfactory progress on thesis or dissertation research. By its nature, research can progress sporadically, and at times, “one step forward and two steps back”. However, a commitment to good organization, sound judgment, creativity, and sustained effort, are evidence of satisfactory progress (and future success) in graduate student research.

For graduate students holding appointments as research assistants (RA) or teaching assistants (TA), another element is job responsibility. Students need to perform their assigned tasks in a timely manner, and their work should be thorough and of high quality.

Graduates students should be aware that their progress is being evaluated on a continual basis --- in the class room, in the laboratory, in their RA or TA work, and in their research interactions with an advisor. Each year, a student’s advisor must provide an annual written review of academic progress to the department.

For the majority of students, the annual review of academic progress will document their satisfactory progress within departmental standards. However, if a student is not making satisfactory progress, the situation must be communicated to the student in writing. In this case, the advisor will prepare an academic progress letter that describes the deficiencies and potential consequences, and provides specific ways (e.g., deliverables and deadlines) to correct deficiencies. The University of Iowa Graduate Manual (Section IV.E) provides guidelines that are followed:

E. Academic Progress, Departmental Probation, and Dismissal Procedures. If a student is failing to meet departmental standards, the department shall warn the student of this fact in writing. The notification shall specify in what way(s) the student is failing to meet the standards. The student shall be provided a reasonable amount of time to meet the standards prior to departmental dismissal. If conditions such as conditional admission or probation are imposed, the department shall give at the time of its imposition written explanation of this status and its time limits.

The letter must be reviewed and initialized by the student, the Program Coordinator, the Director of Graduate Studies, and the Department Chair, and placed in the student’s file.

If after receiving an unsatisfactory review, the student fails to address the deficiencies in a timely manner, there can be consequences: loss of financial support and/or dismissal from the CEE program.

4.7. Graduate Student Dismissal Procedures

Student Dismissal: When a student is dismissed they will be denied permission to reregister within any departmental program. A letter to the student will be written by the Department’s

Director of Graduate Studies (DGS) that explains the reasons for dismissal. Reasons for dismissal and an appeal process are defined below.

Dismissal Due to Inadequate GPA

The department follows the Graduate College policies for dismissal due to inadequate GPA with no exceptions. These policies can be found at: <http://www.grad.uiowa.edu/manual-part-1-section-iv-academic-standing-probation-and-dismissal>

In brief, while pursuing a degree, MS degree students are expected to maintain a 2.75 or better grade-point average (GPA) and PhD degree students are expected to maintain a 3.00 or better GPA. A student with less than the minimum GPA after 9 or more semester hours of graded graduate work will be placed on probation by the Graduate College. If, after completing 9 more semester hours of graded graduate work at the University of Iowa, the student's GPA remains below the minimum, the student will be dismissed and denied permissions to reregister within any Graduate College degree program; otherwise the student will be restored to good standing. A student on probation shall not be permitted to take comprehensive or final examinations leading to any degree or certificate, nor may the student receive any graduate degree.

Dismissal Due to Failure of the PhD Qualifying Examination

If the PhD qualifying examination is failed, the Graduate Program will decide on the appropriate course of action. Options include dismissal from the program, retaking the examination, retaking portions of the examination, or additional activities/requirements in order to remedy deficiencies. If the student is allowed to take the PhD qualifying examination a second time, a second failure would result in dismissal from the program.

Dismissal Due to Failure of the PhD Comprehensive Examination

At least two unsatisfactory votes by the examining committee signify a failure of the PhD Comprehensive Examination. If a failure is ruled, the student may be permitted retake the exam one time, no sooner than 4 months after the examination and no later than 6 months. A second failure will result in dismissal. To avoid dismissal after a second failure, the student may request to be admitted into a departmental MS program to complete its requirements to obtain an MS degree. Acceptance in an MS program, in that case, must be approved by the advisor, the Director of Graduate Studies, and the Department Executive Officer.

Dismissal Due to Failure of the Final PhD Examination or Final MS Examination

For both the MS and PhD Final Examination two unsatisfactory votes will make the committee report unsatisfactory, which constitutes a failure of the examination. In that case the candidate may not retake the examination until the next session (fall, spring, or summer). The Final Examination may be repeated only once. A second failure will result in dismissal.

