Graduate Guide*

Graduate Study Policies and Procedures in the Department of Civil and Environmental Engineering

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*These guidelines are specific to the Department of Civil and Environmental Engineering and are in addition to all degree requirements imposed by the Graduate School (www.gradschool.umd.edu).
Introduction

The Department of Civil and Environmental Engineering offers two advanced degrees: The Master of Science (M.S.) and the Doctor of Philosophy (PhD). A third degree, the Master of Engineering (M.E.) is offered within the college with an option in Civil and Environmental Engineering (for details regarding this program, please see www.oaee.umd.edu).

Graduate study is designed to stimulate intellectual growth, increase the level of objective understanding of the physical world, and further develop capabilities for analysis and synthesis. Each plan of study will provide depth in a chosen track while broadening the student’s command of basic scientific principles and encourage creative application of current science and technology.

This guide has been prepared as a resource for graduate students and faculty. It is a record of the most up to date policies and procedures for all phases of the graduate degree program. The statements herein compliment the University of Maryland Graduate School Catalog (http://www.gradschool.umd.edu/catalog/). New policies and procedures for Civil and Environmental Engineering will be made to this guide as policies are changed, so please check this guide regularly.
Admission Requirements and Procedures

The decision to admit a student for graduate study at the University of Maryland is formally made by the Graduate School after reviewing the recommendations of the applicant’s chosen department as to the applicant’s ability to carry out scholarly work at the graduate level.

Steps of the Admission Process

1. The application, application fee, and supporting documents should all be submitted to the Graduate School online (www.gradschool.umd.edu). The supporting documents for all applicants include: official transcripts from all universities attended, three letters of recommendation, a personal statement of goals and research interests, and official GRE scores. For international applicants either TOEFL scores or IELTS scores are required (http://www.international.umd.edu/ies/97).

2. Once an application is complete it is evaluated by the faculty members from the applicant’s technical division. The department graduate committee will then submit a recommendation to accept or decline the application is sent to the Graduate School and to the applicant.

3. The Graduate School (and if the applicant is international, International Education Services) reviews the applicants file again, make the final decision and notifies the student of the final decision and gives detailed instructions to successful applicants for completion of their registration.

Minimum Admission Requirements

1. The full-time faculty of each technical division will review applicants to the Master of Science and Doctor of Philosophy program and submit their evaluations to the division’s technical coordinator and based on these recommendations will decide whether to accept or decline individuals.

2. Applicants should have a Bachelor of Science Degree (typically in Engineering, Physical Sciences or Mathematics) from an accredited institution. Students who do not already hold a degree in engineering can be considered for provisional admission and fulfill prerequisites as determined by each technical division. The following is a list of minimum pre-requisites for each division.
Environmental—Calculus I, Calculus II, Calculus III, Differential Equations, Fluids, one semester of Chemistry for Environmental Engineers

Civil Systems—Each applicant is evaluated and pre-requisites determined on a case by case basis.

Geotechnical—Each applicant is evaluated and pre-requisites determined on a case by case basis.

Project Management—Calculus I, Calculus II, Calculus and ENCE 302, Probability and Statistics for Civil and Environmental Engineers.


Transportation—Calculus I, Calculus II, Calculus III, ENCE 302, Probability and Statistics for Civil and Environmental Engineers, a course in Physics covering basic mechanics (statics and dynamics), one computer programming course.

Water Resources--Calculus I, Calculus II, Calculus III, Differential Equations, Fluids, Groundwater Hydrology, Hydraulic Engineering

3. All students must hold a Master of Science degree before entering the PhD program. If a student is applying directly from an undergraduate program, the student may be accepted to the PhD but the start of the PhD program will not begin until the student has satisfactorily completed all requirements for the Master of Science degree; however under special circumstances a faculty member can request a conditional acceptance for students who do not want to receive a Master of Science degree.

4. Applicants are expected to have a strong academic record with a GPA of at least a 3.0/4.0 for the Master of Science degree and a GPA of at least 3.5/4.0 for the Doctor of Philosophy degree.

