CIVIL ENGINEERING (BS)

Department Website (https://engineering.nyu.edu/academics/departments/civil-and-urban-engineering/)

NYSED: 08813 **HEGIS:** 0908.00 **CIP:** 14.0801

Program Description

Civil engineers play a vital role in the design, construction, and operation of the built environment around the world, ranging from individual structures (bridges and skyscrapers) to complex infrastructure systems (transportation and water supply networks). Without civil engineers, there would be no cities, commerce, or air travel, and no means to protect our public health and environment.

What makes our BS program in Civil Engineering unique is the combination of a rigorous, broad-based, traditional curriculum with state-of-the-art computational coursework in big data, artificial intelligence (AI), and smart cities. In addition, our location in New York City connects our students and alumni to leading engineering design and consulting firms, construction companies, some of the largest public agencies in the country, and an emerging technology sector.

Our undergraduate program is accredited by the Accreditation Board for Engineering and Technology (ABET) and produces well-rounded graduates who communicate effectively, understand the context of civil engineering projects in a complex world, and are ready to contribute to society right away and advance to positions of responsibility and leadership throughout their professional careers.

Our mission is to engage our students, faculty, and researchers to address the critical challenges to our natural and built environments through interdisciplinary education, systems thinking, and advanced research in a collaborative and inclusive. environment.

Accreditation

The BS in Civil Engineering is accredited by the Engineering Accreditation Commission of ABET (http://www.abet.org).

Admissions

New York University's Office of Undergraduate Admissions supports the application process for all undergraduate programs at NYU. For additional information about undergraduate admissions, including application requirements, see How to Apply (https://www.nyu.edu/admissions/undergraduate-admissions/how-to-apply.html).

Program Requirements

The program requires the completion of 129 credits, comprised of the following:

Course	Title	Credits
Major Requirements		
Mathematics		
MA-UY 1024	Calculus I for Engineers [1]	4
MA-UY 1124	Calculus II for Engineers [1]	4
MA-UY 2034	Linear Algebra and Differential Equations [1]	4
MA-UY 2224	Probability and Statistics for Engineers [1]	4
Sciences		
CM-UY 1003	General Chemistry for Engineers	3
CM-UY 1001	General Chemistry for Engineers Laboratory	1
PH-UY 1013	Mechanics	3
PH-UY 2121	General Physics Laboratory I	1
PH-UY 2023	Electricity, Magnetism, & Fluids	3
PH-UY 2033	Waves, Optics, & Thermodynamics	3
Science Elective [2]		3
General Engineering, Computer Science		
CS-UY 1113	Problem Solving and Programming I	3
EG-UY 1004	Introduction to Engineering and Design	4
Humanities and Social Science		
EXPOS-UA 1	Writing as Inquiry	4
EXPOS-UA 22	Advanced Writing for Engineers	4
Humanities and Social Sciences Electives [3]		16
Civil Engineering		
CE-UY 1002	Introduction to Civil and Environmental Engineering	2
CE-UY 2112	Structural Statics	2
CE-UY 2122	Strength of Materials	2
CE-UY 2143	Analysis of Determinate Structures	3
CE-UY 2213	Fluid Mechanics and Hydraulics	3
CE-UY 2343	Transportation Engineering	3
CE-UY 2533	Construction Project Management	3
CE-UY 3013	Computing in Civil Engineering	3
CE-UY 3153	Geotechnical Engineering	3
CE-UY 3163	Materials for the Built Environment	3
CE-UY 3183	Structural Engineering	3
CE-UY 3223	Fundamentals of Environmental Engineering	3
CE-UY 3243	Water Resources Engineering	3
CE-UY 4092	Leadership, Business Principles, Policy and Ethics in Civil Engineering	2
CE-UY 4803	Civil Engineering Capstone	3
CE-UY 48X3	Civil Engineering Concentration Capstone [4]	3
CE-UY 4990	Fundamentals of Engineering Exam Registration for CUE [5]	0
Civil Engineering Electives		9
Electives		
Free Electives [6]		12
Total Credits		**129**

1. Placement in math classes is based on AP credit and/or placement exams administered by the Mathematics Department.
2. To fulfill ABET requirements, students must select a computer science (not computer programming), data science, or additional basic science elective in consultation with the civil engineering undergraduate program adviser.
3. Students must take sixteen credits (four courses) of elective courses in the humanities and social sciences. Consult the Technology, Culture and Society portion of the bulletin for details. At least one course must be a course in ethics and technological and/or scientific practice. At least one course must be a Tandon Advanced Seminar, identifiable by course number 4504 in one of the following areas: STS-UY 4504 Advanced Seminar in Science and Technology, CAM-UY 4504 Advanced Seminar in Culture, Arts and Media, URB-UY 4504 Advanced Seminar in Urban Studies or TCS-UY 4504 Advanced Seminar in Technology, Culture, and Society.

