

# **Department of Civil and Environmental Engineering**

## **GRADUATE HANDBOOK**

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Department of Civil and Environmental Engineering  
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## CONTENTS

PREAMBLE .....	3
1. GRADUATE PROGRAM OVERVIEW.....	4
2. REQUIREMENTS FOR ADMISSION TO THE GRADUATE PROGRAMS AT THE CEE DEPARTMENT.....	4
3. GRADUATE PROGRAMS GOALS AND VISON.....	5
4. PROGRAM COMPONENTS .....	5
4.1 Official graduate plan of study .....	5
4.2 Comprehensive examination for ME students .....	6
4.3 MS Thesis .....	6
4.4 Written part qualifying examination for Ph.D. students.....	6
4.5 Ph.D. Oral qualifying examination.....	6
4.6 Admission to candidacy .....	7
4.7 Dissertation and final oral examination .....	7
4.8 Conference presentations .....	7
4.9 Journal publications.....	7
5. DEGREE REQUIREMENTS.....	7
5.1 Class registration .....	7
5.2 Provisional admission.....	7
5.3 Course requirements .....	7
6. GRADUATE ACADEMIC ADVISORS AND ADVISORY/EXAMINATION COMMITTEES .....	10
7. UNIVERSITY RESOURCES.....	10

## PREAMBLE

This *Graduate Handbook* provides students with general information about the graduate program in the Department of Civil and Environmental Engineering (CEE). It provides details of the graduate programs in the CEE Department, and presents guidelines for completing degree requirements. This *Graduate Handbook* does not replace or supersede the Howard University Graduate School (GS) procedures, policies and requirements. This Handbook should be viewed as a supplement to the GS procedures, policies and requirements. If you need detailed information, consult with your academic advisor.

This *Graduate Handbook* is intended to familiarize students with the specifics of the graduate program in the CEE Department at Howard University. Additional information about the CEE Department may be found on the Department webpage and through consultation with the faculty and students at Howard University.

While the CEE Department Chair, CEE Graduate Director, CEE faculty members, and the GS can provide guidance, students must remember that responsibility for fulfilling the requirements for their degrees ultimately rests with them. Students must consult the GS website for deadlines and policies.

## 1. GRADUATE PROGRAM OVERVIEW

The Department of Civil and Environmental Engineering (CEE) at Howard University offers Master of Science, Master of Engineering, and the Doctor of Philosophy degree programs. The graduate program within the CEE Department is comprised of four sub-disciplines. Each entering graduate student must be accepted into a sub-discipline. The sub-disciplines are:

- Environmental and Water Resources Engineering
- Structural and Earthquake Engineering
- Transportation Engineering
- Geotechnical Engineering

The degrees awarded at CEE Department are:

- Master of Science (MS), with concentration in one of the sub-disciplines
- Master of Engineering (ME), with concentration in one of the sub-disciplines
- Doctor of Philosophy (Ph.D.), interdisciplinary, with major research in one of the sub-disciplines

The Master of Science (MS) program is usually completed in four semesters of full-time study, including summer research. Each MS student must complete a minimum of 30 semester hours: 24 credit hours of course work and 6 credit hours of thesis research. The course work requires the completion of core courses within the sub-discipline in which the student was accepted. MS students are encouraged to have at least one journal paper publication on a notably ranked journal before completing the MS program. MS candidates must also pass an oral and written examination of their research project.

The Master of Engineering (ME) program may be completed in two semesters of full-time study. Each ME student must complete a minimum of 30 semester hours: 27 credit hours course work, and 3 credit hours of a research project. The course work requires the completion of core courses of the sub-discipline in which the student was accepted. ME candidates must also pass a comprehensive examination.

The Doctor of Philosophy (Ph.D./Doctoral) program is interdisciplinary and focuses on two interdisciplinary research thrusts:

- Environmental engineering (includes environmental and water resources engineering)
- Sustainable urban and global infrastructure (includes structures, geotechnical and transportation engineering).

Each doctoral student must complete a minimum of 72 hours beyond the Baccalaureate degree. A doctoral student beyond a Master's degree must complete a minimum of 48 credit hours at Howard University beyond the Master's degree and may transfer 24 course credit hours from the master's degree to the Ph.D. program to complete the total of 72 hours. The course requirements include 12 hours on a dissertation topic based on original research. The course work requirements for the doctoral degree are designed by the academic advisor in accordance with both the sub-discipline and the interdisciplinary research area in which the student was accepted. Doctoral students are highly encouraged to prepare and publish at least one journal paper publication on a notably ranked journal before completing their program. They are encouraged to support the submission of external funding applications to agencies for sponsored research support.

