CIVIL & ENVIRONMENTAL ENGINEERING
PhD Student Guide

August 2026

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Northwestern | McCORMICK SCHOOL OF ENGINEERING

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Introduction and Purpose

This handbook is intended to provide you with a comprehensive guide to the Doctor of Philosophy (Ph.D.) degree in Civil and Environmental Engineering (CEE) programs, The Graduate School (TGS) at Northwestern University. We hope this handbook will enhance your experience at Northwestern.

This handbook is prepared as a handy reference guide to the degree requirements, programs, policies, and procedures of the Department and The Graduate School. We hope that you will find the information you need for both planning and understanding your Ph.D. education.

The Department would also like to emphasize the importance of social and ethical implications of an engineer's work in the betterment of society. Through student professional organizations, departmental seminars, and many ethnics groups, you can interact with world renowned researchers and engineers, and experience diverse cultures. You can also interact with professionals in the greater Chicago area through meetings hosted by various professional groups. We hope you will take full advantage of the opportunities presented to you during your stay with us.

We hope you find this handbook a useful resource for your Ph.D. study. We wish you much success and welcome your suggestions for improvement of the handbook.

Yu (Marco) Nie, Ph.D.
Roxelyn and Richard Pepper Family Chair and Professor
in Civil and Environmental Engineering

Gianluca Cusatis, Ph.D.
Professor and Director of Graduate Studies
Civil and Environmental Engineering

Program Contacts

This section provides a general description of who has responsibility for curricular, admission, financial, and other matters in the program. The most up-to-date list of personnel can be found on the Department of Civil & Environmental Engineering's website.

Director of Graduate Studies (DGS): Gianluca Cusatis (g-cusatis@northwestern.edu). The DGS oversees the graduate program, advising students on academic matters and assisting with advisor selection and changes. The DGS also monitors academic progress and participates in decisions concerning academic probation and exclusion.

Department Chair: Yu (Marco) Nie (y-nie@northwestern.edu). The Department Chair is responsible for providing academic leadership, managing faculty affairs, overseeing curriculum and instruction, supporting student success along with the DGS, handling budgeting and resource allocation, coordinating departmental operations, and representing the department externally.

Graduate Program Coordinator: Logan Hart (logan.hart@northwestern.edu). This staff member aids with administrative aspects of the program, including procedures, paperwork for milestones, registration issues, and other day-to-day operations.

Financial Assistant / Coordinator: Mounir Affoun (mounir.affoun@northwestern.edu). This staff member handles financial aspects such as stipends and tuition payments.

Learning Outcomes

We inspire and cultivate innovative leaders and problem solvers prepared to address complex societal-scale challenges in areas of resilient infrastructure, smart and sustainable cities, water and energy security, climate change, mobility of goods and people, and environmental protection. We achieve this mission through:

1. Education that advances the intellectual development of our students using modern engineering curricula focused on quantitative and predictive methods, academic and professional mentoring, and service-based learning;
2. Research that leads to new theories and techniques and transforms our ability to design, construct, and manage society's infrastructure, control material behavior, and sustain natural and engineering systems around the world; Cultivation of a diverse community of scholars, who, through motivation to serve society, are prepared to lead, manage, and make decisions both inside and outside the Civil and Environmental Engineering professions.

Program-Specific Academic Requirements & Policies

First-Year PhD Student Advising Policy

To ensure timely academic progress and successful integration into the research environment, the Department establishes the following advising procedures for first-year doctoral students.

1. Assignment of Advisor

Each first-year PhD student shall be assigned an academic advisor until a faculty member agrees to serve as the student's research (thesis) advisor. The Area Coordinator, in consultation with area faculty, shall make this assignment prior to the fall quarter orientation.

For the purposes of this policy, the term advisor refers to the academic advisor or, once determined, the research advisor.

2. Advising Meetings

The advisor shall meet with the student at least twice per quarter during the first year. These meetings should include:

- review of the student's academic plan and course progress,
- assistance with course registration (including research credits), and
- guidance in identifying and securing a research advisor.

