

CIVIL ENGINEERING, BS

for the degree of Bachelor of Science in Civil Engineering

Civil and environmental engineers apply basic principles of science, supported by mathematical and computational tools, to address the biggest challenges facing society: ensuring clean air, safe drinking water and sanitation; addressing our changing environment; protecting the population from natural and man-made hazards; designing a sustainable infrastructure that serves everyone; re-imagining human and commodity traffic for an automated future; and of course designing and constructing the world's tallest buildings and most iconic bridges.

The civil engineering program comprises seven focus areas (construction engineering and management, construction materials, environmental engineering and science, geotechnical engineering, water resources engineering and science, structural engineering, and transportation engineering) and three interdisciplinary programs (sustainable and resilient infrastructure systems; energy-water-environment sustainability; and societal risk and hazard mitigation). Although each area and program has its own special body of knowledge and engineering tools, civil and environmental engineering projects often use knowledge and data from many of these topical areas together in order to address societal challenges.

CEE's Program Education Objectives are to educate CEE students to:

1. a wide range of careers as engineers, consultants, and entrepreneurs in both traditional and emerging fields of civil and environmental engineering, science, and technology;
2. placement in leading graduate programs in engineering and interdisciplinary areas so they are able to develop as researchers, experts, educators, and leaders;
3. professional licensure and continuous professional skills development;
4. the ability to learn and create new knowledge in ever-changing environments of the 21st century and to communicate their work and ideas to colleagues, professional societies, and the public at large; and
5. high ethical and technical standards that enable them to lead their professional disciplines, organizations, and communities globally.

Program Review and Approval

To qualify for the degree of Bachelor of Science in Civil Engineering, each student's academic program plan must be reviewed by a standing committee of the faculty (the Program Review Committee) and approved by the Associate Head of Civil and Environmental Engineering in charge of undergraduate programs. This review and approval process ensures that individual programs satisfy the educational objectives and all of the requirements of the civil and environmental engineering program, that those programs do not abuse the substantial degree of flexibility that is present in the curriculum, and that the career interests of each student are cultivated and served.

Current Program Educational Objectives

for the degree of Bachelor of Science in Civil Engineering

Graduation Requirements

Minimum hours required for graduation: 128 hours.

Minimum Overall GPA: 2.0

University Requirements

Minimum of 40 hours of upper-division coursework, generally at the 300- or 400-level. These hours can be drawn from all elements of the degree.

Students should consult their academic advisor for additional guidance in fulfilling this requirement.

The university and residency requirements can be found in the Student Code (<https://studentcode.illinois.edu/article3/part8/3-801/>) (§ 3-801) and in the Academic Catalog (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>).

General Education Requirements

Follows the campus General Education (Gen Ed) requirements (<https://courses.illinois.edu/gened/DEFAULT/DEFAULT/>). Some Gen Ed requirements may be met by courses required and/or electives in the program.

Code	Title	Hours
	Composition I	4-6
	Advanced Composition	3
	Humanities & the Arts (6 hours)	6
	Natural Sciences & Technology (6 hours)	6
	fulfilled by CHEM 102, CHEM 104, PHYS 211, PHYS 212	
	Social & Behavioral Sciences (6 hours)	6
	fulfilled by ECON 102 or ECON 103 and any other course approved as Social & Behavioral Sciences	
	Cultural Studies: Non-Western Cultures (1 course)	3
	Cultural Studies: US Minority Cultures (1 course)	3
	Cultural Studies: Western/Comparative Cultures (1 course)	3
	Quantitative Reasoning (2 courses, at least one course must be Quantitative Reasoning I)	6-10
	fulfilled by CS 101, MATH 220 or MATH 221; MATH 231, MATH 241, PHYS 211, PHYS 212	
	Language Requirement (Completion of the third semester or equivalent of a language other than English is required)	0-15

Orientation and Professional Development

Code	Title	Hours
CEE 190	Project-Based Introduction to CEE	4
CEE 495	Professional Practice	0
ENG 100	Grainger Engineering Orientation Seminar (External transfer students take ENG 300.)	1
Total Hours		5

Introductory Economics Elective

Code	Title	Hours
ECON 102	Microeconomic Principles	3
or ECON 103	Macroeconomic Principles	
Total Hours		3

