CIVIL ENGINEERING, BS

Bachelor of Science in Civil Engineering

The Bachelor of Science in Civil Engineering can be combined with the Cooperative Education, College of Engineering and Polymer Science certificate (https://bulletin.uakron.edu/undergraduate/colleges-programs/engineering-polymer-science/cooperative-education/), for a nominal five-year plan of study that includes four total years of coursework and one full year of relevant work experience. Alternatively, the Bachelor of Science in Civil Engineering can be earned without the certificate, with a nominal four-year plan of study.

The BS in Civil Engineering program is accredited by the Engineering Accreditation Commission of ABET (https://www.abet.org), under the General Criteria and Program Criteria for *Civil and Similarly Named Engineering Programs*.

Program Educational Objectives

The program educational objectives of the Civil Engineering program are that, within a few years of graduation, our Civil Engineering graduates:

- Successfully and accurately complete Civil Engineering projects as part of a team, on time and within budget, in an ethical and professional manner, and using modern engineering tools-software
- An ability to communicate effectively with written, oral, and visual means in both technical and non-technical settings
- Professional service as evidenced by active participation in a professional society and/or educational outreach activities
- Engage in lifelong learning as evidenced by participation in continuing education courses, workshops, graduate courses, and by pursuing professional licensure
- A basic knowledge of the business of engineering including how the private and public sector operate separately and collectively

Student Outcomes

The Civil Engineering program has specified these student outcomes to be achieved by the time of graduation:

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

Requirements for Admission

All students who meet the minimum requirements for admittance into The University of Akron and intend to major in engineering or engineering technology are accepted into the College of Engineering and Polymer Science and welcome to begin study towards their intended major. Students must show success in key classes early in the program curriculum before they gain approval to take classes in the third year of the curriculum and beyond.

Combined BS/MS program

The department offers BS Civil Engineering students at The University of Akron a BS/MS program that allows them to earn the Master of Science in Civil Engineering with one additional year of study. Applications are accepted in the Spring before the senior year.

The following information has official approval of **The Department of Civil Engineering** and **The College of Engineering and Polymer Science**, but is intended only as a supplemental guide. Official degree requirements are established at the time of transfer and admission to the degree-granting college. Students should refer to the Degree Progress Report (Stellic) which is definitive for graduation requirements. *Completion of this degree within the identified time frame below is contingent upon many factors, including but not limited to: class availability, total number of required credits, work schedule, finances, family, course drops/withdrawals, successfully passing courses, prerequisites, among others.* The transfer process is completed through an appointment with your academic advisor.

Requirements

Summary

Code	Title	Hours
General Education Requirements (https://bulletin.uakron.edu/undergraduate/general-education/) *		24
Program Specific General Education		11
Math and Natural Science		19
Engineering Core		5
Non-Engineering Core		3
Civil Engineering		48
Technical Electives		15
Total Hours		**125**

* Several courses required for the major also satisfy General Education requirements. The University minimum of 36 credits are required for General Education and credit for these courses will apply to multiple requirements.

General Education Requirements

Code	Title	Hours
Students pursuing a bachelor's degree must complete the following General Education coursework		
Breadth of Perspectives courses may also fulfill major or Breadth of Knowledge requirements. Integrated and Applied Learning courses may also fulfill requirements in the major.		
Academic Foundations		**12**

Mathematics, Statistics and Logic: 3 credit hours	
Speaking: 3 credit hours	
Writing: 6 credit hours	
Breadth of Knowledge	**19**
Arts: 3 credit hours	
Humanities: 3 credit hours	
Natural Sciences: 7 credit hours	
Social Sciences: 6 credit hours	
Breadth of Perspectives	
U.S. Perspectives	
Global Perspectives	
Civic Literacy	
Integrated and Applied Learning	**1-3**
Select one class from one of the following subcategories:	
Complex Issues Facing Society	
Capstone	
General Education Elective [1]	**4-2**
Review the General Education Requirements page for detailed course listings.	
Total Hours	**36**

[1] Credits may be selected from any approved General Education course not already accounted for.