Students are expected to actively seek advice and keep the advisor informed of their academic progress and research interests.

3. Performance Assessment and Progress Reports

The advisor shall conduct formal progress assessments twice each quarter, once during Week 5 and once during Week 10. Following each assessment, the advisor shall provide feedback through GSP indicating whether the student's performance is satisfactory or needs improvement.

If deficiencies are identified, the advisor shall document recommended corrective actions, expectations for improvement, and any relevant deadlines. Academic progress records maintained in GSP will be used in evaluating satisfactory academic progress.

4. Faculty Meetings in the Fall Quarter

First-year students are encouraged to interact broadly with faculty members in their area during the first year. During the fall quarter, each first-year student must meet at least once with every faculty member in their area to discuss research interests and potential opportunities.

Following these meetings, the student shall submit a brief written summary to the advisor. The advisor shall incorporate this information into the first quarterly progress report.

5. Research Exposure Requirement (CIV_ENV 499)

First-year students must complete at least one CIV_ENV 499 research exposure course during their first year. The course may be taken with any faculty member in the student's area. Performance in these courses will contribute to the evaluation of the student's academic progress.

6. Matching with a Research Advisor

Students are expected to formally secure a research advisor by the end of the spring quarter of their first academic year. Each Area Coordinator shall report first-year student placements to the Department's Director of Graduate Studies.

Students who have not secured a research advisor by this time may be considered not in satisfactory academic standing. In such cases, the Area Coordinator, in consultation with the academic advisor, shall submit a report to the Director of Graduate Studies outlining the circumstances and recommending appropriate next steps.

Coursework Requirements

TGS requires a minimum of 9 units of coursework to be completed for a letter grade. Additional coursework requirements vary by specialization depending on whether the student joins NU with or without an MS degree in civil and environmental engineering or related disciplines. The specialization coursework requirements are discussed in the relevant webpages and curriculum charts. It is CEE policy that all incoming PhD students complete no fewer than 9 course units in the first academic year of study. Transfer credits are not allowed. Individual CEE program areas may require more coursework. Students should check with their advisor and the program area coordinator for more details. Students enrolled in the PhD program are allowed to use their PhD coursework to obtain an MS degree in the same specialization.

CEE offers the Doctor of Philosophy (PhD) degree in five Program Areas:

1. **Environmental Engineering and Science (EES)**
2. **Underground Science and Engineering (USE)**
3. **Transportation Systems Analysis and Planning (TRN)**
4. **Mechanics, Materials, and Structures (MMS)**
5. **Engineering of the Built Environment (EBE)**

Minimum Grade & GPA Requirements

Students must maintain a grade point average of **3.5 or higher.**

Course Waiver Policy

The department permits waivers for required courses listed on the specialization's curriculum chart at the discretion and approval of the student's advisor, the relevant area coordinator, and the Director of Graduate Studies (DGS). To request a waiver, students must formally petition using the CEE Course Waiver Form in GSP. This process ensures that any waived requirement has been reviewed and endorsed by all relevant parties before being granted.

Teaching Requirement

All CEE PhD students are required to have significant teaching experience during their PhD studies; this requirement is typically satisfied by serving as a TA for one or more quarters. PhD students must satisfy TGS's English Proficiency requirement before being appointed as a TA.

TA positions are half-time appointments, with salary paid by departmental funds, for which PhD students are expected to work 20 hours per week and report to the instructor of the course. During the quarter that the PhD student is serving as a TA, the 20 hours of effort is the source of the PhD students funding and must therefore be the first priority of the student's effort in that quarter. Other activities such as his/her own coursework and research must fit within the schedule required of the TA position. TAs are encouraged to attend the lectures of the courses they TA for, and in the case of TAs being unfamiliar with the course material, lecture attendance is mandatory.

TA Assignment Process

TAs are assigned by the department based on course need and student expertise.

Satisfactory Academic Progress

PhD students are required at all times to meet the Department's standards for satisfactory academic progress. Core elements of satisfactory progress include, but are not limited to:

- Completion of coursework as specified by the student's area of study;
- Maintenance of a grade point average (GPA) of **3.5 or higher**; and
- Participation in research activities under the supervision of a research advisor, when applicable.