Foundational Mathematics and Science

Code	Title	Hours
CHEM 102	General Chemistry I	3
CHEM 103	General Chemistry Lab I	1
CHEM 104	General Chemistry II	3
CHEM 105	General Chemistry Lab II	1
MATH 221	Calculus I (MATH 220 may be substituted. MATH 220 is appropriate for students with no background in calculus. 4 of 5 credit hours count towards degree.)	4
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 257	Linear Algebra with Computational Applications (MATH 225 or MATH 415 may be substituted.)	3
MATH 285	Intro Differential Equations (MATH 284 may be substituted. Extra hour counts towards free electives.)	3
PHYS 211	University Physics: Mechanics	4
PHYS 212	University Physics: Elec & Mag	4
PHYS 213	Univ Physics: Thermal Physics	2
Total Hours		35

Civil Engineering Technical Core

Code	Title	Hours
CEE 201	Systems Engrg & Economics	3
CEE 202	Engineering Risk & Uncertainty	3
CS 101	Intro Computing: Engrg & Sci	3
SE 101	Engineering Graphics & Design	3
TAM 211	Statics	3
TAM 212	Introductory Dynamics	3
TAM 251	Introductory Solid Mechanics	3
TAM 335 or CEE 331	Introductory Fluid Mechanics Fluid Dynamics in the Natural and Built Environment	4
Total Hours		25

Civil Engineering Primary and Secondary Fields

Code	Title	Hours
<p>Students choose a primary and a secondary field of study, of which there are seven traditional areas of study and three interdisciplinary programs to choose from. The particular primary and secondary field selections shape the selection of science electives, civil engineering core courses and advanced technical electives. The specific choices of courses in this category are made through the submission of a Plan of Study, which is subject to approval by the faculty Program Review Committee. Instead of choosing separate primary and secondary field options as listed below, students could select to pursue the General Civil Engineering Option. The General Civil Engineering Option offers a broader coverage of Civil Engineering topical areas. This option can be found below the Secondary Field list.</p>		

Primary Field. Students choose 1 primary field, in which they must take 1 science elective course (3-4 hours), 15-16 hours of 300 level Civil Engineering Core Courses from departmentally approved list, and 12-13 hours of 400 level Advanced Technical Electives from departmentally approved list. 31

Construction Engineering and Management Primary**Science Electives - Select 1 course from list below:**

ATMS 120	Severe and Hazardous Weather	3
ATMS 303	Synoptic-Dynamic Wea Analysis	4
ECE 205	Electrical and Electronic Circuits	3
FIN 221	Corporate Finance	3
GEOL 107	Physical Geology	4
GEOL 118	Natural Disasters	3
GEOL 333	Earth Materials and the Env	4
GEOL 380	Environmental Geology	4
ME 200	Thermodynamics	3
NPRE 201	Energy Systems	3
SE 400	Engineering Law	3 or 4
STAT 420	Methods of Applied Statistics	3 or 4
UP 205	Ecology & Environmental Sustainability	3

Civil Engineering Core Courses

Required courses:

CEE 300	Behavior of Materials	4
CEE 320	Construction Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

Select 1 course from list below:

CEE 310	Transportation Engineering	3
CEE 330	Environmental Engineering	3
CEE 340	Energy and Global Environment	3
CEE 350	Water Resources Engineering	3

Advanced Technical Courses

Required courses:

CEE 420	Construction Productivity	3 or 4
CEE 421	Construction Planning (Required Integrated Design Course)	3 or 4
CEE 422	Construction Cost Analysis	3 or 4

Select remaining courses to fulfill this requirement from the list below:

CEE 401	Concrete Properties & 3D Print	4
CEE 461	Reinforced Concrete I	3
CEE 498	Special Topics (As approved)	4
CEE 498	Special Topics (Construction Equipment Methods)	3

Construction Materials Engineering Primary**Science Electives - Select 1 course from list below:**

GEOL 107	Physical Geology	4
MSE 201	Phases and Phase Relations	3

Civil Engineering Core Courses

Required courses:

CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 360	Structural Engineering	3

Select 2 courses from list below:		
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 340	Energy and Global Environment	3
CEE 350	Water Resources Engineering	3
CEE 380	Geotechnical Engineering	3

Advanced Technical Courses

Required courses:

CEE 401	Concrete Properties & 3D Print (Required Integrated Design Course)	4
CEE 405	Asphalt Materials I	3 or 4

Select remaining courses to fulfill this requirement from the list below:

CEE 406	Pavement Design I	3 or 4
CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3
CEE 469	Wood Structures	3 or 4
CEE 483	Soil Mechanics and Behavior	4
ME 430	Failure of Engrg Materials	3 or 4
MSE 401	Thermodynamics of Materials	3
MSE 402	Kinetic Processes in Materials	3
MSE 406	Thermal-Mech Behavior of Matls	3
MSE 450	Polymer Science & Engineering	3 or 4
TAM 428	Mechanics of Composites	3