Program-Specific General Education

Code	Title	Hours
MATH 221	Analytic Geometry-Calculus I [1]	4
CHEM 151	Principles of Chemistry I [2]	3
CHEM 152	Principles of Chemistry I Laboratory [2]	1
CHEM 153	Principles of Chemistry II [2]	3
Total Hours		**11**

[1] MATH 221 Analytic Geometry-Calculus I meets the General Education Mathematics, Statistics, and Logic Requirement.

[2] Together, CHEM 151 Principles of Chemistry I, CHEM 152 Principles of Chemistry I Laboratory and CHEM 153 Principles of Chemistry II complete the General Education Natural Science - 7 credit hours, including one lab Requirement.

Math and Natural Science

Code	Title	Hours
MATH 222	Analytic Geometry-Calculus II	4
MATH 223	Analytic Geometry-Calculus III	4
MATH 335	Introduction to Ordinary Differential Equations	3
PHYS 291	Elementary Classical Physics I	4
PHYS 292	Elementary Classical Physics II	4
Total Hours		**19**

Engineering Core

Code	Title	Hours
MECE 203	Dynamics	3
MECE 310	Fluid Mechanics I	2
Total Hours		**5**

Non-Engineering Core

Code	Title	Hours
SURV 101	Basic Surveying	3
or GEOG 405	Geographic Information Systems	
Total Hours		**3**

Civil Engineering

Code	Title	Hours
CIVE 101	Introduction to Civil Engineering Fundamentals	3
CIVE 102	Tools for Civil Engineering	3
CIVE 201	Engineering Statics	3
CIVE 202	Introduction to Mechanics of Solids	3
CIVE 306	Theory of Structures	3
CIVE 313	Soil Mechanics	3
CIVE 314	Foundation Design	3
CIVE 321	Introduction to Environmental Engineering	3
CIVE 323	Water Supply & Pollution Control	3
CIVE 341	Hydraulic Engineering	3
CIVE 361	Transportation Engineering	3
CIVE 380	Engineering Materials Laboratory	3
CIVE 401	Steel Design	3
CIVE 403	Reinforced Concrete Design	3
CIVE 471	Construction Administration	3
CIVE 490	Senior Design in Civil Engineering	3
Total Hours		**48**

Technical Electives

Code	Title	Hours
Complete fifteen credits from among the following:		**15**
CIVE 497	Honors Project [1]	
CIVE 482	Special Projects: Civil Engineering [2]	
CIVE 407	Advanced Structural Analysis	
CIVE 414	Design of Earth Structures	
CIVE 418	Soil & Rock Exploration	
CIVE 423	Chemistry for Environmental Engineers	
CIVE 426	Environmental Engineering Design	
CIVE 427	Water Quality Modeling & Management	
CIVE 428	Hazardous & Solid Wastes	
CIVE 441	Hydraulic Design	
CIVE 443	Applied Hydraulics	
CIVE 445	Hydrology	
CIVE 451	Computer Methods of Structural Analysis	
CIVE 452	Structural Vibrations & Earthquakes	
CIVE 453	Optimum Structural Design	
CIVE 454	Advanced Mechanics of Materials	

CIVE 463	Transportation Planning
CIVE 464	Highway Design
CIVE 465	Pavement Engineering
CIVE 466	Traffic Engineering
CIVE 467	Advanced Highway Design
CIVE 468	Highway Materials
CIVE 472	Construction Engineering
CIVE 473	Construction Materials
CIVE 474	Underground Construction
CIVE 480	Reliability-Based Design
A student may take up to three credits of the following to count toward their 15 credits of technical electives:	
BMEN 3xx/4xx	Upper level Biomedical Engineering electives
CHEE 3xx/$xx	Upper level Chemical Engineering electives
CPSC 3xx/4xx	Upper level Computer Science electives
ELEN 3xx/4xx	Upper level Electrical and Computer Engineering electives
MECE 3xx/4xx	Upper level Mechanical Engineering electives
CHEM 3xx/4xx	Upper level Chemistry electives
MATH 3xx/4xx	Upper level Mathematics electives
STAT 3xx/4xx	Upper level Statistics electives
COET 4xx	400-level Construction Engineering Technology electives
SURV 4xx	400-level Surveying and Mapping electives
Total Hours	**15**

1 Honors students must complete CIVE 497 Honors Project to meet their Honors Project requirement. This course counts as both the Honors Project and a CE Technical Elective.

