

CIVIL ENGINEERING (CAPITAL)

Graduate Program Head	Thang Bui
Program Code	CENG
Campus(es)	Harrisburg (M.S.)
Degrees Conferred	Master of Science (M.S.)
The Graduate Faculty	View (https://secure.gradsch.psu.edu/gpms/?searchType=fac&prog=CENG)

Penn State Harrisburg (PSH) is located within a short commute from York, Lancaster, Carlisle, Reading, and Harrisburg, where many large civil engineering firms are located. These firms focus on structural design, construction management, transportation design, treatment plant design, and water-resources engineering. The Master of Science in Civil Engineering degree program is designed to provide support for these firms and their employees who want to enhance their design skills and update their knowledge above the level taught at the undergraduate level. This program also will support changes in the professional licensure for civil engineers, if they occur.

The program is accessible to engineering professionals who wish to pursue advanced studies without giving up current employment. The program may be completed on a full-time or part-time basis. Classes are scheduled weekly in three-hour evening sessions, offering a convenient format for career professionals seeking to enroll on part-time basis. Whenever possible, the program will take advantage of the specialized equipment and facilities available in the local firms to enhance the training of M.S. CE program students.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (<http://gradschool.psu.edu/prospective-students/how-to-apply/>). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions Policies (<http://gradschool.psu.edu/graduate-education-policies/>).

Admission into the Master of Science (M.S.) Civil Engineering program will be granted only to candidates who demonstrate high potential for success in graduate studies. Applicants should have undergraduate degrees in engineering or technology-related fields from an accredited university and must meet the admission requirements as set by Penn State's Graduate School. For admission, an undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale. Scores from the GRE are required for those who indicate an interest in a school/college-funded assistantship.

Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Students with a baccalaureate degree in non-civil engineering and engineering technology could be admitted on a provisional basis (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/gcac-303-provisional-admission/>) pending successful completion of prerequisite courses within 1-2 semesters of admission.

Applicants should submit the following:

- a completed Graduate School online application with the application fee;

- official transcripts from all post-secondary institutions attended (<http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission/>);
- three (3) letters of professional recommendations from individuals who can evaluate the applicant's potential;
- a personal statement of professional interest, goals, and experience;
- test scores from the Graduate Record Examination (GRE); and
- a statement of interest in a graduate assistantship, if desired (full-time study required).

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (<http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/gcac-305-admission-requirements-international-students/>) for more information.

Prerequisite Courses

Students may be admitted to the program from various engineering/engineering technology disciplines. Students applying for admission are expected to have B.S. degree in engineering/engineering technology and completed the following core courses:

- Physics I and II (one year of college physics);
- Calculus I and II (differential and integral calculus);
- Differential equations;
- Chemistry (one semester);
- Statics;
- Dynamics; and
- Strength of materials.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (<http://gradschool.psu.edu/graduate-education-policies/>)

All graduate students in Civil Engineering are required to adhere to the requirements of the Graduate School, as found in the Graduate Degree Programs Bulletin. The requirements of the Graduate School, however, are minimum requirements and the policies, procedures, and regulations listed below are additional and more specific for graduate students pursuing the M.S. in Civil Engineering degree. Advisers will call pertinent regulations to the attention of their advisees, but it should be understood that it is the student's personal responsibility to see that all requirements are satisfied.

The M.S. CE program at PSH is structured to take full advantage of the specialty areas of expertise of the CE Graduate Faculty. The M.S. degree with the thesis track requires 31 credits at the 400, 500, 600, or 800 level, including 24 course credits with at least 12 credits at the 500 level, one colloquium credit (CE 590), and six thesis credits (CE 600 or CE 610). The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

The M.S. degree with the non-thesis track also requires 31 credits at the 400, 500, or 800 level, including 27 course credits with at least 15 credits at the 500 level, one colloquium credit (CE 590), and three research/paper credits (ENGR 594).

All M.S. CE students are required to take an advanced math or statistics course (EMCH 524A or STAT 500), and EMCH 500 or CE 437, and colloquium (CE 590). Students will take 12 (thesis) or 15 (non-thesis) credits of civil engineering courses, selected from offerings in structural, construction, transportation, water resources, and environmental with 9 (thesis) or 12 (non-thesis) credits at the 500-level.