Environmental Engineering Primary**Science Electives - Select 1 course from list below:**

CHEM 232	Elementary Organic Chemistry I	3 or 4
CS 357	Numerical Methods I	3
GEOL 107	Physical Geology	4
MCB 300	Microbiology	3
ME 200	Thermodynamics	3
MSE 401	Thermodynamics of Materials	3
STAT 420	Methods of Applied Statistics	3 or 4

Civil Engineering Core Courses

Required course:

CEE 330	Environmental Engineering	3
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Select 4 courses from list below:

CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 340	Energy and Global Environment	3
CEE 350	Water Resources Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

Advanced Technical Courses

Select 1 course from list below:

CEE 437	Water Quality Engineering	3
CEE 440	Fate Cleanup Environ Pollutant	4
CEE 441	Air Pollution Sources, Transport and Control	4

Select remaining courses to fulfill this requirement from the list below:

CEE 434	Environmental Systems I	3
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CEE 435	Public Health Engineering	3 or 4
CEE 438	Science & Environmental Policy	4
CEE 442	Environmental Engineering Principles, Physical	4
CEE 443	Env Eng Principles, Chemical	4
CEE 444	Env Eng Principles, Biological	4
CEE 447	Atmospheric Chemistry	4
CEE 449	Environmental Engineering Lab (Required Integrated Design Course)	3
CEE 452	Hydraulic Analysis and Design	3
CEE 453	Urban Hydrology and Hydraulics	4
CEE 457	Groundwater	3
CEE 493	Sustainable Design Eng Tech	4

Geotechnical Engineering Primary**Science Elective required course:**

GEOL 107	Physical Geology	4
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Civil Engineering Core Courses

Required courses:

CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

Select 3 courses from the list below:

CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 340	Energy and Global Environment	3
CEE 350	Water Resources Engineering	3

Advanced Technical Courses

Required courses:

CEE 483	Soil Mechanics and Behavior	4
CEE 484	Applied Soil Mechanics (Required Integrated Design Course)	4

Select remaining courses to fulfill this requirement from the list below:

CEE 457	Groundwater	3
CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3
CEE 463	Reinforced Concrete II	3 or 4
CEE 498	Special Topics (As approved)	3-4

Structural Engineering Primary**Science Electives - Select 1 course from list below:**

CS 357	Numerical Methods I	3
ECE 205	Electrical and Electronic Circuits	3
GEOL 107	Physical Geology	4
GEOL 118	Natural Disasters	3
ME 200	Thermodynamics	3

Civil Engineering Core Courses

Required courses:

CEE 300	Behavior of Materials	4
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

Select 2 courses from list below:

