

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

The objective of the civil engineering program is to prepare graduates to enter and be successful in the civil engineering profession. Graduates are expected to become licensed professional engineers, and to reach responsible positions in a wide range of professional settings, including consulting firms, industry, or government. This program will prepare students to begin and successfully complete graduate studies in engineering and/or post-baccalaureate education in a professional degree program. The civil engineering program provides breadth in core sub-disciplines and depth in areas of specialization. This degree program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

Civil engineering is the original of the engineering disciplines. With the increase in population, the growing complexity of infrastructure, and changing urban centers, the civil engineer's task—applying science to the control and utilization of the environment for the total benefit of mankind—represents a challenge unsurpassed in all of engineering.

The civil engineer often is confronted with conditions so variable and complex that they cannot be precisely defined by science and mathematics. Therefore, a knowledge of the arts and social sciences, as well as the physical sciences, is essential. In addition, because civil engineering requires overall planning of large projects whose components involve many other disciplines, it is also necessary to have knowledge of management techniques. The goal of the civil engineering program is to provide an education that enables graduates to make far-reaching decisions that draw not only from technical knowledge but also from integrity and judgment.

In professional courses, classroom lectures are supplemented by laboratory practice, including the study of materials, structural engineering, fluid mechanics and hydraulics, environmental engineering, geotechnical engineering, and surveying. The principal functional areas that are considered sub-divisions of civil engineering are structural engineering, transportation engineering, geotechnical engineering, environmental and water resources engineering, and construction management.

Students may choose a professional specialization as described on the following pages, or one of many approved minors.

Architecture students who plan to pursue a Master of Engineering in Structural Engineering degree should take the following courses:

CAE 303	Structural Design I	3
CAE 304	Structural Analysis I	3
CAE 307	Structural Design II	3
CAE 431	Steel Design	3
CAE 432	Concrete and Foundation Design	3

Students should consult the Master of Engineering in Structural Engineering curriculum for additional details.

Required Courses

Code	Title	Credit Hours
Civil Engineering Requirements		(48)
CAE 100	Intro to Engg Drawing & Design	2
CAE 101	Intro to AutoCAD Draw Design	2
CAE 105	Surveying	3
CAE 110	Professional Practice I	1
CAE 111	Professional Practice II	1
CAE 302	Fluid Mechanics and Hydraulics	3
CAE 303	Structural Design I	3
CAE 304	Structural Analysis I	3
CAE 307	Structural Design II	3
CAE 312	Engineering Systems Analysis	3
CAE 315	Materials of Construction	3
CAE 323	Intro to Geotechnical Engineer	3
CAE 419	Intro Transportation Engg/Dsgn	3
CAE 431	Steel Design	3
CAE 432	Concrete and Foundation Design	3
CAE 457	Geotechnical Foundation Dsgn	3
CAE 470	Constrctn Methods&Cost Estmg	3
CAE 496	FE Exam Prep ¹	0
ENVE 401	Introduction to Water Resource	3

CAE Technical Electives		(9)
Select 9 credit hours ²		9
CAE Additional Science Requirement		(3)
ENVE 201	Earth Environ Sci ³	3
or CAE 221	Engineering Geology	
or BIOL 105	Introduction to Biology	
or PHYS 360	Introduction to Astrophysics	
Mathematics Requirements		(18)
MATH 151	Calculus I	5
MATH 152	Calculus II	5
MATH 251	Multivariate & Vector Calculus	4
MATH 252	Introduction to Diff Equations	4
Physics Requirements		(8)
PHYS 123	General Physics I: Mechanics	4
PHYS 221	Gen Physics II: Elect&Magntism	4
Capstone Design Requirement		(3)
CAE 495	Capstone Senior Design	3
Chemistry Requirement		(4)
CHEM 124	Princ of Chemistry I with Lab	4
Computer Science Requirement		(2)
CS 104	Intro to Comp Prgm for Engrs	2
or CS 105	Intro to Computer Programming	
Engineering Course Requirements		(9)
CAE 286	Theory&Concept of Struct Mechcs	3
CAE 287	Mechanics Structural Materials	3
MMAE 305	Dynamics	3
Interprofessional Projects (IPRO)		(6)
See Illinois Tech Core Curriculum, section E		6
Humanities and Social Science Requirements		(21)
See Illinois Tech Core Curriculum, sections B and C		21
Total Credit Hours		131

- ¹ All civil engineering students are required to register for the Fundamentals of Engineering (FE) examination during their senior year. The examination is offered by the National Council of Examiners for Engineering and Surveying (NCEES) throughout the year.
- ² All technical electives must be CAE, ENVE, or EG courses at the 400-level or above. A maximum of one EG course can be used as a CAEE technical elective.
- ³ Students are encouraged to take ENVE 201 but other listed additional science electives are acceptable with advisor approval.