[4] A capstone design course associated with an area of concentration (CE-UY 4813 Structural Engineering Capstone, CE-UY 4833 Transportation Engineering Capstone, CE-UY 4853 Construction Management Capstone, or CE-UY 4863 Environmental Engineering Capstone) is required.

[5] To promote professional registration, students must register for the Fundamentals of Engineering (FE) exam, which is administered by the National Council of Examiners for Engineering and Surveying (NCEES) before graduation. In senior year, all students must complete CE-UY 4092 Leadership, Business Principles, Policy and Ethics in Civil Engineering which includes a recitation to prepare for the exam.
Students must also register for CE-UY 4990 Fundamentals of Engineering Exam Registration for CUE.

[6] A free elective is any course in any department of the University for which the student has the prerequisites.

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
MA-UY 1024	Calculus I for Engineers	4
CM-UY 1003	General Chemistry for Engineers	3
CM-UY 1001	General Chemistry for Engineers Laboratory	1
EXPOS-UA 1	Writing as Inquiry	4
EG-UY 1004	Introduction to Engineering and Design	4
	Credits	**16**
2nd Semester/Term		
MA-UY 1124	Calculus II for Engineers	4
PH-UY 1013	Mechanics	3
EXPOS-UA 22	Advanced Writing for Engineers	4
CS-UY 1113	Problem Solving and Programming I	3
CE-UY 1002	Introduction to Civil and Environmental Engineering	2
	Credits	**16**
3rd Semester/Term		
MA-UY 2034	Linear Algebra and Differential Equations	4
PH-UY 2121	General Physics Laboratory I	1
PH-UY 2023	Electricity, Magnetism, & Fluids	3
Humanities and Social Sciences Elective #1		4
CE-UY 2112	Structural Statics	2
CE-UY 2533	Construction Project Management	3
	Credits	**17**
4th Semester/Term		
MA-UY 2224	Probability and Statistics for Engineers	4
PH-UY 2033	Waves, Optics, & Thermodynamics	3
CE-UY 2122	Strength of Materials	2
CE-UY 2143	Analysis of Determinate Structures	3
CE-UY 2213	Fluid Mechanics and Hydraulics	3
CE-UY 2343	Transportation Engineering	3
	Credits	**18**
5th Semester/Term		
Humanities and Social Sciences Elective #2		4
CE-UY 3223	Fundamentals of Environmental Engineering	3
CE-UY 3183	Structural Engineering	3
CE-UY 3243	Water Resources Engineering	3
CE-UY 3013	Computing in Civil Engineering	3
	Credits	**16**
6th Semester/Term		
Science Elective		3
CE-UY 3153	Geotechnical Engineering	3
CE-UY 3163	Materials for the Built Environment	3
Civil Engineering Elective #1		3
Free Elective #1		3
	Credits	**15**
7th Semester/Term		
Humanities and Social Sciences Elective #3		4
Civil Engineering Elective #2		3
Free Elective #2		3
CE-UY 4092	Leadership, Business Principles, Policy and Ethics in Civil Engineering	2
CE-UY 4990	Fundamentals of Engineering Exam Registration for CUE	0
CE-UY 4803	Civil Engineering Capstone	3
	Credits	**15**
8th Semester/Term		
CE-UY 48X3	Civil Engineering Concentration Capstone	3
Civil Engineering Elective #3		3
Free Elective #3		3
Free Elective #4		3
Humanities and Social Sciences Elective #4		4
	Credits	**16**
	Total Credits	**129**

Learning Outcomes

Student outcomes are those abilities and skills that graduates are expected to have upon graduation with a BS in Civil Engineering degree. For these, the Department has adopted the seven fundamental outcomes specified by the Engineering Accreditation Commission of ABET (http://www.abet.org). They cover the full breadth and depth of the abilities and skills needed by modern engineering professionals. They are listed below with brief discussions of how each relates to the civil engineering profession.