A student's progress is reviewed regularly by the research advisor or, if a research advisor has not yet been identified, by an academic advisor assigned by the Area Coordinator.

First-year students are expected to secure a research advisor by the end of the spring quarter of their first year. After being matched with a research advisor, the student will continue in the program under the advisor's guidance, with progress evaluated through regular advising and research supervision as described above. Students who have not secured a research advisor by this time may be considered not in satisfactory academic standing.

Students who fail to meet the Department's standards will be formally notified and required to take corrective action within a specified timeframe. Failure to restore satisfactory standing in a timely manner may result in Probation, in accordance with McCormick and Graduate School policies.

Typical Civil & Environmental Engineering PhD Timeline

- Year 1:
  - Coursework and Advisor Identification
- Year 2:
  - Completion of Remaining Coursework (if necessary) and Candidacy Exam
- Year 3:
  - Prospectus Defense
- Year 4:
  - Research
- Year 5 (and beyond):
  - Thesis Defense

PhD students achieve PhD candidacy upon completion of required coursework, meeting of TGS's English Proficiency Requirement (as needed), identification of a research advisor who has agreed to supervise their studies, and passing of the Qualifying Exam.

PhD students can find the Master's in Primary PhD form within GSP under the TGS Forms tab. This form is specifically used to request a master's degree along the way to the PhD in the same program. Completing this form is a necessary step before submitting other required forms for degree conferral, such as the Application for Degree and Master's Degree Completion forms, also submitted via GSP.

Program Specific Milestone Policies

Advisor

First-year students are expected to secure a research advisor by the end of the spring quarter of their first year.

Each new PhD student is automatically assigned an academic advisor for their duration of their first year as outlined in the First Year Advising policy. The program area coordinators will communicate first-year academic advisor assignments. The program area coordinators are:

- **Environmental Engineering and Science (EES): Erica Hartmann**
- **Underground Science and Engineering (USE): Alessandro Rotta Loria**
- **Transportation Systems Analysis and Planning (TRN): Amanda Stathopoulos**
- **Mechanics, Materials and Structures (MMS): Federico Ciardo**
- **Engineering of the Built Environment (EBE): Giorgia Chinazzo**

This initial assignment is for orientation purposes and to ensure you have a contact to select courses for your first quarter of study. As the fall quarter begins, you should begin the process of identifying a faculty member who will serve as your PhD advisor for the duration of your studies. **CEE does not have a formal matching process by which students are assigned to advisors**. We allow the process to happen organically, and in order for this to work properly, students must reach out to faculty to identify mutual interest. The program area coordinator can help you to get this process started – speak to this person if you are unsure of how to proceed. Your goal should be to identify a thesis advisor no later than the end of your third quarter of study.

Once you have selected an advisor, please contact the academic program coordinator, the director of graduate studies, and your area coordinator with this information. Please log your advisor selection in GSP as well.

Annual Advisor Reviews

Annual Advisor Reviews are conducted via the Academic Progress Tab in the Graduate Student Progress (GSP) portal.

Prospectus and Defense Committees

CEE requires a minimum of three (3) committee members, at least two of whom must be members of Northwestern's The Graduate School (TGS) faculty. It is recommended that one committee member be from outside the CEE department.

Committee members can be present electronically if necessary.

Qualifying Exam / Candidacy

PhDs should be considered for Admission to Candidacy following completion of the required coursework. The Admission to Candidacy process should not extend beyond the 5th academic quarter of study (i.e., December of second year of study) for a student with a previously earned MS degree, or the 7th academic quarter of study (i.e., June of second year of study) for a student who entered with no MS.

Admission to Candidacy requires passing the **Qualifying Exam**. The Qualifying/Candidacy Exam is held with a committee of at least three faculty members, one of whom (not the advisor) will be designated as Chair. Depending on the program area, the advisor may not be part of the committee. The Qualifying Exam is not open to the public. The subject matter and format of the Qualifying Exam are specific to each research area as per the descriptions on the research areas' webpages. Individual CEE program areas follow specific procedures to organize the logistical and technical details of the Qualifying Exam. Students should discuss these procedures with their program area coordinator and prepare for the exam accordingly.

