

CIVIL AND ENVIRONMENTAL ENGINEERING

cee.illinois.edu (<http://cee.illinois.edu>) or cee.illinois.edu/environmental (<http://cee.illinois.edu/environmental>)

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Major: Civil Engineering
 Degrees Offered: M.S., Ph.D.

Major: Environmental Engineering in Civil Engineering
 Degrees Offered: M.S., Ph.D.

Major: Engineering
 Degrees offered: M.Eng.

Online Program: Civil Engineering
 Degrees offered: M.S.

Joint Degree Program: the M.S. in Civil Engineering can be earned jointly with the following
 Degrees Offered:
 M.Arch. in Architecture (<http://catalog.illinois.edu/graduate/graduate-majors/architecture/#masterstext>) (Construction Management or Structures),
 M.B.A. in Business Administration (<http://catalog.illinois.edu/graduate/graduate-majors/bus-admin-mba/#masterstext>)

Concentration: Railway Engineering

Graduate Degree Programs

The Department of Civil and Environmental Engineering, consistently ranked as having one of the best graduate programs in the country, offers graduate work leading to master's and doctoral degrees. These are in a variety of specialized areas through departmental and joint programs which are described on this page. Opportunity also exists for earning certificates and/or concentrations in

1. computational science and engineering and
2. energy and sustainability engineering within the department's graduate programs via the Computational Science and Engineering (CSE) (<http://www.cse.illinois.edu>) transcriptable Concentration and the Energy and Sustainability Engineering (EaSE) Option (<http://ease.illinois.edu>).

The College of Engineering offers a professional master's degree program for students whose primary intent is a career in industry or government. This degree differs from the Master of Science degree in that it is a terminal degree and not a pathway to a doctoral program. The major in Engineering for the M.Eng. degree requires the selection of an interdisciplinary concentration.

Admission M.S./Ph.D./Joint Degree Programs

Admission to the Graduate College with full status in civil engineering or in environmental engineering in civil engineering is granted to graduates of accredited institutions whose requirements for the bachelor's degree are substantially equivalent to those of the University of Illinois, provided the applicant's preparation is appropriate for advanced study in his or her chosen major field and his or her scholastic average is at least 3.00 (A = 4.00). The Graduate Record Examination (GRE) (<http://www.ets.org/portal/site/ets/menuitem.fab2360b1645a1de9b3a0779f1751509/?vgnnextoid=b195e3b5f64f4010VgnVCM10000022f95190RCRD>) is required. Applications are considered for both spring and fall admissions. In general, a 3.00 grade point average for the last two years of the undergraduate program and for any previous graduate work is a minimum requirement for admission to the M.S. program. Requirements for admission to the Ph.D. program are variable, but are usually substantially higher. For additional information, see the departmental Web site (<http://cee.illinois.edu/programs/Grad/GradApps>).

All applicants whose native language is not English must submit a minimum TOEFL (<http://www.toefl.org>) score of 79 (iBT), 213 (CBT), or 550 (PBT); or minimum International English Language Testing System (IELTS) (<http://www.ielts.org>) academic exam scores of 6.5 overall and 6.0 in all subsections. Applicants may be exempt from the TOEFL if certain criteria (<http://grad.illinois.edu/admissions/instructions/04c>) are met. For those taking the TOEFL or IELTS, full admission status (<http://grad.illinois.edu/admissions/instructions/04c>) is granted for scores greater than 102 (TOEFL iBT), 253 (TOEFL CBT), 610 (TOEFL PBT), or 6.5 (IELTS). Limited status (<http://grad.illinois.edu/admissions/instructions/04c>) is granted for lesser scores and requires enrollment in English as a Second Language (ESL) courses (<http://linguistics.illinois.edu/students/esl/guidelines>) based on an ESL Placement Test (EPT) taken upon arrival to campus.

Applicants to the joint M.Arch or M.B.A degree programs must meet the admissions standards for both programs and be accepted by both programs.

M.Eng.

Students with bachelor's or master's degrees in engineering or related fields will be considered for admission if they have a grade point average of at least 3.00 (A = 4.00) for the last two years of undergraduate study. Admission is possible for the spring term, but most admissions are for the fall term. Full details of admission requirements are on the Railway Engineering Concentration website (<http://railwaymeng.engineering.illinois.edu>).