2 Students choosing to take CIVE 482 Special Projects: Civil Engineering as a CE Technical Elective should select a section with three credit hours. Students can take multiple Special Projects courses towards their elective requirements, provided that the courses are on different subjects.

Recommended Schedule with Cooperative Education

This plan of study shows the recommended schedule for students who are also earning the Cooperative Education, College of Engineering and Polymer Science certificate (https://bulletin.uakron.edu/undergraduate/colleges-programs/engineering-polymer-science/cooperative-education/). Together, the Bachelor of Science and certificate require a five-year plan of study. The program recommends that students earn this certificate.

1st Year		
Fall Semester		**Hours**
CHEM 151	Principles of Chemistry I [1]	3
CHEM 152	Principles of Chemistry I Laboratory	1
ENGL 111	English Composition I [1,2]	3
MATH 221	Analytic Geometry-Calculus I [1]	4
CIVE 101	Introduction to Civil Engineering Fundamentals	3
	General Education or Honors Distribution [4]	3
	Hours	**17**
Spring Semester		
CHEM 153	Principles of Chemistry II [1]	3
MATH 222	Analytic Geometry-Calculus II [1]	4
CIVE 102	Tools for Civil Engineering	3
	Second Writing Course [1,3]	3
	General Education or Honor Distribution [4]	3
	Hours	**16**
2nd Year		
Fall Semester		
SURV 101 or GEOG 405	Basic Surveying or Geographic Information Systems	3
MATH 223	Analytic Geometry-Calculus III [1]	4
PHYS 291	Elementary Classical Physics I [1]	4
CIVE 201	Engineering Statics [1]	3
	General Education or Honors Distribution [4]	3
	Hours	**17**
Spring Semester		
MATH 335	Introduction to Ordinary Differential Equations	3
PHYS 292	Elementary Classical Physics II [1]	4
CIVE 202	Introduction to Mechanics of Solids	3
CIVE 321	Introduction to Environmental Engineering	3
MECE 203	Dynamics [1]	3
	Hours	**16**
Summer Semester		
GNEN 300	Cooperative Education Work Period optional	0
	Hours	**0**
3rd Year		
Fall Semester		
CIVE 306	Theory of Structures	3
CIVE 313	Soil Mechanics (includes lab)	3
CIVE 323	Water Supply & Pollution Control	3
MECE 310	Fluid Mechanics I	2
	General Education or Honors Distribution [4]	3
	Hours	**14**
Spring Semester		
GNEN 301	Cooperative Education Work Period I (for Cooperative Education certificate)	0
	Hours	**0**
4th Year		
Fall Semester		
GNEN 302	Cooperative Education Work Period II (for Cooperative Education certificate)	0
	Hours	**0**
Spring Semester		
CIVE 314	Foundation Design	3
CIVE 341	Hydraulic Engineering	3
CIVE 361	Transportation Engineering	3
CIVE 380	Engineering Materials Laboratory (includes lab)	3
CIVE 401	Steel Design	3
	Hours	**15**

Summer Semester		
GNEN 403	Cooperative Education Work Period III (for Cooperative Education certificate)	0
	Hours	**0**
5th Year		
Fall Semester		
CIVE 403	Reinforced Concrete Design	3
CIVE 471	Construction Administration	3
	CE Technical/Professional Requirement	3
	CE Technical/Professional Requirement	3
	CE Technical/Professional Requirement	3
	Hours	**15**
Spring Semester		
CIVE 490	Senior Design in Civil Engineering	3
	CE Technical/Professional Requirement	3
	CE Technical/Professional Requirement	3
	General Education or Honors Distribution [4]	3
	General Education or Honors Distribution [4]	3
	Hours	**15**
	Total Hours	**125**

