

CIVIL ENGINEERING, BS

Civil engineering shapes our world by supporting the health and safety of the environment and the communities we call home. It's a multidisciplinary career field dedicated to public good by designing, building, operating, and maintaining:

- Buildings, homes, schools, theaters, and stadiums where we live, learn, work, and play
- Highways, streets, and bridges where we walk, bike, and drive
- Systems and infrastructure that guard us from flooding and provide safe water for drinking, swimming, and recreation
- Transportation hubs like airports, railways, and harbors that support the movement of people and goods
- Treatment and emission systems that ensure the safety of the air we breathe
- Systems for recycling, reusing, and disposing of solid and hazardous waste
- Production and transmission systems for conventional and renewable energy sources

As our infrastructure needs evolve and older generations leave the workforce, the demand for civil engineers is on the rise. The U.S. Bureau of Labor and Statistics projects over 21,000 job openings annually in the civil engineering field now through 2032, exceeding the average for other occupations.

At the University of Wisconsin–Madison, we help future engineers prepare for what's ahead with hands-on learning opportunities in well-equipped labs (<https://engineering.wisc.edu/news/vacuum-box-enhances-structures-lab-testing-capacity/>), computer facilities, on-site and field experiences, and our capstone design course (<https://engineering.wisc.edu/blog/cee-capstone-course-wins-7th-ncees-award-for-renewable-energy-project/>).

You'll learn from supportive professors and practicing engineers while using the tools and technology that civil engineers use every day. Working with other students, you'll create solutions to challenges in our natural and built environments for real-world clients. And as you move forward in the program, you'll be ready for internships and co-ops (<https://engineering.wisc.edu/blog/a-blueprint-for-success-schiesls-journey-from-student-to-alum/>) that add to your education and offer valuable experience before graduation day.

Required civil engineering courses cover the breadth of fundamental knowledge you will need in this career field. Elective courses in facility design or operation help you tailor your studies and explore the latest innovations and methods for integrating sustainability, resilience to climate change, smart infrastructure, and virtual reality into engineering design and operation. There are also a variety of certificate programs that you can pair with your degree, including a Certificate in Architecture (<https://guide.wisc.edu/undergraduate/engineering/civil-environmental-engineering/architecture-certificate/>).

We encourage students to take the Fundamentals of Engineering (FE) exam before or shortly after graduating (<https://engineering.wisc.edu/blog/taking-the-fe-exam-as-an-undergrad/>), which is the first step in professional engineering licensure and its benefits. A pass rate of 95%

among our students surpasses the national average of 70%, ensuring our graduates are well-prepared for their careers.

Alumni from our program find jobs with planning and design consulting firms (<https://engineering.wisc.edu/blog/from-student-to-startup-co-founder-olivia-fritz-sets-sights-on-sustainability-engineering/>); architectural firms; construction companies; local, state, and federal agencies (<https://engineering.wisc.edu/blog/anthony-heddlesten-2023-early-career-award-recipient/>); and beyond. Areas of expertise include construction engineering and management, environmental engineering, geological and geotechnical engineering, structural engineering, transportation engineering, and water resources. Common entry-level job titles include civil engineer, field engineer, design engineer, structural engineer, surveyor, and transportation engineer.

VISION

Develop and maintain a learning community that pursues new knowledge and understanding, and provides innovative and sustainable solutions to human and ecological needs.

MISSION OF BACHELOR OF SCIENCE IN CIVIL ENGINEERING (BSCE) PROGRAM

Create, integrate, and transfer civil engineering knowledge and practice in the development of professionals, leaders, and citizens that help define and serve societal and environmental needs by applying this knowledge and practice in an effective and sustainable manner.

HOW TO GET IN

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ADMISSION TO THE COLLEGE AS A FIRST-YEAR STUDENT

Students applying to UW–Madison (<https://www.admissions.wisc.edu/apply/>) need to indicate an engineering major (<https://engineering.wisc.edu/degrees-programs/undergraduate/>) as their first choice in order to be considered for direct admission to the College of Engineering. Direct admission means that students get to start their college career in the engineering program of their choice and have access to engineering-specific resources and facilities. Students who are directly admitted need to meet progression requirements (<https://engineering.wisc.edu/student-services/undergraduate-student-advising/progression/>) at the end of the first year to guarantee advancement in that program.

CROSS-CAMPUS TRANSFER TO ENGINEERING

UW–Madison students in other schools and colleges on campus must meet minimum admission requirements (<https://engineering.wisc.edu/admissions/undergraduate/cross-campus-students/>) for admission consideration to engineering degree programs. Cross-campus admission is competitive and selective, and academic performance expectations may increase as demand trends change. The student's overall academic record at UW–Madison is also considered. Students apply to their intended engineering program by submitting the online application by stated deadlines for spring and fall. The College of Engineering offers an online information tutorial and advising (<https://engineering.wisc.edu/>)

admissions/undergraduate/cross-campus-students/) for students to learn about the cross-campus transfer process.