## 2. REQUIREMENTS FOR ADMISSION

Admission to the graduate program is granted to students who show great promise and provide sufficient evidence for their potential to meet high standards of academic and research performance. The CEE faculty graduate committee administers the final review for each candidate and provides a recommendation for or against admission to the Graduate School. Admission requirements for the graduate programs at CEE Department include those required by the Graduate School (GS), as well as the following departmental requirements:

ME and MS programs: a minimum GPA of 3.0

Ph.D. program: a minimum GPA of 3.2

Financial resources may be available to support the highest quality M.S. and Ph.D. students.

### 3. GRADUATE PROGRAM GOALS AND VISON

The **goals** of the graduate programs in the CEE Department are:

- To cultivate a new generation of civil and environmental engineering graduates, trained to solve complex problems regarding the civil infrastructure, and the natural and engineered environments.
- To offer an interdisciplinary Ph.D. program for graduate education at Howard University that is technically grounded, but built around common thematic areas.

The CEE Department expects that graduate students follow the guiding principles:

- Graduates will understand the importance of sustainable systems, with the goal of minimizing environmental consequences of engineering decisions
- Graduates will understand the appropriateness of engineering solutions for developed, developing, and underdeveloped nations.
- Graduates will be knowledgeable of the environmental, economic and social consequences of planned and built infrastructures
- Graduates will understand the role of government, academia, industry, policy and business in managing the built and natural environment
- Graduates will be engaged in research that could make a significant contribution to professional knowledge in the field

The **vision** of the Ph.D. program in the CEE Department is to integrate faculty, students and research thrust areas that involve the departments of the College of Engineering and Architecture (CEA) and a number of allied disciplines at Howard University. Specifically, the thrusts of the program would overlap as follows:

- **Structural Mechanics Thrust:**
  - Department of Mechanical Engineering
  - Department of Electrical and Computer Engineering
  - Department of Mathematics
- **Environmental Thrust:**
  - Department of Biology,
  - Department of Chemistry,
  - Department of Mechanical Engineering
  - Department of Chemical Engineering
- **Transportation Thrust:**
  - Department of Electrical and Computer Engineering and Computer Science
  - Department of Mathematics
  - Department of Psychology
  - Department of Management

In addition to the required CEA courses of the program, students are encouraged to take additional courses in engineering education, business management, economics or public policy. These courses will be approved by the student's academic advisor.

### 4. PROGRAM COMPONENTS

#### 4.1 Official graduate plan of study

At the beginning of the first semester, each new entrant student should meet with the assigned academic advisor to design and formalize the *graduate plan of study*. The graduate plan of study is a personalized plan, based on the sub-discipline describing the envisioned program completion. The plan of study should include the completion of the core requirements of the sub-discipline in which the student was accepted. This plan is developed by the student and the academic advisor. It is the student's responsibility to obtain the appropriate signatures to formalize the study plan which will be added to his/her file in the CEE Department

and the GS. Any modification to this study plan requires the approval and signatures of the academic advisor and the CEE Department Chair.

#### **4.2 Comprehensive examination for ME students**

Each ME candidate is required to pass a comprehensive examination with a minimum score of 80/100. The comprehensive examination must be taken only when all course requirements for the ME program have been completed with a minimum GPA of 3.0. Content for the comprehensive examination includes all relevant material of the graduate program including all the course materials the student is using for graduation with focus, but not limited to the core courses of the sub-discipline courses taken at Howard University, transferred courses and classes taken at the consortium. It is the student's responsibility to initiate the exam procedure by filling out the appropriate form (*Application to Schedule a Comprehensive Examination*) and submitting this form to the academic advisor. The academic advisor will request the CEE Department Chair to form a committee to prepare and administer the examination. The comprehensive examination committee will be comprised of a minimum of three faculty members including the student's academic advisor and two faculty members who have instructed the student in the graduate program. Comprehensive examinations for ME students in the CEE Department are held **once a semester**. If the student fails the examination the first time, the student can retake the exam once. Any student who fails the examination for a second time will be dismissed from the program.