CEE 310	Transportation Engineering	3
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CEE 320	Construction Engineering	3	CEE 407	Airport Design	3 or 4
CEE 330	Environmental Engineering	3	CEE 408	Railroad Transportation Engrg	3 or 4
CEE 340	Energy and Global Environment	3	CEE 409	Railroad Track Engineering	3 or 4
CEE 350	Water Resources Engineering	3	CEE 410	Railway Signaling & Control	3 or 4
Advanced Technical Courses			CEE 411	RR Project Design & Constr	3 or 4
Required courses:			CEE 412	High-Speed Rail Engineering	3 or 4
CEE 460	Steel Structures I	3	CEE 415	Geometric Design of Roads (Required Integrated Design Course)	4
CEE 461	Reinforced Concrete I	3	CEE 416	Traffic Capacity Analysis	3 or 4
CEE 465	Design of Structural Systems (Required Integrated Design Course)	3	CEE 417	Urban Transportation Planning	4
CEE 470	Structural Analysis	4	CEE 418	Public Transportation Systems	3 or 4
Transportation Engineering Primary			Water Resources Engineering and Science Primary		
Science Electives - Select 1 course from list below:			Science Electives - Select 1 course from list below:		
CS 357	Numerical Methods I	3	CS 357	Numerical Methods I	3
ECE 205	Electrical and Electronic Circuits	3	GEOL 107	Physical Geology	4
GEOL 107	Physical Geology	4	ME 200	Thermodynamics	3
ME 200	Thermodynamics	3	Civil Engineering Core Courses		
ME 340	Dynamics of Mechanical Systems	3.5	Required course:		
MSE 401	Thermodynamics of Materials	3	CEE 350	Water Resources Engineering	3
SE 320	Control Systems	4	Select 4 courses from the list below:		
STAT 420	Methods of Applied Statistics	3 or 4	CEE 300	Behavior of Materials	4
Civil Engineering Core Courses			CEE 310	Transportation Engineering	3
Required courses:			CEE 320	Construction Engineering	3
CEE 300	Behavior of Materials	4	CEE 330	Environmental Engineering	3
CEE 310	Transportation Engineering	3	CEE 340	Energy and Global Environment	3
Select 3 courses from the list below:			CEE 360	Structural Engineering	3
CEE 320	Construction Engineering	3	CEE 380	Geotechnical Engineering	3
CEE 330	Environmental Engineering	3	Advanced Technical Courses		
CEE 340	Energy and Global Environment	3	Required courses - Select 1 from list below:		
CEE 350	Water Resources Engineering	3	CEE 452	Hydraulic Analysis and Design	3
CEE 360	Structural Engineering	3	CEE 453	Urban Hydrology and Hydraulics (Required Integrated Design Course)	4
CEE 380	Geotechnical Engineering	3	Select remaining courses to fulfill this requirement from the list below:		
Advanced Technical Courses - Select 1 course from each of the 3 Areas below and 1 course from the recommended list:			CEE 433	Water Technology and Policy	3 or 4
Area 1 - Facilities:			CEE 434	Environmental Systems I	3
CEE 405	Asphalt Materials I	3 or 4	CEE 437	Water Quality Engineering	3
CEE 406	Pavement Design I	3 or 4	CEE 450	Surface Hydrology	3
CEE 407	Airport Design	3 or 4	CEE 451	Environmental Fluid Mechanics	3
Area 2 - Systems:			CEE 452	Hydraulic Analysis and Design	3
CEE 407	Airport Design	3 or 4	CEE 453	Urban Hydrology and Hydraulics	4
CEE 415	Geometric Design of Roads (Required Integrated Design Course)	4	CEE 457	Groundwater	3
CEE 416	Traffic Capacity Analysis	3 or 4	CEE 458	Water Resources Field Methods	4
CEE 418	Public Transportation Systems	3 or 4	CEE 459	Ecohydraulics	4
Area 3 - Railroad:			Energy-Water-Environment Sustainability Primary		
CEE 408	Railroad Transportation Engrg	3 or 4	Science Electives - Select 1 course from list below:		
CEE 409	Railroad Track Engineering	3 or 4	ME 200	Thermodynamics	3
CEE 410	Railway Signaling & Control	3 or 4	CHBE 321	Thermodynamics	4
CEE 411	RR Project Design & Constr	3 or 4	Civil Engineering Core Courses		
Advanced Technical Courses Recommended:			Required course:		
CEE 401	Concrete Properties & 3D Print	4	CEE 340	Energy and Global Environment	3
CEE 405	Asphalt Materials I	3 or 4	Select 4 courses from the list below:		
CEE 406	Pavement Design I	3 or 4	CEE 300	Behavior of Materials	4

CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 350	Water Resources Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

Advanced Technical Courses

Required course:

CEE 493	Sustainable Design Eng Tech	4
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Select remaining courses to fulfill this requirement from the list below:

ABE 436	Renewable Energy Systems	3 or 4
CEE 433	Water Technology and Policy	3 or 4
CEE 435	Public Health Engineering	3 or 4
CEE 434	Environmental Systems I	3
CEE 437	Water Quality Engineering	3
CEE 441	Air Pollution Sources, Transport and Control	4
CEE 449	Environmental Engineering Lab	3
CEE 450	Surface Hydrology	3
CEE 452	Hydraulic Analysis and Design	3
CEE 453	Urban Hydrology and Hydraulics	4
CEE 457	Groundwater	3
CEE 459	Ecohydraulics	4
CEE 473	Wind Effects on Structures	4
CEE 492	Data Science for Civil and Environmental Engineering	4
CEE 498	Special Topics (As approved)	4
ES 471	Seminar in Energy & Sustainability Engineering	1
ES 475	Wind Power Systems	3 or 4
ME 400	Energy Conversion Systems	3 or 4
NPRE 402	Nuclear Power Engineering	3 or 4

Societal Risk and Hazard Mitigation Primary**Science Electives - Select 1 course from list below:**

FIN 230	Introduction to Insurance	3
GEOL 118	Natural Disasters	3
LAW 301	Introduction to Law	3
NRES 287	Environment and Society	3
STAT 420	Methods of Applied Statistics	3 or 4

Civil Engineering Core Courses

Required course:

CEE 340	Energy and Global Environment	3
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Select 4 courses from list below:

CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 350	Water Resources Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

