

# CIVIL ENGINEERING (CAPITAL)

## Integrated Undergrad-Grad Programs

### Integrated B.S. in Civil Engineering and M.S. in Civil Engineering

This Integrated Undergraduate/Graduate (IUG) degree program combines the B.S. in Civil Engineering with the M.S. in Civil Engineering offered at the following campuses:

#### Undergraduate Degree

- Harrisburg
- University Park

#### Graduate Degree

- Harrisburg

The graduate portion of this IUG is currently offered as face-to-face residential instruction. While the undergraduate curriculum for this IUG may be completed at multiple campuses, the ease and feasibility of completing the integrated program may be heavily dependent upon the location of the graduate instruction. Please discuss the feasibility of completing the IUG with a representative for the graduate program.

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-210-integrated-undergraduate-graduate-degree-programs/>).

The Civil Engineering program offers a limited number of academically superior Bachelor of Science candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science and the Master of Science in Civil Engineering. The ability to coordinate as well as concurrently pursue the two degree programs enables students to earn the two degrees in five years.

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Science degrees. However, the total course load is reduced due to the maximum of 12 credits that can count towards both degrees. A minimum of 6 credits proposed to count for both degrees must be at the 500 level. Thesis, master's paper, and undergraduate capstone credits may not be double counted. The fourth year of the IUG program differs from the fourth year of the Bachelor of Science program due to the courses that count toward the Master of Science Degree requirements.

Student performance will be monitored on an on-going basis. In addition, a formal evaluation of a student's academic performance will be conducted at the end of the first semester of the senior year for a typical program student. Students who have not maintained a 3.0 retention GPA in their Math and Civil (CE/ENVE) Engineering courses will be put on probationary status with respect to the IUG program. Their ability to continue in the IUG program will be based on academic performance in the last semester of their fourth year. As part of the review in the fourth year, students will be advised about the thesis or master's paper requirement in the graduate program.

If for any reason a student admitted to the IUG program is unable to complete the requirements for the Master of Science degree, the student will be permitted to receive the Bachelor of Science degree assuming

all the undergraduate degree requirements have been satisfactorily completed. If students successfully complete courses listed in the recommended schedule, they will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

#### Admission Requirements

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

Students must apply to the program via the Graduate School application for admission (<http://www.gradschool.psu.edu/prospective-students/how-to-apply/>), and must meet all the admission requirements of the Graduate School and the Civil Engineering graduate program for the Master of Science degree, listed in the Admission Requirements section. Students must submit:

- an official transcript
- three letters of professional recommendation from individuals who can evaluate the applicant's potential
- a personal statement of technical interest and goals

A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. In order to apply for this IUG program, students must have completed entrance to the undergraduate major and a minimum of 83.5 credits; therefore, a typical student would apply after completing the fifth semester and before the end of the sixth semester. Students must be admitted no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Transfer students must have completed at least 15 credits at Penn State to enroll in an IUG. For consideration for acceptance into the program, students must have an admissions cumulative grade point average (GPA) of 3.3 or better and an admissions collective GPA of 3.3 or better in the following courses:

Code	Title	Credits
CE 310	Surveying	
CE 335	Engineering Mechanics of Soils	
CE 336	Materials Science for Civil Engineers	
CE 340	Structural Analysis	
CE 360	Fluid Mechanics	
CE 370	Introduction to Environmental Engineering	

And all the designated MATH and EMCH courses

Applications will be evaluated based on the students' overall academic performance, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee of the Civil Engineering program.

#### Degree Requirements

Students must fulfill all degree requirements for each degree to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Civil Engineering are listed in the Undergraduate Bulletin (<http://bulletins.psu.edu/undergraduate/>). Degree requirements for the Master of Science in Civil Engineering degree are listed on the Degree Requirements tab. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. Students are expected to complete the

undergraduate degree requirements within the typical time to degree for the undergraduate major. In the semester in which the undergraduate degree requirements will be completed, IUG students must apply to graduate, and the undergraduate degree should be conferred at the next appropriate Commencement.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Independent study courses and credits associated with the culminating experience for the graduate degree cannot be double-counted. The double-counted classes (required and elective) are listed below:

Code	Title	Credits
<b>Courses Eligible to Double Count for Both Degrees</b>		
<i>Math Core Requirements</i>		
EMCH 524A	Mathematical Methods in Engineering	3
or STAT 500	Applied Statistics	
<i>Materials</i>		
EMCH 500	Solid Mechanics	3
or CE 437	Engineering Materials for Sustainability	
<i>Electives</i>		
CE 422	Transportation Planning	3
CE 423	Traffic Operations	3
CE 424	Project Info. Modeling	3
CE 434	Geotechnical Engineering Design	3
CE 435	Foundation Engineering	3
CE 436	Construction Engineering Materials	3
CE 441	Structural Design of Foundations	3
CE 445	Advanced Structural Analysis	3
CE 447	Structural Analysis by Matrix Methods	3
CE 449	Advanced Structural Design	3
CE 456	Planning and Scheduling	3
CE 458	Construction Management II	3
CE 462	Open Channel Hydraulics	3
ENVE 411	Water Supply and Pollution Control	3
ENVE 415	Hydrology	3
ENVE 417	Hydraulic Design	3
ENVE 430	Sustainable Engineering	3
CE 511	Engineering Soil Characteristics	3
CE 512	Soil Mechanics II	2-5
CE 521	Transportation Networks and Systems Analysis	3
CE 522	Traffic Flow Theory and Simulation	3
CE 523	Analysis of Transportation Demand	3
CE 525	Transportation Operations	3
CE 526	Highway and Street Design	3
CE 528	Transportation Safety Analysis	3
CE 529		
CE 539	Approximate Methods of Structural Analysis	3
CE 540	Statically Indeterminate Structures	3
CE 541	Structural Analysis	3
CE 543	Prestressed Concrete Behavior and Design	3
CE 544	Design of Reinforced Concrete Structures	3
CE 545	Metal Structure Behavior and Design	3
CE 548	Structural Design for Dynamic Loads	3

CE 549	Bridge Engineering I	3
CE 550	Engineering Construction Management	3
CE 555	Groundwater Hydrology: Analysis and Modeling	3
CE 566	Uncertainty and Reliability in Civil Engineering	3
CE 570	Environmental Aquatic Chemistry	3
CE 571	Physical-Chemical Treatment Processes	3
CE 572	Biological Treatment Processes	3
CE 581	Pavement Management and Rehabilitation	3
CE 582	Pavement Design and Analysis	3
CE 583	Bituminous Materials and Mixtures	3
CE 584	Concrete Materials and Properties	3
ENVE 540	Biodegradation and Bioremediation	3
ENVE 550	Chemical Fate and Transport	3
ENVE 569	Environmental Risk Assessment	3

The MSCE faculty has established a six-year time limit for completion of the M.S. degree. Any extension beyond six years requires the approval of the program's Graduate Faculty.

Students must maintain a minimum retention grade point average (GPA) of 3.00 or better on a 4.00 scale in 500- and 400-level courses listed on their Plan of Study.