1. **An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.** Virtually all of civil engineering involves the application of mathematics and basic sciences to the solution of real-world infrastructure problems. Fundamental engineering skills evolve directly from science and mathematics. Students are immersed in these applications across all subdisciplines of civil engineering.
   The program is frequently updated to incorporate the latest approaches to engineering solutions, and to include the use of modern engineering tools. Important “tools” include a variety of computer programs for data analysis, simulation and design. The program is heavily design-oriented. Several courses include full design-project laboratories. Many additional courses have design components, and all students finish their academic programs with a comprehensive civil engineering capstone project.

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.** Engineers do not just solve problems brought to them by others. Engineers must spot problems before they become evident and describe them in terms that expedite their solution. As students progress through the program, they increase their participation in identifying and framing problems, as well as in developing comprehensive solutions.

3. **An ability to communicate effectively with a range of audiences.** Engineers do not solve problems in a vacuum. Everything engineering professionals do affects the world around them. In the modern world economy, the “world” includes local neighborhoods, regions, states, nations and, indeed, the world. Solutions must be couched in a firm

understanding of the impacts they will have on the environment, the economy and society.Engineers must explain their views and solutions to problems in ways that can be understood clearly by other professionals and by the public. Modern communication involves written and oral forms, and a wide variety of electronic media.

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.** All professionals must be keenly aware of their general and professional ethical responsibilities to society in general, and to others who require and pay for their services. Like many professions, engineers, and civil engineers in particular, have specific ethical codes issued by professional societies with which they must comply. General ethical considerations are discussed throughout the curriculum, and several courses have a strong focus on the basis for, and application of, professional ethical code.

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.** Any significant project involves several engineers, perhaps with different engineering backgrounds, as well as non-engineers (planners, architects, financiers, managers, etc). Students have the opportunity to work in teams in several courses, but particularly in the capstone design project.

6. **An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.** Civil engineers must engage in a number of basic experiments, and be aware of how to collect, organize, report and interpret the results of basic experiments and direct field observations of infrastructure operations. In the program, students are exposed to a wide range of laboratory experiments, including experiments in fluid mechanics, material behavior under loading, soil properties and behavior, and others. They also are exposed to the collection of field data related to environmental conditions and problems, highway and street traffic, and the monitoring of structures.

7. **An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.** The engineering profession changes rapidly with the technological world. While general principles tend to change slowly, the specific materials, analysis techniques and approaches to engineering change quite rapidly. The body of knowledge graduates leaves with must be updated constantly and expanded during their professional lives. The program provides opportunities for students to appreciate this need, and develop useful skills for self-learning, now and in the future.

Policies

Program Policies

Minimum GPA Requirements

After a student completes four semesters or 64 credits at NYU (whichever is earlier), the student must have a combined GPA of at least 2.333 in the following seven required CE courses, all of which must be completed by this point: CE-UY 1002 Introduction to Civil and Environmental Engineering, CE-UY 2112 Structural Statics, CE-UY 2122 Strength of Materials, CE-UY 2143 Analysis of Determinate Structures, CE-UY 2213 Fluid Mechanics and Hydraulics, CE-UY 2343 Transportation Engineering, and CE-UY 2533 Construction Project Management. If a student has a combined GPA below 2.000 in the above seven classes, the student may not be allowed to remain in the major. If a student has a combined GPA of at least 2.000 and below 2.333, the student will be required to re-take at least one of the aforementioned courses to raise the GPA to 2.333 before being allowed to enroll in some junior-level required CE courses.

Since the capstone design course, CE-UY 4803 Civil Engineering Capstone requires a thorough understanding of all aspects of civil engineering, students registering for the course must have a cumulative GPA of 2.000 or better in all civil engineering courses taken thus far, excluding civil engineering electives.

NYU Policies

University-wide policies can be found on the New York University Policy pages (https://bulletins.nyu.edu/nyu/policies/).

Tandon Policies

Additional academic policies can be found on the Tandon academic policy page (https://bulletins.nyu.edu/undergraduate/engineering/academic-policies/).