Advanced Technical Courses

Required course:

CEE 491	Decision and Risk Analysis	3 or 4
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Select remaining courses to fulfill this requirement from list below:

CEE 406	Pavement Design I	3 or 4
CEE 416	Traffic Capacity Analysis	3 or 4
CEE 417	Urban Transportation Planning	4
CEE 437	Water Quality Engineering	3
CEE 440	Fate Cleanup Environ Pollutant	4
CEE 449	Environmental Engineering Lab	3
CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3
CEE 465	Design of Structural Systems	3
CEE 472	Structural Dynamics I	3 or 4
CEE 473	Wind Effects on Structures	4
IE 410	Advanced Topics in Stochastic Processes & Applications	3 or 4
NPRE 442	Radioactive Waste Management	3
SE 450	Decision Analysis I	3 or 4
STAT 425	Statistical Modeling I	3 or 4
STAT 429	Time Series Analysis	3 or 4
STAT 430	Topics in Applied Statistics	3 or 4
UP 438	Disasters and Urban Planning	4

Sustainable and Resilient Infrastructure Systems Primary**Science Electives - Select 1 course from list below:**

ATMS 120	Severe and Hazardous Weather	3
CS 357	Numerical Methods I	3
ENSU 300	Environmental Sustainability	3
ESE 140	Climate and Global Change	3
ESE 320	Water Planet, Water Crisis	3
ESE 482	Challenges of Sustainability	3
FIN 221	Corporate Finance	3
GGIS 103	Earth's Physical Systems	4
NPRE 201	Energy Systems	3
NRES 439	Env and Sustainable Dev	3
SE 320	Control Systems	4
STAT 420	Methods of Applied Statistics	3 or 4
UP 406	Urban Ecology	4

Civil Engineering Core Courses

Required course:

CEE 340	Energy and Global Environment	3
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Select 4 courses from list below:

CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 350	Water Resources Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

Advanced Technical Courses

Required course:

CEE 491	Decision and Risk Analysis	3 or 4
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Select remaining courses to fulfill this requirement from list below:

ABE 436	Renewable Energy Systems	3 or 4	CEE 443	Env Eng Principles, Chemical	4
CEE 401	Concrete Properties & 3D Print	4	CEE 444	Env Eng Principles, Biological	4
CEE 406	Pavement Design I	3 or 4	CEE 447	Atmospheric Chemistry	4
CEE 408	Railroad Transportation Engrg	3 or 4	CEE 449	Environmental Engineering Lab	3
CEE 409	Railroad Track Engineering	3 or 4	Geotechnical Engineering Secondary		
CEE 416	Traffic Capacity Analysis	3 or 4	Students must have taken CEE 380 to pursue this Secondary Field.		
CEE 417	Urban Transportation Planning	4	Advanced Technical Courses		
CEE 418	Public Transportation Systems	3 or 4	Required course:		
CEE 421	Construction Planning	3 or 4	CEE 484	Applied Soil Mechanics	3
CEE 434	Environmental Systems I	3	Select 1 course from list below:		
CEE 453	Urban Hydrology and Hydraulics	4	CEE 483	Soil Mechanics and Behavior	4
CEE 458	Water Resources Field Methods	4	CEE 498	Special Topics (As approved)	3-4
CEE 465	Design of Structural Systems	3	Structural Engineering Secondary		
CEE 493	Sustainable Design Eng Tech	4	Students must have taken CEE 360 to pursue this Secondary Field.		
CEE 498	Special Topics (As approved)	3-4	Advanced Technical Courses		
MSE 489	Matl Select for Sustainability	3 or 4	Required courses:		
UP 466	Energy & the Built Environment	4	CEE 460	Steel Structures I	3
UP 480	Sustainable Design Principles	2	CEE 461	Reinforced Concrete I	3
Secondary Field. Students choose 1 secondary field that is different from but complements and adds breadth to their primary field selection. This should be done in consultation with academic advisor. See list of classes for each area of study below.			Transportation Engineering Secondary		
Construction Engineering and Management Secondary			Students must have taken CEE 310 to pursue this Secondary Field.		
Students must have taken CEE 320 to pursue this Secondary Field.			Advanced Technical Courses		
Advanced Technical Courses			Select 2 courses, each from a different Area listed below:		
Required course:			Area 1 - Facilities:		
CEE 421	Construction Planning	3	CEE 405	Asphalt Materials I	3
Select 1 course from list below:			CEE 406	Pavement Design I	3
CEE 420	Construction Productivity	3	CEE 407	Airport Design	3
CEE 422	Construction Cost Analysis	3	Area 2 - Systems:		
Construction Materials Engineering Secondary			CEE 407	Airport Design	3
Students must have taken CEE 300 to pursue this Secondary Field.			CEE 415	Geometric Design of Roads	4
Advanced Technical Courses			CEE 416	Traffic Capacity Analysis	3
Select 2 courses from list below:			CEE 418	Public Transportation Systems	3
CEE 401	Concrete Properties & 3D Print	4	Area 3 - Railroad:		
CEE 405	Asphalt Materials I	3	CEE 408	Railroad Transportation Engrg	3
CEE 406	Pavement Design I	3	CEE 409	Railroad Track Engineering	3
Environmental Engineering Secondary			CEE 410	Railway Signaling & Control	3
Students must have taken CEE 330 to pursue this Secondary Field.			CEE 411	RR Project Design & Constr	3
Advanced Technical Courses			CEE 412	High-Speed Rail Engineering	3
Select at least 2 courses from list below, a minimum of 6 credit hours required.			Water Resources Engineering and Science Secondary		
CEE 434	Environmental Systems I	3	Students must have taken CEE 350 to pursue this Secondary Field.		
CEE 435	Public Health Engineering	3	Advanced Technical Courses		
CEE 437	Water Quality Engineering	3	Select 2 courses from list below:		
CEE 438	Science & Environmental Policy	4	CEE 433	Water Technology and Policy	3
CEE 441	Air Pollution Sources, Transport and Control	4	CEE 450	Surface Hydrology	3
CEE 442	Environmental Engineering Principles, Physical	4	CEE 451	Environmental Fluid Mechanics	3
			CEE 452	Hydraulic Analysis and Design	3
			CEE 453	Urban Hydrology and Hydraulics	4
			CEE 457	Groundwater	3
			CEE 458	Water Resources Field Methods	4
			CEE 459	Ecohydraulics	4