#### **4.3 MS Thesis**

All MS candidates must complete an approved research project that demonstrates his or her ability to conduct original, independent research that constitutes a distinct contribution to knowledge in the principal field of study. MS students are required to pass a final oral and written examination (thesis). CEE students should follow the GS procedures, policies and requirements for the thesis and the corresponding defense/oral examination. This procedure is aligned with the GS policies found at <https://gs.howard.edu/students/rules-and-regulations/article-v-general-requirements-masters-degrees>

#### **4.4 Qualifying Examination (Ph.D students)**

4.4.1. Written Portion. The written qualifying examination is a first in the series of three Ph.D. examinations. The written qualifying examination is followed by the oral qualifying examination and final oral defense of the dissertation near the completion of Ph.D. degree. The content and structure of qualifying examination varies by sub-discipline and interdisciplinary research area. The written qualifying examination will be prepared and administrated by an examination committee. The written qualifying examination can be taken only when (1) a doctoral student holding a Master's degree has completed 3 semesters as a full-time student completing course requirements; and (2) a doctoral student holding a Baccalaureate degree has completed 5 semesters as a full-time student completing course requirements. To take the written qualifying examination; the doctoral student needs to have a minimum GPA of 3.5. Students are required to pass the qualifying examination with a minimum score of 80%. The examination will be offered only once each semester. Any student who fails the examination for a second time will not be allowed to continue their study in the GS. It is the student's responsibility to request his/her academic advisor to begin the procedure by filling out the *application of intent to complete qualifying examination & faculty approval form* before the qualifying registration deadline set by the CEE Department. The academic advisor will request the CEE Department Chair to form an examination committee to administer the exam. This procedure is aligned with the GS policies found at <https://gs.howard.edu/academics/rules-and-regulations/article-vi-general-requirements-doctor-philosophy-degree>

4.4.2. Oral Portion. The oral qualifying examination must be taken when all course requirements for the Ph.D. program have been completed, and within one year after the student has passed the written qualifying examination. This is the second screening examination which encompasses the early portion of the student's program and establishes that the student is of doctoral quality and capable of doing research at this level. This is the opportunity for the doctoral committee to inform Ph.D. students about their strengths and weaknesses and the likelihood of their successful completion of the requirements for the doctorate. The nature and content of the examination are at the discretion of the doctoral committee. This examination may include a broad inquiry into the student's preparation for research and the opportunity in which the doctoral committee also reviews the dissertation proposal. Prior to the oral qualifying examination, a dissertation proposal must be submitted to the doctoral committee at least three (3) weeks in advance.

Students will propose an examination committee in advance of taking the doctoral oral qualifying examination. The CEE Department will authorize and formalize the nomination of the selected examination committee which will be submitted to the GS for approval. The examination committee at this level consists of a minimum of four internal faculty members that will serve on the dissertation committee. Students must be registered and enrolled during the semester they plan to take the doctoral oral qualifying examination.

#### **4.6 Admission to candidacy**

A student can be admitted to candidacy for the Ph.D. degree if that student has fulfilled all the candidacy requirements of the GS including the completion of the final version of the dissertation proposal approved during the Ph.D. oral qualifying examination (<https://gs.howard.edu/academics/rules-and-regulations/article-vi-general-requirements-doctor-philosophy-degree>).

#### **4.7 Dissertation and final oral examination**

All doctoral students are required to complete an approved dissertation that demonstrate their ability to perform original, independent research and constitute a distinct contribution to knowledge in the principal field of study. Doctoral students are required to defend the dissertation work in a final oral examination following of procedures established by the GS. The examination committee is conformed as required by the GS. The CEE graduate students should follow the GS procedures, policies and requirements for dissertation and the final oral examination (<https://gs.howard.edu/academics/rules-and-regulations/article-vi-general-requirements-doctor-philosophy-degree>).

#### **4.8 Conference presentations**

All graduate students in the CEE Department are highly encouraged to present research findings at regional and national conferences. The conference presentations offer many opportunities: to present research findings during the different stages of development and to receive feedback from colleagues, to learn from cutting-edge researchers, to enhance the overall research profile, and provide the chance to meet other researchers in the field and potential contacts for future job opportunities. All graduate students in the CEE Department are encouraged to plan with their advisors the conference presentations they intend to give each academic year. Graduate students are encouraged to be familiar with the procedures to apply for partial/full support from the GS for conference presentations.

#### **4.9 Journal publications**

All graduate students in the CEE Graduate Program are highly encouraged to prepare at least one journal paper publication in a notably ranked journal in their sub-discipline before completing the graduate program.

