

# CIVIL ENGINEERING, BACHELOR OF SCIENCE

The Department of Civil and Systems Engineering offers an undergraduate program that strives to educate intellectual leaders of the profession by instilling in them a fundamental understanding of the mathematical and physical principles that underlie civil engineering science, an appreciation for the challenges of creative engineering design, and a sense of responsibility for professional service. Civil Engineering is a broad field with many subdisciplines. The Civil Engineering curriculum exposes students to the fields of structural engineering, engineering mechanics, systems engineering, and geotechnical engineering.

## ABET Accreditation

The B.S. in Civil Engineering program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org> (<http://www.abet.org/>), under the General Criteria and the Civil and Similarly Named Engineering Program Criteria.

## Program Educational Objectives

Consistent with our Educational Mission and the Mission of the Whiting School of Engineering, the Program Educational Objectives (PEOs) for the Civil Engineering program at Johns Hopkins University are to produce graduates who:

- Rise to positions of leadership in their chosen fields, within organizations that require innovative, adaptable, and systems thinkers, and that consider the engineering, societal, and environmental impacts of their decisions.
- Dedicate themselves to lifelong learning, service, and teaching to foster excellence and disseminate knowledge in their chosen fields.
- Innovate and implement resilient, sustainable, and equitable solutions to meet evolving societal challenges.

## Student Outcomes

Students graduating with a B.S. in Civil Engineering will have demonstrated:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

## Annual Student Enrollment and Graduation Data

## Continuous Improvement

The department strives to continuously improve its curriculum by using performance criteria to regularly assess its program educational objectives (what it expects its students to attain post-graduation) and its student outcomes (what skills it expects its students to demonstrate). The civil engineering program uses the results of each assessment to continuously improve upon its curriculum and thus ensure that it is meeting the needs of its students.

## Financial Aid

Student Financial Support (<https://finaid.jhu.edu/undergraduate-aid/financial-aid-at-hopkins/>) will help to navigate the financial aid application process and explore the resources available to help students and their family pay for college now and throughout their time here. In addition, some undergraduate students are employed by departmental faculty to provide assistance on research projects.

## Departmental Honors

The Whiting School of Engineering and the Department of Civil Engineering recognize students with exemplary academic records.

For graduating students, these awards include General Honors and Departmental Honors:

- General Honors are awarded to students with a cumulative GPA of 3.5 or higher.
- Departmental Honors are awarded to students with a 3.75 GPA or higher in their major-specific courses.

## Combined Bachelor's/Master's Programs

The Department of Civil and Systems Engineering offers two options for earning a combined bachelor's/master's degree.

One option combines a **B.S. in Civil Engineering** with a **Master of Science in Engineering (M.S.E.) in Civil Engineering or Systems Engineering\*\***.

For students who are admitted to this program, the two degrees typically require five years total to complete. Students who enroll in the combined Bachelor's/Master's program or pursue a master's degree after having earned the B.S. in Civil Engineering at Hopkins may double-count one advanced course (400-level or higher) towards both the bachelor's and master's degrees with the permission of the master's faculty advisor. More detail on double-counting courses can be found here (<https://engineering.jhu.edu/education/graduate-studies/graduate-academic-policies-procedures/>).

The other option combines a **B.S. in Civil Engineering** with a **Master of Science in Engineering Management (M.S.E.M.)** (<http://mseme.engineering.jhu.edu/>). Students are required to submit a formal application through the M.S.E.M. Program (<http://mseme.engineering.jhu.edu/>).

Students enrolled in either the B.S./M.S.E. or B.S./M.S.E.M program are awarded a Dean's Master's Fellowship, covering half their tuition, after they have completed eight semesters of undergraduate study. More information about these programs can be found at <http://>

engineering.jhu.edu/academics/combined-bachelors-masters/. (<http://engineering.jhu.edu/academics/combined-bachelors-masters/>.html)

**\*\*Effective Spring 2024, due to accreditation compliance requirements, the residential MSE (Master of Science in Engineering) in Systems Engineering has been renamed as Master of Science (MS) in Systems Engineering. Please visit Systems Engineering (<https://engineering.jhu.edu/case/academics/masters-program/mse-systems-engineering/>) for additional information.**

## Program Requirements

The B.S. degree in Civil Engineering requires 127 credits in Mathematics, Basic Sciences, Humanities, Social Sciences, and Engineering courses.