Energy-Water-Environment Sustainability Secondary

Students must have taken CEE 340 to pursue this Secondary Field.

Advanced Technical Courses

Required course:

CEE 493 Sustainable Design Eng Tech 4

Select 1 course from list below:

ABE 436	Renewable Energy Systems	3 or 4
CEE 433	Water Technology and Policy	3
CEE 434	Environmental Systems I	3
CEE 435	Public Health Engineering	3
CEE 437	Water Quality Engineering	3
CEE 441	Air Pollution Sources, Transport and Control	4
CEE 449	Environmental Engineering Lab	3
CEE 450	Surface Hydrology	3
CEE 452	Hydraulic Analysis and Design	3
CEE 453	Urban Hydrology and Hydraulics	4
CEE 457	Groundwater	3
CEE 459	Ecohydraulics	4
CEE 473	Wind Effects on Structures	4
CEE 492	Data Science for Civil and Environmental Engineering	4
CEE 498	Special Topics (As approved)	3-4
ES 475	Wind Power Systems	3 or 4
ME 400	Energy Conversion Systems	3 or 4
NPRE 402	Nuclear Power Engineering	3 or 4

Societal Risk and Hazard Mitigation Secondary**Advanced Technical Courses**

Required course:

CEE 491 Decision and Risk Analysis 3

Select 1 course from the list below:

CEE 406	Pavement Design I	3
CEE 416	Traffic Capacity Analysis	3
CEE 417	Urban Transportation Planning	4
CEE 437	Water Quality Engineering	3
CEE 440	Fate Cleanup Environ Pollutant	4
CEE 449	Environmental Engineering Lab	3
CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3
CEE 465	Design of Structural Systems	3
CEE 472	Structural Dynamics I	3
CEE 473	Wind Effects on Structures	4
IE 410	Advanced Topics in Stochastic Processes & Applications	3 or 4
NPRE 442	Radioactive Waste Management	3
SE 450	Decision Analysis I	3 or 4
STAT 425	Statistical Modeling I	3 or 4
STAT 429	Time Series Analysis	3 or 4
STAT 430	Topics in Applied Statistics	3 or 4
UP 438	Disasters and Urban Planning	4

Sustainable and Resilient Infrastructure Systems Secondary

Students must have taken CEE 340 to pursue this Secondary Field.