5. The Graduate Record Examination (GRE) is required of all applicants. Applicants to the Master of Science program are expected to have an overall
score of 306 with a minimum score of 156 in the quantitative section. Applicants to the Doctor of Philosophy program are expected to have an overall score of 309 with a minimum score of 159 in the quantitative section. Applicants who do not meet these requirements can be considered for provisional admission.

6. Applicants from non-English speaking countries or who have attended non-English speaking colleges/universities are required to take the Test of English as a Foreign Language (TOEFL) exam. Please see [http://www.international.umd.edu/ies/97](http://www.international.umd.edu/ies/97) for details regarding the minimum requirements.

Admission to the PhD Program for Current MS students

1. Students completing the MS program in the Department of Civil and Environmental Engineering must reapply to continue studies in the PhD program. Students should apply online at [www.gradschool.umd.edu](http://www.gradschool.umd.edu). All transcripts are obtained automatically, but the student will need to provide additional letters of reference, and a new personal statement. Other documents may be required. A student must secure a research advisor to be accepted to the PhD program.
Selection of Academic Advisor

All funded graduate students are assigned an advisor upon enrollment in the program. This advisor will supervise his/her research as well as the student’s progress to degree completion.

All unfunded graduate students will need to identify an academic advisor based on his/her indicated area of interest within their first year of study. Students are required to notify the Graduate Office of their advisor as soon as the advisor has been determined. Students who need assistance with initial advising or need assistance finding a permanent advisor are to contact the technical division coordinator for their track.

- Environmental—Alba Torrents, 301-405-1979, alba@umd.edu, 1153 Martin Hall
- Civil Systems—Steve Gabriel, 301-405-3242, sgabriel@umd.edu, 1143 Martin Hall
- Geotechnical—M. Sherif Aggour, 301-405-1942, msaggour@umd.edu, 0147D Martin Hall
- Project Management—Gregory Baecher, 301-405-1972, gbaecher@umd.edu, 1157 Martin Hall
- Structural—Yunfeng Zhang, 301-405-1955, zyf@umd.edu, 1178 Martin Hall
- Transportation—Lei Zhang, 301-405-2881, lei@umd.edu, 3142 Kim Building
- Water Resources—Richard McCuen, 301-405-1949, rhmccuen@umd.edu, 1170 Martin Hall

Changing Academic Advisors

On occasion a student or advisor may determine that it is not in his/her best interest to continue working together. Students who are not funded by a faculty member are free to change academic advisors within their technical division at any point in time; the student just needs to notify the former advisor and also the Graduate Office. Students who are funded and need to discontinue his/her relationship with their advisor, should first discuss the issue with the division’s technical coordinator (if the advisor is the technical coordinator, the student should discuss the issue with the Graduate Director). If the issue cannot be resolved the student will be assigned a new advisor. All efforts will be made to keep the student funded; however, there is no guarantee that the student will continue to be funded after their current contract expires. If a student decides to change technical divisions, the student will have to be re-evaluated by all the faculty in the new division before acceptance is granted. Faculty in the new division are encouraged to talk and consult with the technical division director of the prior division.
Degree Requirements for the Master of Science Program

The student may pursue the degree of Master of Science in Civil and Environmental Engineering under either of two options, with thesis option or non-thesis option.

Requirements for the Master of Science WITH THESIS option.

The student is required to complete at least 24 semester hours of coursework beyond the BS degree and maintain an overall GPA of 3.0. Students are required to take a minimum of 12 credits at the 600 level or above and a minimum of 12 credits of technical/division core courses.

Each technical division sets its own core course list (see below).

i. Environmental
   1. ENCE 650, Process Dynamics of Environmental Systems
   2. ENCE 651, Chemistry of Natural Waves
   3. ENCE 637, Biological Principles of Environmental Engineering

ii. Civil Systems
   1. All Masters students need to take one course in each of the core areas:
      a. Systems -- ENSE 621, Systems Modeling and Design or ENSE 622, Systems Requirements, Design and Trade-Off Analysis
      b. Operations Research/Optimization -- ENCE 603, Management Science Applications in Project Management or ENCE 677, OR Models for Transportation Systems Analysis
      c. Sensing and Control -- ENCE 688A, Sensing and Systems Control

iii. Geotechnical
   1. Select from Geotechnical course offering in consultation with advisor.