All applicants whose native language is not English must submit a minimum TOEFL (<http://www.toefl.org>) score of 103 (iBT), 257 (CBT), or 613 (PBT); or minimum International English Language Testing System (IELTS) (<http://www.ielts.org>) exam scores of 7.0 overall and 6.0 in all subsections. Applicants may be exempt from the TOEFL if certain criteria (<http://grad.illinois.edu/admissions/instructions/04c>) are met. Full admission status (<http://grad.illinois.edu/admissions/instructions/04c>) is granted for those meeting the minimum requirements and having taken the TOEFL or IELTS since the scores required for admission to the M.Eng. are above the minimum scores demonstrating an acceptable level of English language proficiency.

Faculty Research Interests

Areas of study and research pursued by our world-renowned faculty are focused in the following specializations:

- construction management
- environmental engineering and science
- environmental hydrology and hydraulic engineering
- geotechnical engineering
- materials
- structural engineering
- transportation engineering
- sustainable and resilient infrastructure systems
- energy-water-environment sustainability
- societal risk management

Within these specializations, current research programs include:

- air quality
- aquatic biology and ecology;
- computer-aided engineering systems (artificial intelligence, expert systems, and neural networks)
- construction engineering and management
- construction materials (concrete composition, microstructure, and engineering properties)
- earthquake engineering
- environmental chemistry
- environmental fluid mechanics
- geotechnical engineering (rock mechanics, soil mechanics, and foundation engineering)
- hazardous-waste management
- hydrology and hydraulic engineering
- information technology including distributed sensors and monitoring
- nondestructive diagnostics
- railway engineering
- river mechanics and morphology, stochastic structural dynamics and random vibrations
- structures (analysis, design, and behavior)
- structural and computational mechanics
- traffic engineering
- transportation (facilities, planning, systems design, and operations)
- water quality process engineering
- water resources and environmental systems analysis

Centers, Programs, and Institutes

Multi-hazard Approach to Engineering (MAE) Center (<http://mae.cee.illinois.edu>) – originally established by the National Science Foundation, works to develop an integrated framework and application tools for loss assessment due to earthquake and other disruptive events, disaster planning, response and mitigation strategies, and decision-making engines that enable policy makers to effectively manage risk.

Illinois Center for Transportation (ICT) (<http://ict.uiuc.edu>) – funded by the Illinois Department of Transportation and the State of Illinois, promotes innovation and progress in transportation through interdisciplinary research.

Center of Excellence for Airport Technology (CEAT) (<http://www.ceat.illinois.edu>) – founded in 1995 as a Federal Aviation Administration (FAA) Center of Excellence, aims to develop new scientific knowledge and technology for the development, maintenance, and operation of airports.

Fabricated Geomembrane Institute (<http://www.fabricatedgeomembrane.com>) – conducts research and disseminates technical information about geomembranes that can be factory fabricated, transported to a project, and deployed, e.g., polypropylene, PVC, LDPE, and EPDM geomembranes, and answers technical questions regarding testing, design, fabrication, installation, and performance of these geomembranes.

Safe Global Water Institute (<http://publish.illinois.edu/safeglobalwater>) – founded in 2012 with the goal of seeking sustainable solutions to the world's safe water and sanitation challenges.

Rail Transportation and Engineering Center (<http://railtec.illinois.edu>) – founded in 2010 in recognition of the expanding importance of rail transportation to the economy, to society, and to a safe and sustainable environment. It is the first and only US national center in railroad engineering.