Advanced Technical Courses

Required course:

CEE 491 Decision and Risk Analysis 3

Select 1 course from the list below:

ABE 436	Renewable Energy Systems	3 or 4
CEE 401	Concrete Properties & 3D Print	4
CEE 406	Pavement Design I	3
CEE 408	Railroad Transportation Engrg	3
CEE 409	Railroad Track Engineering	3
CEE 416	Traffic Capacity Analysis	3
CEE 417	Urban Transportation Planning	4
CEE 418	Public Transportation Systems	3
CEE 421	Construction Planning	3
CEE 434	Environmental Systems I	3
CEE 453	Urban Hydrology and Hydraulics	4
CEE 458	Water Resources Field Methods	4
CEE 465	Design of Structural Systems	3
CEE 493	Sustainable Design Eng Tech	4
CEE 498	Special Topics (As approved)	3-4
MSE 489	Matl Select for Sustainability	3 or 4
UP 466	Energy & the Built Environment	4
UP 480	Sustainable Design Principles	2

Global Context Secondary

Students must have taken CEE 340 and either CEE 330 or CEE 350 to pursue this Secondary Field.

Advanced Technical Courses

Select 1 course from the Global Issues list below:

ACE 451	Agriculture in Intl Dev	3 or 4
ATMS 421	Earth Systems Modeling	4
CEE 438	Science & Environmental Policy	4
CEE 441	Air Pollution Sources, Transport and Control	4
CEE 447	Atmospheric Chemistry	4
CEE 450	Surface Hydrology	3
ECON 420	International Economics	3 to 4

Select 1 course from the CEE Global Design list below:

CEE 408	Railroad Transportation Engrg	3
CEE 417	Urban Transportation Planning	4
CEE 437	Water Quality Engineering	3
CEE 449	Environmental Engineering Lab	3
CEE 465	Design of Structural Systems	3

CEE Multidisciplinary Secondary

Science Electives Recommended: Any recommended science electives from existing CEE Primary and Secondary listed above.

Civil Engineering Core Courses Recommended: Core courses relevant to the student's interests.

Advanced Technical Courses: Students must work with CEE Academic Advisors to select courses.

Atmospheric Science Secondary

Students must have taken CEE 330 to pursue this Secondary Field.

Advanced Technical Courses

Select 2 courses from list below:

ATMS 302	Atmospheric Dynamics I	3
ATMS 410	Radar Remote Sensing	4
ATMS 411	Satellite Remote Sensing	4
ATMS 421	Earth Systems Modeling	4
CEE 441	Air Pollution Sources, Transport and Control	4
CEE 447	Atmospheric Chemistry	4

Chemical Engineering Secondary

Students must have taken CEE 330 and CEE 350 to pursue this Secondary Field.

Advanced Technical Courses

Select 2 courses from list below:

CHBE 321	Thermodynamics	4
CHBE 421	Momentum and Heat Transfer	4
CHBE 422	Mass Transfer Operations	4
CHBE 424	Chemical Reaction Engineering	3

Chemistry Secondary

Students must have taken CEE 330 to pursue this Secondary Field.

Advanced Technical Courses

Select at least 2 courses from list below, a minimum of 6 credit hours required.

CHEM 232	Elementary Organic Chemistry I	3 or 4
CHEM 315	Instrumental Chem Systems Lab	2
CHEM 332	Elementary Organic Chem II	4
CHEM 420	Instrumental Characterization	2
CHEM 440	Physical Chemistry Principles	4

Microbiology Secondary

Students must have taken CEE 330 to pursue this Secondary Field.

Advanced Technical Courses

Select 2 courses from list below:

CEE 444	Env Eng Principles, Biological	4
MCB 301	Experimental Microbiology	3
MCB 431	Microbial Physiology	3
MCB 450	Introductory Biochemistry	3

Toxicology Secondary

Students must have taken CEE 330 to pursue this Secondary Field.

Advanced Technical Courses

Select 2 courses from list below:

CHEM 332	Elementary Organic Chem II	4
ENVS 480	Basic Toxicology	3
MCB 450	Introductory Biochemistry	3

The General Civil Engineering Option 37**Science Electives - Select 1 course from list below:**

GEOL 107	Physical Geology	4
CHEM 232	Elementary Organic Chemistry I	3 or 4
ME 200	Thermodynamics	3
STAT 420	Methods of Applied Statistics	4

Civil Engineering Core Courses

Select 7 courses from list below:

CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 340	Energy and Global Environment	3
CEE 350	Water Resources Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

Advanced Technical Courses

Select 4 courses from Areas below, following either of these two options: Option I: Pick no more than 1 course from each area below. Option II: Pick 2 courses from 1 area and no more than 1 course from each of the remaining areas.