iv. Project Management
   1. ENCE 661, Project Cost Accounting and Finance
   2. ENCE 662, Introduction to Project Management
   3. ENCE 664, Legal Aspects of Engineering Design and Construction
   4. ENCE 665, Management of Project Teams
   5. ENCE 667, Project Performance Measurement

v. Structural
1. Select from Structures course offerings in consultation with advisor.

vi. Transportation
   1. Select from Transportation course offerings in consultation with advisor.

vii. Water Resources
   1. Select from Water Resources course offerings in consultation with advisor.

b. To accomplish a Master of Science with thesis, the student must perform a body of work that is commensurate with the level of the Master’s Degree. This thesis should make some contribution to the advancement in civil and environmental research. Work performed for the Master of Science thesis should be of such quality and extent that it would be suitable for publication as at least a technical note in an archival journal. The student must register for at least six credits of ENCE 799 (M.S. thesis research) over the course of his/her Master’s program in addition to the 24 hours of coursework.

c. The procedure for the review of a Master of Science thesis is as follows.
   1. The student works with his/her faculty advisor to create a committee of at least three members of the Graduate faculty of the University of Maryland to review the thesis. The advisor serves as the chair of the committee. The members should have backgrounds and interests related to the student's area of specialization and the subject matter of the thesis. This committee must be submitted for approval by the Director of Graduate Studies and the Graduate School, using the “Nomination of Thesis or Dissertation Committee” form (http://www.gradschool.umd.edu/images/uploads/NominationThesis.pdf). This form must be submitted at least 6 weeks prior to the thesis defense.

   2. The advisor is responsible for setting dates and deadlines for the review of the thesis. The student is responsible for providing each committee member with a typewritten copy of the thesis, advisor approved, at least ten working days prior to the thesis defense.

   3. The thesis committee will evaluate the quality of the research as well as the clarity and literary quality of the thesis.

   4. The thesis defense is an oral examination of up to 3 hours duration. During this exam the student will defend the thesis and answer any related questions posed by the thesis examining committee.

   5. All members of the thesis examining committee must accept the thesis for the student to pass the examination: revisions to the thesis may be recommended. These revisions should be reviewed and approved by the
advisor or by all members of the committee before the Report of Examining Committee form is signed.

6. The student may redo the thesis defense once only, if necessary.

7. The student must make proper application to the Graduate School indicating completion of degree requirements.

8. The student must provide the department with a final revised copy of the thesis in electronic form (PDF file) on diskette, zip disk, or CD. Copies of the thesis must also be provided to the Graduate School in accordance with the Thesis and Dissertation Manual.

9. It is expected that the MS thesis will result in a manuscript that can be submitted for publication in peer-review literature.

Requirements for the Master of Science WITHOUT THESIS option.

The student is required to complete at least 30 semester hours of coursework beyond the BS degree and maintain an overall GPA of 3.0. Some technical groups may have the requirement that a B or better needs to be achieved in the division core courses. Students are required to take a minimum of 21 credits at the 600 level or above and a minimum of 12 credits of technical/division core courses.

Each technical division sets its own core course list (see below).

ii. Environmental
   1. ENCE 650, Process Dynamics of Environmental Systems
   2. ENCE 651, Chemistry of Natural Waves
   3. ENCE 637, Biological Principles of Environmental Engineering

iii. Civil Systems
   1. All Masters students need to take one course in each of the core areas:
      a. Systems -- ENSE 621, Systems Modeling and Design or ENSE 622, Systems Requirements, Design and Trade-Off Analysis
      b. Operations Research/Optimization -- ENCE 603, Management Science Applications in Project Management or ENCE 677, OR Models for Transportation Systems Analysis
      c. Sensing and Control -- ENCE 688A, Sensing and Systems Control

iv. Geotechnical
   1. Select from Geotechnical course offering in consultation with advisor.
v. Project Management
   1. ENCE 661, Project Cost Accounting and Finance
   2. ENCE 662, Introduction to Project Management
   3. ENCE 664, Legal Aspects of Engineering Design and Construction
   4. ENCE 665, Management of Project Teams
   5. ENCE 667, Project Performance Measurement

vi. Structural
   1. Select from Structures course offerings in consultation with advisor.