Dismissal Due to Failure to Make Satisfactory Progress

The above section on Academic Standing describes the expectation regarding sufficient academic progress, and the consequences for failing to meet those expectations. Student failing to make sufficient academic progress must be notified of deficiencies in writing, and given a

reasonable time period to correct deficiencies (as stated in the letter). Failure to address the deficiencies within the time period may be cause for dismissal.

Dismissal Due to Unethical Behavior

The result of an egregious act of plagiarism or other forms of academic fraud (e.g., data fabrication) may result in the student being dismissed. Other behaviors or actions that may result in dismissal by the department are provided in the University of Iowa Code of Student Life (available at: <http://www.uiowa.edu/~our/opmanual/iv/01.htm>). Students are advised to review the Code. The department will follow the Graduate College policy concerning plagiarism by graduate students for dismissal due to plagiarism or other actions that violate the Code of Student Life. The text of the policy is given in Section IV.F of the Manual and Rules of the Graduate College (available at: <http://www.grad.uiowa.edu/manual-part-1-section-iv-academic-standing-probation-and-dismissal>)

4.8. Appeal of Dismissal

If a student judges the dismissal decision to be improper, the student has the right to request a review. In that case, a committee will be formed consisting of three department faculty members not including the student's advisor. The committee will review the materials that document the case against the student. The result of their deliberations will be submitted in a letter to the DGS and DEO stating their opinion as to whether there was sufficient cause to dismiss the student. If sufficient cause is not found, the student will be re-instated in good standing.

If the student believes that there was a procedural irregularity in the dismissal, the student has the right to request a review. In that case, the Graduate College policy given in Section IV.G of the Manual and Rules of the Graduate College will be followed. This policy is described here: <http://www.grad.uiowa.edu/manual-part-1-section-iv-academic-standing-probation-and-dismissal>. The policy mentions a formal grievance procedure which can be obtained here: <http://www.grad.uiowa.edu/academic-policies/academic-grievance-procedure>

4.9. Policies Affecting Students

University of Iowa General Policies

General University policies associated with student rights at the University level are given at the following website: <http://student-services.uiowa.edu/students/policies/index.php>

University of Iowa Code of Student Life:
<http://www.uiowa.edu/~our/opmanual/iv/01.htm>

Information on Academic Standing, Probation and Dismissal:
<http://www.grad.uiowa.edu/manual-part-1-section-iv-academic-standing-probation-and-dismissal>

The University of Iowa Academic Grievance Procedures:
<http://www.grad.uiowa.edu/academic-policies/academic-grievance-procedure>

Policy on Sexual Harassment and Consensual Relationships:
<http://www.uiowa.edu/~eod/policies/index.html>

Policy for Language Proficiency and Communication:
http://cph.uiowa.edu/faculty-staff/faculty/handbook/pdf/Chapter_X.pdf

Plagiarism

Plagiarism is the unacknowledged use of another's ideas expressed in either the author's original words or in a manner similar to the original form. When using ideas, direct quotes, or paraphrases, the source must be footnoted. This principle applies even if the writer discovers that an idea, initially thought to be his or her own, has already been published by someone else.

It is the student's responsibility to seek clarification of any situation in which he/she is uncertain whether plagiarism is/has been involved. Students who are uncertain about what constitutes plagiarism should consult with their advisors or other faculty members.

Human Subject Research

If you have a significant research role in a project that deals with human subjects, you will be required to take a short course on human subject research. Ask your advisor or the Graduate Program Coordinator for information on this.

Disabilities

If you have or suspect you may have a disability which could affect your potential to successfully complete your educational objectives, contact Student Disability Services to arrange for academic accommodations: <http://www.uiowa.edu/~sds/>.

4.10. Resources for Graduate Students

Graduate College

A list of resources provided by the Graduate College can be found at their homepage: <https://www.grad.uiowa.edu/>. In particular, the Graduate College offers a series of Professional Development Seminars and Workshops intended for graduate students. More information on the workshops can be found at: <https://www.grad.uiowa.edu/professional-development>.

Grants 4 Hawks Blog for Graduate Student External Funding

Graduate College External Funding Coordinator, Jennifer Teitle, provides support to graduate students in searching for funding sources and preparing proposals. Please email Jennifer at dsp-gradgrants@uiowa.edu or phone (33)5-3597 for the following services. Such opportunities are discussed at her blog: <http://grants4hawks.wordpress.com>