Facilities and Resources

The Newmark Structural Engineering Laboratory (NSEL) features a nearly 6,000 square foot structural testing floor (strong floor), a three-story clear height, and a multiplicity of testing equipment (including a shake table, stand-alone universal testing machines, reaction frames, actuators, controllers, transducers, and a data acquisition) that can be used for conducting large-scale experimental structural, materials, and earthquake engineering research. It provides a new experimental environment for conducting integrated distributed hybrid tests on compounds of large bridge and building structures. The Environmental Engineering and Science Laboratories contain over 11,000 square feet with state-of-the-art analytical equipment. Two additional laboratories occupying approximately 2,500 ft² were built and opened in early 2016 for faculty and students doing research in the area of materials science and engineering for environmental, energy, and built environment applications. The Hydrosystems Laboratory covers an area of more than 11,000 square feet and includes several flumes, a rainfall generator, a stratified flow tank, and a water tunnel. The Advanced Transportation Research and Engineering Laboratory (ATREL) is a unique and comprehensive transportation research, educational, and testing laboratory. It is located on 47 acres, 15 miles north of the main campus, and it contains 60,000 square feet of laboratories, continuing education classrooms, office space, and a technical library. It is home to the Illinois Center for Transportation (ICT). The Smart Structures Technology Laboratory seeks to implement advanced sensing and control technologies to more effectively monitor and protect our nation's civil infrastructure. The Laboratory houses a new medium-scale 6 Degree-of-Freedom seismic simulator, as well as extensive instrumentation and telepresence capabilities. The Research & Innovation Laboratory (RAIL), located on the Construction Engineering Research Laboratory campus, supports the Rail Transportation and Engineering Center. This laboratory is dedicated to improving performance and design of railway infrastructure. To achieve these objectives, the 3,500 square foot Research and Innovation Laboratory (RAIL) was conceived and is located in the Harry Schnabel Jr. building on the CERL campus.

Financial Aid

Financial aid is available in the form of fellowships and research and teaching assistantships. All applicants, regardless of U.S. citizenship, whose native language is not English and who wish to be considered for teaching assistantships must demonstrate spoken English language proficiency (<http://www.grad.illinois.edu/admissions/taengprof.htm>) by achieving a minimum score of 50 or 24 on the speaking subsection of the TOEFL iBT or 8 on the speaking subsection of the IELTS. For students who are unable to take the iBT or IELTS, a minimum score of 4CP is required on the EPI test (http://cte.illinois.edu/testing/oral_eng/epi_overview.html), offered on campus. All new teaching assistants are required to participate in the Graduate Academy for College Teaching (http://cte.illinois.edu/programs/ta_train.html) conducted prior to the start of the semester.

Students in the M.Eng. degree are not eligible for tuition waivers through research assistantships or teaching assistantships.

For information on the Master of Engineering, Railway Engineering Concentration, see the Concentration tab (p. 4).

Master of Science, all majors

Thesis Option

CEE 599	Thesis Research (min-max applied toward degree)	4-12
	Elective courses, subject to Other Requirements and Conditions below	20-28
Total hours		32

Other requirements ¹

Other Requirements and Conditions may overlap.

Individual programs are developed by the students in consultation with their academic advisors.

A minimum of 16 hours of credit within the major field with 8 graded and at the 500 level.

A minimum of 12 hours at the 500-level overall.

A maximum of 8 hours of CEE 597 (or other independent study) may be applied toward the elective course work requirement.

At least half of the minimum hours required for the degree must be in Illinois courses meeting on the Urbana-Champaign campus or in courses meeting in other locations approved by the Graduate College for residency credit for the degree.

Minimum program GPA 2.75

¹ For additional details and requirements refer to the department's Graduate Handbook and the Graduate College Handbook.

Non-Thesis Option

Elective courses, subject to Other Requirements and Conditions below	36
Total Hours	36

Other requirements ¹

Other Requirements and Conditions may overlap.

Individual programs are developed by the students in consultation with their academic advisors.

A minimum of 16 hours of credit within the major field with 8 graded and at the 500 level.

A minimum of 12 hours at the 500-level overall.

A maximum of 8 hours of CEE 597 (or other independent study) may be applied toward the elective course work requirement.

At least half of the minimum hours required for the degree must be in Illinois courses meeting on the Urbana-Champaign campus or in courses meeting in other locations approved by the Graduate College for residency credit for the degree.

Minimum program GPA 2.75

Doctor of Philosophy, all majors

The degree of Doctor of Philosophy, primarily a research degree, requires from three to four years of graduate study beyond the master's degree.

The major area of specialization encompasses courses and research that are closely related, but the courses need not be offered by a single major department. Candidates must demonstrate a capacity for independent research by preparing an original thesis on a topic within the major field of study, must meet the qualifying requirements or examination in the area of specialization, and must pass both preliminary and final examinations.