- The results of the Qualifying Exam are: pass, provisional pass, and fail. A grade of pass means the Qualifying Exam requirement is satisfied. Students will be notified of the exam outcome within one week after the conclusion of the exam.
- Students receiving a provisional pass grade are given conditions and a time interval under which a passing grade may be awarded. The Chair of the examination committee will evaluate completion of conditions provided. Although the Qualifying Exam requirement will not be satisfied until these conditions are met, a re-take of the Qualifying Exam may not be required, unless specifically requested by the Qualifying Exam committee. Failure to successfully satisfy the conditions of the provisional pass within the assigned timeframe will invalidate the provisional pass and convert it into a grade of fail.
- A student receiving a grade of fail on the Qualifying Exam may retake the exam once; a second failing grade will result in the student not being allowed to continue in the PhD program. It is required that the exam be retaken within one quarter of the first attempt.

Students who do not pass their Qualifying Exam a second time may leave the program with an MS degree in their specialization via the MS in Primary PhD process outlined above under the **Typical**

Civil & Environmental Engineering PhD Timeline provided they satisfy the requirements for the MS degree**.**

Prospectus (Dissertation Proposal)

The Prospectus process involves the development of a written research proposal that will culminate in the dissertation. This research proposal should be of the style and quality of a standard NSF proposal. The written proposal is delivered to the committee no less than two weeks before the Prospectus defense date.

On the Prospectus defense date, the proposal is presented and defended in oral form to the Prospectus committee. The prospectus presentation is open to the public, but the subsequent examination is with the committee only. The Prospectus milestone should be completed no later than the end of their 12th quarter of study.

Students who do not pass their Prospectus should retake it no later than one quarter after their first attempt. Students who do not pass their Prospectus a second time may leave the program with an MS degree in their specialization via the MS in Primary PhD process outlined above under the **Typical Civil & Environmental Engineering PhD Timeline** provided they satisfy the requirements for the MS degree.

Dissertation/Thesis/Defense

PhD students must complete a written dissertation that is a significant and original research contribution, based on the research project presented in the Prospectus. PhD students defend the dissertation to the Dissertation committee in a presentation open to the public. The details of the individual dissertation and defense are up to the advisor and PhD student, and subject to the requirements available on the TGS website.

Program Resources/Support

Student and professional organizations provide networking opportunities and seminars on the state-of-the-art research and design in the civil and environmental engineering profession. The Department of Civil and Environmental Engineering is home to the Student Chapter of American Society of Civil Engineers (NU ASCE). Professional organizations of all branches of civil and environmental engineering have local sections in Chicago area which hosts monthly meetings. You are encouraged to attend some of these meetings to interact and network with the engineering profession. The following is a list of organizations in which you may consider participating.

Student organizations at Northwestern:

Civil and Environmental Engineering Graduate Association (CEEGA) – see Charles Martell, staff advisor or Prof. Giuseppe Buscarnera, faculty advisor.

McCormick Graduate Leadership Council (MGLC) Founded in 2006, the MGLC fosters community among all McCormick graduate students. http://mglc.mccormick.northwestern.edu/

Graduate Student Association (NUGSA) at Northwestern enhances graduate students' experiences in and out of the classroom and strives to create resources and programs to improve the quality of students' lives. https://nugsa.wordpress.com/

For PhD students in Civil Engineering:

Northwestern University American Society of Civil Engineers Founded in 1852, the American Society of Civil Engineers represents more than 140,000 members of the civil engineering profession worldwide and is America's oldest national engineering society. ASCE's mission is to provide essential value to our members and partners, advance civil engineering, and serve the public good.

The Mission of NUASCE is *to create a more informed and involved Civil Engineering community by providing opportunities to apply and further refine technical skills, increasing student and faculty interactions, and preparing students to enter the professional engineering industry*. Through NUASCE you will have the opportunity to meet other students with similar interests, network with professionals, and participate in exciting design competitions such as concrete canoe and steel bridge. Most importantly, the student chapter prides itself on creating a strong community of engineers, and they would love for you to join!!! For more information, visit their website: http://asce.mccormick.northwestern.edu.