Construction

CEE 420	Construction Productivity	3
CEE 421	Construction Planning	3
CEE 422	Construction Cost Analysis	3

Environmental

CEE 437	Water Quality Engineering	3
CEE 440	Fate Cleanup Environ Pollutant	4
CEE 441	Air Pollution Sources, Transport and Control	4

Geotechnical

CEE 483	Soil Mechanics and Behavior	4
CEE 484	Applied Soil Mechanics	3 or 4

Materials

CEE 401	Concrete Properties & 3D Print	4
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Structures

CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3

Transportation

CEE 405	Asphalt Materials I	3
CEE 406	Pavement Design I	3
CEE 407	Airport Design	3
CEE 408	Railroad Transportation Engrg	3
CEE 409	Railroad Track Engineering	3
CEE 410	Railway Signaling & Control	3
CEE 411	RR Project Design & Constr	3
CEE 412	High-Speed Rail Engineering	3
CEE 415	Geometric Design of Roads	4
CEE 416	Traffic Capacity Analysis	3
CEE 417	Urban Transportation Planning	4
CEE 418	Public Transportation Systems	3

Water Resources

CEE 451	Environmental Fluid Mechanics	3
CEE 453	Urban Hydrology and Hydraulics	4

Free Electives

Code	Title	Hours
Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree. (https://go.grainger.illinois.edu/FreeElectives/)		10
Total Hours of Curriculum to Graduate		128

for the degree of Bachelor of Science in Civil Engineering

Sample Sequence

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence. The curriculum sequence can also be viewed via dynamic and static curricular maps (<https://grainger.illinois.edu/academics/undergraduate/majors-and-minors/cee-map/>), which include prerequisite sequencing.

Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. See the corresponding section on the Degree and General Education Requirements (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>). One of the SBS courses must be an introductory economics course (ECON 102 or ECON 103). CEE 300 or CEE 340 will satisfy a Civil Engineering core course requirement and the Campus General Education Advanced Composition requirement.

Free Electives: Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives (<https://go.grainger.illinois.edu/FreeElectives/>), so that there are at least 128 credit hours earned toward the degree.

First Year		
First Semester		Hours
CEE 190		4
ENG 100		1
MATH 221 (MATH 220 may be substituted)		4
CHEM 102		3
CHEM 103		1
Composition I or SE 101		4
		17
Total Hours 17		

First Year		
Second Semester		Hours
CS 101		3
PHYS 211		4
MATH 231		3
CHEM 104		3
CHEM 105		1

SE 101 (or Composition I)	3
17	

Total Hours 17

Second Year

First Semester	Hours
CEE 201	3
PHYS 212	4
MATH 241	4
TAM 211	3
MATH 257	3
17	

Total Hours 17

Second Year

Second Semester	Hours
CEE 202	3
PHYS 213	2
TAM 212	3
TAM 251	3
ECON 102 or 103	3
Free Elective course	3
17	

Total Hours 17

Third Year

First Semester	Hours
TAM 335 or CEE 331	4
Civil Engineering Core course	3
Civil Engineering Core course	3
Science Elective course	3
General Education course (Choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	3
16	

Total Hours 16

Third Year

Second Semester	Hours
CEE 300 or 340	4
MATH 285	3
Civil Engineering Core course	3
Civil Engineering Core course	3
General Education course (Choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	3
16	

Total Hours 16

Fourth Year

First Semester	Hours
CEE 495	0
Civil Engineering Advanced Technical course (Primary Field)	3
Civil Engineering Advanced Technical course (Primary Field)	3
Civil Engineering Advanced Technical course (Secondary Field)	3
General Education course (Choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	3
Free Elective course	3
	15

Total Hours 15**Fourth Year**

Second Semester	Hours
Civil Engineering Advanced Technical course (Primary Field)	3
Civil Engineering Advanced Technical course (Primary Field)	3
Civil Engineering Advanced Technical course (Secondary Field)	3
Language Other Than English (3rd level)	4
	13

Total Hours 13**Total Hours: 128***for the degree of Bachelor of Science in Civil Engineering*

- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

for the degree of Bachelor of Science in Civil Engineering

Civil & Environmental Engineering

Civil & Environmental Engineering website (<https://cee.illinois.edu/directory/faculty/>)

Civil & Environmental Engineering faculty

The Grainger College of Engineering

The Grainger College of Engineering Admission (<https://grainger.illinois.edu/admissions/>)

The Grainger College of Engineering (<https://grainger.illinois.edu/>)

Student learning outcomes are based on learning outcomes in line with the ABET accreditation process.

Civil Engineering graduates will have:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- 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.
- An ability to communicate effectively with a range of audiences.
- 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.
- 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.
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.