CEE 599	Thesis Research (min-max applied toward degree)	32
	Elective courses (subject to Other Requirements and Conditions below)	32
Total Hours		64

Other Requirements ¹

Other Requirements and Conditions may overlap

A maximum of 8 hours of CEE 597 (or other independent study) may be applied toward the elective course work requirement; approval required.

There is no department-wide foreign language requirement. However, the faculties of some areas of specialization may require foreign language proficiency if essential to the conduct of research in that area.

64 graduate hours must be completed in residence.

A Masters degree is required for admission to the Ph.D. program.

Ph.D. exam and dissertation requirements:

Qualifying exam²

Preliminary exam

Final exam or dissertation defense

Dissertation deposit

The minimum program GPA is 2.75.

¹ For additional details and requirements refer to the department's *Graduate Handbook* (<http://cee.illinois.edu/online-graduate-handbook>) and the *Graduate College Handbook* (<http://grad.illinois.edu/gradhandbook>).

² *Qualifying Exam Information* (<http://cee.illinois.edu/academics/graduate-programs/phd-degree-and-curriculum>)

Joint Degree Programs

Master of Science in Civil Engineering and Master of Architecture

The M.Arch.-M.S.C.E. joint degree program with the School of Architecture requires a total of 78 graduate hours (Architecture Track II), 70 graduate hours (Architecture Track III), or 64 graduate hours (Architecture Track I). Full details of requirements are presented at the School of Architecture's Web site (<http://arch.illinois.edu>); the thesis option is not available.

Joint M.B.A. Program

Students in this unit may choose to earn their major degree and simultaneously complete an M.B.A., with 12 fewer required hours than when pursuing both degrees independently. Students must be enrolled in the M.B.A. program for three terms and complete all the requirements of their primary degree. Interested students should see the joint program requirements (<http://catalog.illinois.edu/graduate/graduate-majors/bus-admin-mba/master-ba-fulltime>) and contact the M.B.A. program and their major department office for more information.

Online Program

The degree requirements are the same as for the on-campus non-thesis M.S. program—36 hours of course work—and the degree awarded to online students is the same degree awarded to resident students. Online students have five years to complete the program.

The M.S. degree in Civil Engineering offered online is currently available for specialization in Construction Management, Infrastructure, Structural Engineering, and Transportation Engineering. Students can also develop cross-disciplinary programs in consultation with their advisers. Additional courses are available online in the following areas of concentration to complement the student's area of specialty above: Construction

Materials, Environmental Engineering and Science, Environmental Hydrology and Hydraulic Engineering, and Geotechnical Engineering.

Concentration in Railway Engineering for the Master of Engineering, major in Engineering

Core Courses from Illinois		6
CEE 409	Railroad Track Engineering	
CEE 412	High-Speed Rail Engineering	
Alternate Illinois course from approved list for students who have completed one or both of the required courses in previous degree		
Core Courses from KTH		12
CEE 498	Special Topics (RTV, KTH SD2307, Rail Vehicle Technology)	
CEE 498	Special Topics (TMS, KTH AK2036, Theory and Methodology of Science with Applications)	
CEE 598	Special Topics (ET, KTH EJ2400, Electric Traction)	
CEE 598	Special Topics (RVD, KTH SD2313, Rail Vehicle Dynamics)	
Elective Courses from Illinois		14
Railway Elective Courses from Approved List A, minimum 6 hours		
Engineering Elective Courses from Approved List B, minimum 6 hours		
Professional Development courses from approved list		4
Total Hours		36

Other Requirements and Conditions (may overlap)¹

Minimum of 20 credit hours must be taken at the University of Illinois at Urbana-Champaign campus

Minimum of 12 500-level credit hours in the concentration with at least 8 credit hours in the core concentration

No courses used to fulfill any degree requirement may be taken using the Credit/No Credit option.

Minimum program GPA 3.0

¹ For additional details and requirements, please refer to the concentration's website (<http://railwaymeng.engineering.illinois.edu>) and the Graduate College Handbook (<http://grad.illinois.edu/gradhandbook>).

Note: Students in the M.Eng. degree are not eligible for tuition waivers through research assistantships or teaching assistantships