Chicago Area Professional Organizations

Illinois Section American Society of Civil Engineers represents Civil Engineers in Northern Illinois. The Section has five technical groups and the Younger Member Group (YMG). The technical groups are Environmental and Water Resources Institute (EWRI), Geo Institute (GEO), Structural Engineering Institute (SEI), Transportation and Development Institute (T&DI), and Urban Planning and Development (UBD). All groups hold monthly lunch or dinner meeting. YMG usually hosts social

event for younger engineers of all disciplines to network and they also sponsor a number of outreach events to pre-college students. For more information, visit http://www.isasce.org/.

American Concrete Institute (ACI) https://www.concrete.org/

American Institute of Steel Construction (AISC) http://www.aisc.org/

Institute of Transportation Engineers (ITE) http://www.ite.org/

Structural Engineers Association of Illinois (SEAOI) advances and advocates excellence in structural engineering and to aid in safeguarding the public. https://www.seaoi.org/

Transportation Research Board (TRB) http://www.trb.org/AboutTRB/AboutTRB.aspx

For PhD students in Environmental Engineering and Science:

As research is performed in a variety of fields, i.e., Chemistry, Microbiology, and Transport Processes there are a number of International and national organizations to choose from. The most commons are:

ACS Chemistry for Life® The American Chemical Society that publishes the journal *Environmental Science & Technology*, among many other relevant journals, and that has been a reference journal for all the work performed in Environmental Engineering. Student membership is as it also provides cheaper registration for 2 annual meetings, and also local sections.

AMERICAN SOCIETY FOR MICROBIOLOGY The American Society for Microbiology that publishes Applied and Environmental Microbiology, one among many others. As with ACS, ASM organizes annual meetings and also provides students' memberships at low cost.

AGU ADVANCING EARTH AND SPACE SCIENCE The American Geophysical Union that sections dealing with Hydrology, Atmospheric Sciences and Biogeosciences. AGU publishes also many relevant journal dealing with earth sciences at large.

AEESP | Association of Environmental Engineering & Science Professors

1963-2013: Celebrating 50 Years of Advancing Environmental Engineering & Science

That is the professional organization for academics that provides a student membership open to full-time graduate students and postdoctoral appointees in environmental engineering, environmental science or related fields who intend to pursue careers in academia.

Internship and Career Development

Civil and Environmental Engineering Career Fair

Through the joint effort of NUASCE and EnvEUS, the inaugural **CEE Career Fair** was held in 2013. Since 2014, the Career Fair has been organized by the CEE Department with support from McCormick's Engineering Career Development office beginning in 2019. The department hosts Fall and Winter fairsfocused on firms hiring civil and environmental engineering graduates for internships and for full-time positions. **The Fall Career Fair is held in October while the Winter one is held in January**. Watch for the announcement of the event and call for registration and submission of resumes. The Department also maintains a web page http://www.mccormick.northwestern.edu/civil-environmental/career-opportunities/career-fair.html where internships and graduate engineer positions are posted when the information is sent to the Department. We suggest you check on the site periodically to see what is being posted.

McCormick Office of Career Development (MCD)

MCD http://www.mccormick.northwestern.edu/career-development/index.html provides career preparation and employment assistance through a variety of work-integrated learning programs including co-op engineering education, internships, research experience, and service learning. Register with **McCormickConnect** (http://www.mccormick.northwestern.edu/career-development/mccormickconnect.html) to receive information on job postings, resume submissions, interview schedules, career events, or meet with a MCD advisor. MCD is located in Room 2.350 in Ford Building.

Northwestern Career Advancement (NCA)

The mission of Northwestern Career Advancement is to foster excellence in career development, preparation, and professional opportunities for undergraduate and graduate students and alumni by providing comprehensive services and programming and by promoting strong partnerships with

employers, academic departments, and the university community.
http://www.northwestern.edu/careers/