### **5. DEGREE REQUIREMENTS**

#### **5.1 Class registration**

Each semester, Howard University issues a calendar for registration for the next academic semester. It is the student's responsibility to meet the academic advisor and define the academic schedule for the coming semester. This meeting is formalized with completion of the *CEE graduate advising form* that should be signed by both the academic advisor and student before registration. It is the student's responsibility to obtain the corresponding signatures on the form to be added to his/her file at the CEE Department. **Students cannot make any modifications to the approved course schedule without the consent of their academic advisor.**

#### **5.2 Provisional admission**

At the discretion of the CEE faculty graduate committee, provisional admission may be recommended. In this case, a provision must be met before the student is awarded full admission to the program. Any student who fails to complete the stipulation for provisional acceptance by the specified deadline will not be allowed to continue his/her graduate studies.

#### **5.3 Course requirements**

Tables 1 through 4 present the credit hours requirements for the MS and ME programs including the core courses of the different sub-disciplines. The student is expected to consider courses offer through

Consortium (<http://www.consortium.org/>) to complete the course requirements. Consortium courses must be pre-approved by the academic advisor and CEE Department Chair.

**Table 1. Requirements for MS and ME in Environmental and Water Resources**

Course	MS			ME		
	Core/Mandatory	Elective	Credits	Core/Mandatory	Elective	Credits
Environmental Chemistry	X		3	X		3
Environmental Microbiology	X		3	X		3
Physical/Chemical Process for Water Treatment	X		3	X		3
Biological Processes for Wastewater Treatment	X		3	X		3
Advanced Hydrology	X		3	X		3
Transport Phenomena		X	3	X		3
CEE Elective		X	3		X	3
CEE Elective		X	3		X	3
Elective					X	3
Elective					X	3
Thesis	X		6	-	-	-
Pass Comprehensive examination				X		
<b>TOTAL</b>			<b>30</b>			<b>30</b>

**Table 2. Requirements for MS and ME in Structural and Earthquake Engineering**

Course	MS			ME		
	Core/Mandatory	Elective	Credits	Core/Mandatory	Elective	Credits
Advanced Structural Analysis (Matrix Structural Analysis or equivalent)	X		3	X		3
Finite Element Analysis	X		3	X		3
Advanced Reinforced Concrete Design	X		3	X		3
Advanced Steel Design	X		3	X		3
Introduction to Structural Protective Systems		X	3		X	3
Structures Research Project		X	3	X		3
Special Topics in Structures		X	3		X	3
CEE Elective		X	3		X	3
Elective					X	3
Elective					X	3

Thesis	X		6	-	-	-
Pass Comprehensive examination				X		
<b>TOTAL</b>			<b>30</b>			<b>30</b>

**Table 3. Core Course Requirements for MS and ME in Transportation Systems**

Course	MS			ME		
	Core/Mandatory	Elective	Credits	Core/Mandatory	Elective	Credits
Traffic Flow Theory	X		3	X		3
Intelligent Transportation Systems	X		3	X		3
Traffic Engineering II	X		3	X		3
Transportation Systems Modeling and Analysis	X		3	X		3
Urban Transit Planning and Rail Transportation Engineering		X	3		X	3
Advanced Traffic Engineering		X	3	X		3
CEE Elective		X	3		X	3
CEE Elective		X	3		X	3
Elective					X	3
Elective					X	3
Thesis	X		6	-	-	-
Pass Comprehensive examination				X		
<b>TOTAL</b>			<b>30</b>			<b>30</b>

**Table 4. Core Course Requirements for MS and ME in Geotechnical Engineering**

Course	MS			ME		
	Core/Mandatory	Elective	Credits	Core/Mandatory	Elective	Credits
Advanced Foundation Eng.	X		3	X		3
Advanced Soil Mechanics	X		3	X		3
Advanced Laboratory Testing of Soils	X		3	X		3
Geotechnical and Earthquake Eng.	X		3	X		3
CEE Elective		X	3		X	3
CEE Elective		X	3	X		3
CEE Elective		X	3		X	3
CEE Elective		X	3		X	3
Elective					X	3
Elective					X	3
Thesis	X		6	-	-	-
Pass Comprehensive examination				X		

<b>TOTAL</b>		<b>30</b>		<b>30</b>
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All doctoral students must complete a minimum of 48 credit hours beyond the Master's degree (transfer 24 course credit hours from the master's degree to the Ph.D. program to complete the total of 72 hours) or a minimum of 72 hours beyond the baccalaureate degree; this includes 12 hours of Dissertation based on an original scholarly research. The course work requirements for the Ph.D. degree are designed by the academic advisor in accordance with both the sub-discipline and the interdisciplinary research area in which the student was accepted. Doctoral students are highly encouraged to prepare and publish at least one journal paper in a notably ranked journal before completing their program. They are highly encouraged to support funding applications to external agencies for sponsored research support during their period of study. Table 5 summarizes the course requirements for the CEE doctoral program.