1. Honors sections may be available; check the schedule of classes.
2. Recommendation for General Education, Writing First Course
3. Check General Education Program or Honors Distribution to find courses that satisfy the second writing course requirement.
4. Credit hours shown for General Education or Honors Distribution are general guidelines only. These courses should be chosen in accordance with the appropriate General Education curriculum guide (for non-honors students) or Honors Distribution (for honors students). Honors students must also ensure that their course selections meet additional requirements not shown on this curriculum guide.

Recommended Schedule without Cooperative Education

If a student chooses not to earn the Cooperative Education certificate, the following four-year plan of study is used.

1st Year		
Fall Semester		**Hours**
CHEM 151	Principles of Chemistry I [1]	3
CHEM 152	Principles of Chemistry I Laboratory	1
MATH 221	Analytic Geometry-Calculus I [1]	4
CIVE 101	Introduction to Civil Engineering Fundamentals	3
ENGL 111	English Composition I [1,2]	3
	General Education or Honors Distribution [4]	3
	Hours	**17**
Spring Semester		
CHEM 153	Principles of Chemistry II [1]	3
MATH 222	Analytic Geometry-Calculus II [1]	4
CIVE 102	Tools for Civil Engineering	3
	Second Writing Course [1,3]	3
	General Education or Honor Distribution [4]	3
	Hours	**16**
2nd Year		
Fall Semester		
SURV 101 or GEOG 405	Basic Surveying or Geographic Information Systems	3
MATH 223	Analytic Geometry-Calculus III [1]	4
PHYS 291	Elementary Classical Physics I [1]	4
CIVE 201	Engineering Statics [1]	3
	General Education or Honors Distribution [4]	3
	Hours	**17**
Spring Semester		
MATH 335	Introduction to Ordinary Differential Equations	3
PHYS 292	Elementary Classical Physics II [1]	4
CIVE 202	Introduction to Mechanics of Solids	3
CIVE 321	Introduction to Environmental Engineering	3
MECE 203	Dynamics [1]	3
	Hours	**16**
3rd Year		
Fall Semester		
CIVE 306	Theory of Structures	3
CIVE 313	Soil Mechanics (includes lab)	3
CIVE 323	Water Supply & Pollution Control	3
MECE 310	Fluid Mechanics I	2
	General Education or Honors Distribution [4]	3
	Hours	**14**
Spring Semester		
CIVE 314	Foundation Design	3
CIVE 341	Hydraulic Engineering	3
CIVE 361	Transportation Engineering	3
CIVE 380	Engineering Materials Laboratory (includes lab)	3
CIVE 401	Steel Design	3
	Hours	**15**
4th Year		
Fall Semester		
CIVE 403	Reinforced Concrete Design	3
CIVE 471	Construction Administration	3
	CE Technical/Professional Requirement	3
	CE Technical/Professional Requirement	3
	CE Technical/Professional Requirement	3
	Hours	**15**
Spring Semester		
CIVE 490	Senior Design in Civil Engineering	3
	CE Technical/Professional Requirement	3
	CE Technical/Professional Requirement	3
	General Education or Honors Distribution [4]	3
	General Education or Honors Distribution [4]	3
	Hours	**15**
	Total Hours	**125**

1. Honors sections may be available; check the schedule of classes.
2. Recommendation for General Education, Writing First Course

[3] Check General Education Program or Honors Distribution to find courses that satisfy the second writing course requirement.

[4] Credit hours shown for General Education or Honors Distribution are general guidelines only. These courses should be chosen in accordance with the appropriate General Education curriculum guide (for non-honors students) or Honors Distribution (for honors students). Honors students must also ensure that their course selections meet additional requirements not shown on this curriculum guide.