Bachelor of Science in Civil Engineering Curriculum

		Year 1	
Semester 1	Credit Hours	Semester 2	Credit Hours
CAE 100	2	CAE 101	2
CAE 110	1	CAE 111	1
CAE 105	3	MATH 152	5
MATH 151	5	CS 104 or 105	2
CHEM 124	4	PHYS 123	4
Humanities 200-level Course	3	Social Sciences Elective	3
18		17	
		Year 2	
Semester 1	Credit Hours	Semester 2	Credit Hours
MATH 251	4	MATH 252	4
CAE 286	3	CAE 287	3
ENVE 201, CAE 221, BIOL 105, or PHYS 360 ¹	3	CAE 312	3
PHYS 221	4	MMAE 305	3
Humanities or Social Sciences Elective	3	Humanities Elective (300+)	3
17		16	
		Year 3	
Semester 1	Credit Hours	Semester 2	Credit Hours
CAE 302	3	CAE 307	3
CAE 303	3	CAE 323	3
CAE 304	3	ENVE 401	3
CAE 315	3	I PRO Elective II	3
I PRO Elective I	3	Social Sciences Elective (300+)	3
15		15	
		Year 4	
Semester 1	Credit Hours	Semester 2	Credit Hours
CAE 419	3	CAE 432	3
CAE 431	3	CAE 495	3
CAE 457	3	CAE 496	0
CAE 470	3	CAEE Technical Elective ²	3
CAEE Technical Elective ²	3	CAEE Technical Elective ²	3
Humanities Elective (300+)	3	Social Sciences Elective (300+)	3
18		15	

Total Credit Hours: 131

¹ Students are encouraged to take ENVE 201 but other listed additional science electives are acceptable with advisor approval.

² All technical electives must be CAE, ENVE, or EG courses at the 400-level or above. A maximum of one EG course can be used as a CAEE technical elective.

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Professional Specializations in Civil Engineering

Students who select an area of specialization must take a minimum of nine credit hours from the following technical electives listed under the respective area of specialization.

Three additional credit hours may be any 400-level CAE course taken with prior approval of the student's adviser and chair.

Environmental Engineering

Code	Title	Credit Hours
Select a minimum of three courses from the following:		
CAE 439	Intro Geographic Info Syst	3
ENVE 402	Introduction to Environmental	3
ENVE 403	Occup Environ Health Safety	3
ENVE 404	Water & Wastewater Engineering	3
ENVE 463	Intro Air Pollution Control	3
Total Credit Hours		9

Construction Engineering and Management

Code	Title	Credit Hours
CAE 471	Construction Plan & Scheduling	3
CAE 472	Construction Site Operation	3
CAE 473	Construction Contract Admin	3
Total Credit Hours		9

Geotechnical Engineering

Code	Title	Credit Hours
CAE 401	Hydraulics, Hydrology, & Appl	3
CAE 415	Pavement Design	4
CAE 486	Soil Site Improvement	3
Total Credit Hours		10

Structural Engineering

Code	Title	Credit Hours
CAE 411	Structural Analysis II	3
Select a minimum of two courses from the following:		
CAE 408	Bridge Structural Design	3
CAE 410	Intro to Wind/Earthquake Engg	3
CAE 435	Experimental Anlys Structures	3
CAE 436	Dsgn Masonry/Timber Structures	3
CAE 437	Homeland Security Concerns	3
Other 400- or 500-level courses may be used towards the specialization with the prior approval of the student's adviser.		3
Total Credit Hours		9

Transportation Engineering

Code	Title	Credit Hours
Select a minimum of three courses from the following:		
CAE 416	Facly Dsgn Trnsprtn Syst	3
CAE 417	Railroad Engineering & Design	3
CAE 437	Homeland Security Concerns	3
CAE 439	Intro Geographic Info Syst	3
Total Credit Hours		9