Code	Title	Credits
<b>BASIC SCIENCES</b>		
AS.030.101	Introductory Chemistry I	3
AS.030.105	Introductory Chemistry Laboratory I	1
AS.171.101 or AS.171.107	General Physics: Physical Science Major I General Physics for Physical Sciences Majors (AL)	4
AS.173.111	General Physics Laboratory I <sup>1</sup>	1
AS.270.103	Introduction to Global Environmental Change	3
EN.560.112	Electromagnetism & Sensors Lab	1
One additional Natural Science elective		3
<b>MATHEMATICS</b>		
AS.110.108	Calculus I (Physical Sciences & Engineering)	4
AS.110.109	Calculus II (For Physical Sciences and Engineering)	4
AS.110.202 or AS.110.211	Calculus III Honors Multivariable Calculus	4
EN.553.291	Linear Algebra and Differential Equations	4
<b>HUMANITIES and SOCIAL SCIENCES <sup>2</sup></b>		
Select 15 credits of H or S electives		15
<b>CIVIL ENGINEERING FUNDAMENTALS</b>		
EN.500.113	Gateway Computing: Python	3
EN.560.100	Civilization Engineered	3
EN.560.201	Statics & Mechanics of Materials	3
EN.560.211	Statics and Mechanics of Materials Laboratory	1
EN.560.240	Uncertainty, Reliability and Decision-making	3
EN.560.250	Intro to Mathematical Decision Making	3
EN.560.255	Dynamical Systems	3
EN.560.301	Structural Systems I	3
EN.560.302	Structural Systems II	3
EN.560.305	Soil Mechanics	4
EN.560.330	Foundation Design	3
EN.560.362	Engineering Mechanics and Materials	3
EN.560.458	Natural Disaster Risk Modeling	3
EN.560.462	Failure Mechanics in Materials	3
<b>CaSE PROFESSIONAL PRACTICE <sup>3</sup></b>		
EN.560.401	Design Theory and Practice	3
EN.560.402	Integrated Design Project	3
EN.660.463	Engineering Management & Leadership	3
EN.661.110	Professional Writing and Communication	3
<b>CaSE EXPERIENCES</b>		
EN.560.191	CaSE Collaborative	.5

EN.560.192	CaSE Design	.5
EN.560.291	CaSE Coding	.5
EN.560.292	CaSE Research	.5
EN.560.391	CaSE Careers I	.5
EN.560.392	CaSE Careers II	.5

### CaSE TECHNICAL ELECTIVES

Technical electives are designed to provide students with opportunities to explore the field of civil engineering in greater depth. To that end, these courses must have E distribution and be at or above the 300-level. 300-level courses with N or Q distribution may be allowed with the faculty advisor's permission.

### FREE ELECTIVES

Select 15 credits of free electives 15

**Total Credits 127**

- <sup>1</sup> If a student earns AP credit for Physics I, they MUST still take either General Physics Lab I (173.111) or another 1 credit N laboratory course.
- <sup>2</sup> This Whiting School requirement recognizes that human-centered engineering design relies not only on strong technical skills, but on an understanding of the humanities and social sciences as well. Any five 3-credit H or S elective courses may be used to fulfill this requirement. See the Distribution tab in the Requirements for a Bachelor's Degree (<https://e-catalogue.jhu.edu/ksas-wse/undergraduate-policies/academic-policies/requirements-bachelors-degree/>) section for two exceptions to the rule that each H/S distribution course is at least 3 credits. (Note that because Professional Communications has an S distribution credit, only 15 credits are required here, as opposed to the reported 18 required by the Whiting School).
- <sup>3</sup> In preparation for CaSE-Professional Practice, students must also take the Fundamentals of Engineering (FE) exam in the spring of their senior year.

### Additional Notes:

- No required courses may be taken as Satisfactory/Unsatisfactory (S/U).
- A maximum of 3 credits from the Humanities and Social Science (H/S) requirements may be taken S/U.
- Technical electives may be taken S/U only with the approval of the advisor.
- No more than two grades of D in the required engineering and technical electives may be counted.

## Sample Program of Study

This sample illustrates the general sequence of courses; individual programs may vary as a result of AP credits, study abroad, or pursuit of a minor in another department.

First Year	Fall	Credits Spring	Credits
	AS.030.101	3 AS.171.101	4
	AS.030.105	1 AS.173.111	1
	AS.110.108	4 AS.110.109	4
	EN.560.100	3 EN.500.113	3
	EN.560.191	0.5 EN.560.112	1
	H/S Elective	3 EN.560.192	0.5

Optional HEART course or First Year Seminar	0-3 EN.661.110	3
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<b>14.5-17.5</b>	<b>16.5</b>
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**Second Year**

<b>Fall</b>	<b>Credits Spring</b>	<b>Credits</b>
EN.553.291	4 EN.560.250	3
EN.560.201	3 EN.560.255	3
EN.560.211	1 EN.560.292	0.5
EN.560.291	0.5 EN.560.301	3
EN.560.240	3 Natural Science Elective	3
H/S Elective	3 H/S Elective	3
Free Elective	3	

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<b>17.5</b>	<b>15.5</b>
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**Third Year**

<b>Fall</b>	<b>Credits Spring</b>	<b>Credits</b>
AS.110.202	4 EN.560.305	4
AS.270.103	3 EN.560.362	3
EN.560.302	3 EN.560.392	0.5
EN.560.391	0.5 CaSE Technical Elective	3
H/S Elective	3 H/S Elective	3
Free Elective	3 Free Elective	3

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<b>16.5</b>	<b>16.5</b>
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**Fourth Year**

<b>Fall</b>	<b>Credits Spring</b>	<b>Credits</b>
EN.560.330	3 EN.560.402	3
EN.560.401	3 EN.560.458	3
EN.560.462	3 CaSE Technical Elective	3
EN.660.463	3 Free Elective	3
CaSE Technical Elective	3 Free Elective	3

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<b>15</b>	<b>15</b>
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**Total Credits 127-130**