Elective Courses. Students will take six (6) additional elective credits at either the 400- or 500-level. These electives may be taken from civil engineering courses or courses offered by other departments that meet the objective of the M.S. CE degree. The student can work with their adviser to select courses that either focus on a specific area of civil engineering or that provide a robust in-depth background of multiple areas of civil engineering. A maximum of four 400-level courses (12 credits) may be taken for the M.S. CE degree.

Culminating Experience. For a thesis, original research, requiring at least two semesters of work (up to 6 credits), is expected. The work should be an in-depth investigation intended to extend the state of knowledge in a specialty area. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense. For the non-thesis track, a scholarly paper is required while the student is enrolled in ENGR 594. The paper should be an inquiry in a specialty area. The paper must be accepted by the advisers and/or committee members, the head of the graduate program, and the student must pass the paper defense.

Additional Requirements. A maximum of three credits of independent study (CE 596) may be applied towards the M.S. CE degree program, but the undergraduate individual study course (CE 496) will not count towards program credit requirements.

All students are expected to complete one credit of colloquium (CE 590) during the first two semesters of study. Degree requirements must be completed during a six-year period.

Penn State Harrisburg's M.S. CE program is distinct and independent of the M.S. CE program offered at the University Park campus.

Environmental Option

Code	Title	Credits
Core Courses		
EMCH 524A or STAT 500	Mathematical Methods in Engineering Applied Statistics	3
EMCH 500 or CE 437	Solid Mechanics Engineering Materials for Sustainability	3
Required Environmental Option Courses		
ENVE 591	Research Methods in Environmental Engineering	1
ENVE 569	Environmental Risk Assessment	3
Select 3 credits of environmental chemistry or biology from the following list:		3
CE 570	Environmental Aquatic Chemistry	
ENVE 540	Biodegradation and Bioremediation	
ENVE 550	Chemical Fate and Transport	
Select 3 credits of design engineering in environmental and water resources:		3
ENVE 411	Water Supply and Pollution Control	
ENVE 415	Hydrology	
ENVE 417	Hydraulic Design	
CE 462	Open Channel Hydraulics	

CE 555	Groundwater Hydrology: Analysis and Modeling
CE 571	Physical-Chemical Treatment Processes
CE 572	Biological Treatment Processes
Total Credits	16

Minor

A graduate minor is available in any approved graduate major or dual-title program. The default requirements for a graduate minor are stated in Graduate Council policies listed under GCAC-600 Research Degree Policies (<http://gradschool.psu.edu/graduate-education-policies/>) and GCAC-700 Professional Degree Policies (<http://gradschool.psu.edu/graduate-education-policies/>), depending on the type of degree the student is pursuing:

- GCAC-611 Minor - Research Doctorate (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-611-minor-research-doctorate/>)
- GCAC-641 Minor - Research Master's (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-641-minor-research-masters/>)
- GCAC-709 Minor - Professional Doctorate (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-700/gcac-709-professional-doctoral-minor/>)
- GCAC-741 Minor - Professional Master's (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-700/gcac-741-masters-minor-professional/>)

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (<http://gradschool.psu.edu/graduate-funding/>) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (<http://gradschool.psu.edu/graduate-education-policies/gsad/gsad-900/gsad-901-graduate-assistants/>) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Civil Engineering (CE) Course List (<https://bulletins.psu.edu/university-course-descriptions/graduate/ce/>)

Contact

Campus	Harrisburg
Graduate Program Head	Thang Nguyen Bui
Director of Graduate Studies (DGS) or Professor-in-Charge (PIC)	Seroj Mackertich-Sengerdy
Program Contact	Melissa Ann Burkholder Penn State Harrisburg 777 W. Harrisburg Pike, W236 Olmsted Middletown PA 17057 mab56@psu.edu (717) 948-6124
Program Website	View (https://harrisburg.psu.edu/science-engineering-technology/civil-structural-construction/masters-science-civil-engineering/)