vii. Transportation
   1. Select from Transportation course offerings in consultation with advisor.

viii. Water Resources
   1. Select from Water Resources course offerings in consultation with advisor.

b. For the non-thesis option, a scholarly paper must be completed and approved.
   The scholarly paper can:
   i. Be done in conjunction of a course or independent from a course, but must be done with the advisement of a faculty member.
   ii. Take the form of a critical literature search; in this form, the paper can be similar to the first chapter of a PhD thesis including
       1. A survey of the state of the art in a given problem area
       2. Concise discussion of the fundamental principles involved
       3. Discussion of what needs to be done to extend the state of the art in the future.
   iii. Take the form of a piece of original research as for the MS thesis, although the research need not be as extensive. This form, for example might be the solution of a problem of interest by a preliminary or less developed method.
   iv. Be non-original such as redoing all or part of the work of a published paper or report in order to gain in-depth understanding of a complicated analysis technique or concept.

c. The procedure for review of the scholarly paper is as follows:
   i. The advisor is responsible for setting dates and deadlines for the review of the paper. The student is responsible for providing the instructor a typewritten copy at least ten days prior to the review deadline.
   ii. If major problems are found, the advisor shall recommend revisions.
   iii. Final approval of the paper is obtained when the “Certification of Master’s Degree Without Thesis” form has been signed.
d. For the non-thesis option, a comprehensive exam, which includes a written section, are also required.
Degree Requirements for the Doctor of Philosophy

a. These policies pertain to the doctoral program in Civil and Environmental Engineering. However, the student should work closely with his/her academic advisor as some technical divisions have additional requirements.

b. General Requirements of the PhD Program

i. To qualify for the PhD degree, the student must accomplish the following:

1. Complete a minimum of 36 credits of coursework beyond the Bachelor’s degree, with at least four courses from the University of Maryland College Park, with specifics to be determined by the advisor. If technical training is needed off-campus (i.e. instrumentation, specialized software, internships) the advisor can waive up to six credits of coursework in lieu of specialized training.

2. Maintain a grade point average of at least 3.5 in ENCE courses and an overall grade point average of 3.0 from outside of the department.

3. Pass the PhD qualifying examination.

   a. The exam is to be taken one to two semesters after entering the PhD program and should consist of at least two parts.

   b. Part 1: A written exam covering coursework and field methodologies

   c. Part 2: Written or oral examination to assess the student’s capabilities in his/her area of research. The student should demonstrate an ability to critically analyze literature, an ability to use analytic techniques and tools as they pertain to his/her research, an ability to communicate effectively orally and in writing, and an ability to postulate and test hypotheses.

   d. There are three possible outcomes of the examination

      i. Pass: The student is advanced to candidacy and moves on to prepare a proposal for his/her dissertation.

      ii. Conditional pass: The student may be ask to take some additional courses or learn some additional techniques and prepare a report.

      iii. Fail: The student will be required to re-take the exam after 4 months. If the student fails a second time, he/she will be withdrawn from the program.

4. The chair of the examining committee must complete the Doctoral Degree Outcomes form for the mid-Atlantic accreditation and turn it in to the Graduate Office within 48 hours of the qualifying exam.

5. When a student passes the qualifying exams, the student must then apply to be admitted to candidacy. An advisor-approved form for advancement to candidacy must be submitted to the Graduate
School. Any doctoral student admitted to candidacy must register for a minimum of one credit every fall and spring semester thereafter until the degree is awarded.

6. Submit and present a dissertation research proposal to the student’s Dissertation Committee of which the committee approves. The Dissertation Committee must consist of a minimum of five members, at least three of whom must be Regular Members of the UMCP Graduate Faculty who are on tenured or tenure-track appointments. Each Dissertation Examining Committee will have a chair, who must be a Regular Member of Graduate Faculty. Each Dissertation Examining Committee must also have appointed to it a representative of the Dean of the Graduate School. The Dean’s Representative should have some background or interest related to the student’s research; be from a department other than the students’, and must be a tenured Member of the Graduate Faculty. Each member of the Committee must be a member of the Graduate Faculty of UMCP.