**Table 5. Core and Interdisciplinary Course Requirements for CEE Ph.D.**

<b>Course</b>	<b>Department</b>	<b>Credits</b>
CEE Thrust (Structural Mechanics, Environmental or Transportation)	CEE or related (Courses listed on Tables 1 through 4)	24
Interdisciplinary	Non-CEE	12
Research methods I&II (Structures, Earthquake Eng. Environmental or Transportation)	CEE	9
Eng. Research I, II and III (Structures, Earthquake Eng. Environmental or Transportation)	CEA	12
(Business Management, Economics, Public Policy or Engineering Education)	Business, Law, Education, Psychology, Economics	3
Dissertation Research	CEE	12
<b>TOTAL</b>		<b>72</b>

## **6. GRADUATE ACADEMIC ADVISORS AND ADVISORY/EXAMINATION COMMITTEES**

A student's academic advisor typically works with the student to design the graduate plan of study, approves the plan of study, provides advice, coordinates the logistics for required examinations and regularly assesses the student's progress and accomplishments. Academic advisors are assigned based on the CEE sub-disciplines by the CEE Department Chair and CEE Graduate Director.

All graduate programs in the CEE Department will need the support of advisory or examination committees at different stages of the programs. Advisory/examination committees for the Master programs, and for qualifying examinations for the doctoral program are recommended by the students and approved by CEE Department Chair and the CEE Graduate Director. The formalizing of the graduate plan of study requires the listing the proposed committee members and the description of the purpose of the committee. For dissertation and the final oral examination committee members for the Ph.D. program, the CEE Department Chair and the CEE Graduate Director will recommend the committee members to the GS following the GS procedures, policies and requirements.

Changes in a student's academic advisor will be granted only upon approval of both the new and old academic advisors, based on the recommendation of the CEE Graduate Director and the CEE Department Chair.

Changes in a student's advisory/ examination committee will be granted only upon approval of all committee members, new and old members, based on the recommendation by the CEE Graduate Director or CEE Department Chair.

## **7. UNIVERSITY RESOURCES**

- <https://calendar.howard.edu/>
- <http://www.gs.howard.edu/default.html>

- <https://www.howard.edu/students/hbook/H-Book.pdf>
- <http://www.howard.edu/secretary/documents/StudentCodeofConductApprovedApril182015.pdf>
- <http://www.howard.edu/financialaid/basics.htm>
- <http://www.howard.edu/studentfinancialservices/>
- [https://bisonweb.howard.edu/PROD/bwckschd.p\\_disp\\_dyn\\_sched](https://bisonweb.howard.edu/PROD/bwckschd.p_disp_dyn_sched) (class search)
- <http://www2.howard.edu/withdrawal> (total class withdrawal)
- <http://www.provost.howard.edu/Policy/GradProfCreditHourPolicy.pdf>
- <http://huhealthcare.com/healthcare/students>
- <http://www.provost.howard.edu/Policy/HUArticulationAgreement.pdf>
- <http://gs.howard.edu/gradrequirements.html>
- <http://www.gs.howard.edu/announcements/HowardUniversityTitleIXPolicy.pdf>
- <http://www.howard.edu/enrollment/exchange/cuwma.htm>
- <http://www.gs.howard.edu/pass/default.html> (Program for Academic Support Services located in the Graduate School)
- <http://www.gs.howard.edu/gradrequirements.html>
- [http://www.gs.howard.edu/formandapplications/program\\_of\\_study.pdf](http://www.gs.howard.edu/formandapplications/program_of_study.pdf) (Doctoral Program of Study Form)
- [http://www.gs.howard.edu/formandapplications/masters\\_pos.pdf](http://www.gs.howard.edu/formandapplications/masters_pos.pdf) (Master's Program of Student Form)
- [http://www.howard.edu/bisonweb/documents/StudentReferenceManual\\_17072013.pdf](http://www.howard.edu/bisonweb/documents/StudentReferenceManual_17072013.pdf)