7. The student will complete a written proposal consisting of a well-formulated problem statement, literature review, and outline of the research approach. The written proposal should be presented to the dissertation committee within two semesters after advancing to candidacy.
   a. Students are encouraged to review the proposal writing guidelines set out by the National Science Foundation (www.nsf.gov) but should still work closely with his/her advisor to make sure that the proposal meets the advisor’s specifications.
   b. The student is also required to complete an oral examination consisting of presenting/defending the research proposal to the dissertation committee. During the oral proposal defense, a majority of the committee members (3/5) must be physically present.
   c. The student will be granted a pass, fail or a conditional pass. In this case the condition may be additional courses, re-writing or defending the proposal again.
   d. The chair of the graduate committee will collect all the information from the committee members and compile the assessment rubric required by the Graduate School.

8. Submit a dissertation for review by the student’s Dissertation Committee at least ten working days prior to the oral defense.
   a. The student should provide an abstract, with day, time and location of the oral defense to the Graduate Office one week prior to the defense so it can be advertised to all CEE faculty and students.
9. Pass an oral examination in defense of the dissertation. The possible outcomes of the oral examination are as follows:
   a. The committee accepts the dissertation without any recommended changes and sign the Report of the Examining Committee.
   b. The committee recommends changes and, except for the Chair, the committee members sign the Report of the Examining Committee. The Chair will check the dissertation and, upon his or her approval, sign the Report of the Examining Committee.
   c. The committee recommends revisions to the dissertation and does not sign the Report of Examining Committee until the student has made the changes and submitted the revised dissertation for the committee’s approval. The committee members sign the Report of Examining Committee if they approve the revised dissertation.
   d. The committee recommends revisions and convenes a second meeting to review the dissertation and complete the defense.
   e. The committee rules the dissertation (including the defense) unsatisfactory. In that circumstance, the student will have failed the examination and will not be awarded the doctorate.

10. It is expected that each PhD candidate will have a publication published or submitted by the time of the defense and that the PhD dissertation will result in at least 2 journal peer-review publications.
Financial Support

The department offers various forms of financial support, including teaching and research assistantships and fellowships. However, the total number of appointments is always limited by available resources. Therefore, each year these assistantships and fellowships will be awarded on a competitive basis. There is no guarantee that, once financial assistance is granted to a student, it will continue for the duration of the student’s program. Such continuation is dependent upon the student’s individual competitive standing and dependent on available resources.

Stipends for research and teaching assistants have been standardized in the College of Engineering and can change from one year to the next. The current funding levels can be obtained from the Graduate Office or the Payroll Office.

In addition to the stipend, Graduate Assistants (GAs) also receive health benefits and tuition remission for up to a maximum of 10 credits.

All students employed by the department as a Graduate Assistant must be a full time student during the fall and spring semesters.
Registration and Continued Enrollment

All students must maintain continuous registration throughout the duration of the program. This means, each student is registered for at least one credit during every fall and spring semester. International students in F1 visa status must be registered full time every fall and spring semester, while enrolled in the program.

Leave of Absence

A leave of absence can be requested for students who need to take time off from their studies for: childbearing, adoption, illness or dependent care. Please contact the Graduate Office for additional information regarding this request.

Waiver of Continuous Registration

Students who need to take a semester off for a reason other than those listed above under the leave of absence policy, may fill out a waiver form. It must be noted that students on F1 status cannot apply for this waiver. Please contact the Graduate Office for additional information regarding this request.

Full Time Status

To be certified as full time, a student must be officially registered for a combination of courses equivalent to 48 units. Please refer to the information below.

000-399 courses carry 2 units/credit hour
400-499 courses carry 4 units/credit hour
500-599 courses carry 5 units/credit hour
600-699 courses carry 6 units/credit hour
700-798 courses carry 6 units/credit hour
799 (Master’s Level Research) carries 12 units/credit hour
898 (Pre-Candidacy Research) carries 18 units/credit hour
899 (Post-Candidacy Research) carries 18 units/credit hour
Full Graduate Assistantship carries 24 units
Half Graduate Assistantship carries 12 units