OFF-CAMPUS TRANSFER TO ENGINEERING

With careful planning, students at other accredited institutions can transfer coursework that will apply toward engineering degree requirements at UW–Madison. Off-campus transfer applicants are considered for direct admission to the College of Engineering by applying to the Office of Admissions with an engineering major listed as their first choice. Those who are admitted to their intended engineering program must meet progression requirements (<https://engineering.wisc.edu/admissions/undergraduate/transfer-from-off-campus/>) at the point of transfer or within their first two semesters at UW–Madison to guarantee advancement in that program. A minimum of 30 credits in residence in the College of Engineering is required after transferring, and all students must meet all requirements for their engineering major. Transfer admission to the College of Engineering is competitive and selective, and students who have exceeded the 80 credit limit at the time of application are not eligible to apply.

The College of Engineering has dual degree programs with select four-year UW System campuses. Eligible dual degree applicants are not subject to the 80 credit limit.

Off-campus transfer students are encouraged to discuss their interests, academic background, and admission options with the Transfer & Academic Program Manager in the College of Engineering: ugtransfer@engr.wisc.edu or 608-262-2473.

SECOND BACHELOR'S DEGREE

The College of Engineering does not accept second undergraduate degree applications. Second degree student (<https://engineering.wisc.edu/admissions/undergraduate/adult-students-second-degree-students/>)s (<https://engineering.wisc.edu/student-services/undergraduate-student-advising/>) might explore the Biological Systems Engineering program at UW–Madison, an undergraduate engineering degree elsewhere, or a graduate program in the College of Engineering.

REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (<https://guide.wisc.edu/undergraduate/#requirementsforundergraduatetext>) section of the Guide.

- General Education
- Breadth—Humanities/Literature/Arts: 6 credits
 - Breadth—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
 - Breadth—Social Studies: 3 credits
 - Communication Part A & Part B *
 - Ethnic Studies *
 - Quantitative Reasoning Part A & Part B *

* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

SUMMARY OF REQUIREMENTS

The following curriculum applies to students admitted to the civil engineering degree program.

Code	Title	Credits
	Introduction to Engineering	3
	Mathematics and Statistics	19
	Basic Science	16
	Engineering Mechanics	10
	Civil Engineering Mechanics	6
	Civil Engineering Tools	6
	Civil Engineering Breadth	21
	Civil Engineering Design	10
	Engineering Electives	13
	Communications	8
	Liberal Studies	16
Total Credits		128

INTRODUCTION TO ENGINEERING

Code	Title	Credits
INTEREGR 170	Design Practicum	3
Total Credits		3

MATHEMATICS AND STATISTICS REQUIREMENT

Code	Title	Credits
Mathematics		
MATH 221 or MATH 217	Calculus and Analytic Geometry 1 Calculus with Algebra and Trigonometry II	5
MATH 222	Calculus and Analytic Geometry 2	4
MATH 234	Calculus--Functions of Several Variables	4
Statistics		
One of the following options:		3
STAT 324	Introduction to Statistics for Science and Engineering	
or I SY E 210	Introduction to Industrial Statistics	

STAT 311 & STAT 312	Introduction to Theory and Methods of Mathematical Statistics I and Introduction to Theory and Methods of Mathematical Statistics II
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Advanced Mathematics

One of the following options: 3

MATH 319	Techniques in Ordinary Differential Equations
MATH 320	Linear Algebra and Differential Equations

Total Credits 19

BASIC SCIENCE REQUIREMENT

Code Title Credits

One of the following: 5-9

CHEM 103 & CHEM 104	General Chemistry I and General Chemistry II
CHEM 109	Advanced General Chemistry

One of the following: 5

PHYSICS 202	General Physics
PHYSICS 208	General Physics

One of the following: 3

GEOSCI 100	Introductory Geology: How the Earth Works
GEOSCI/ ENVIR ST 106	Environmental Geology

One of the following: 3

ZOOLOGY/ BIOLOGY/ BOTANY 151	Introductory Biology
ZOOLOGY 153	Introductory Biology
ZOOLOGY/ BOTANY/ ENVIR ST 260	Introductory Ecology
MICROBIO 101	General Microbiology

Total Credits 16-20

ENGINEERING MECHANICS REQUIREMENT

Code Title Credits

E M A 201	Statics (with a grade of C or better)	3
E M A 202	Dynamics	3
E M A 303	Mechanics of Materials	3
E M A/M E 307	Mechanics of Materials Lab	1

Total Credits 10

CIVIL ENGINEERING MECHANICS REQUIREMENT

Code Title Credits

CIV ENGR 310	Fluid Mechanics	3
CIV ENGR/ E M A 395	Materials for Constructed Facilities	3

Total Credits 6

CIVIL ENGINEERING TOOLS REQUIREMENT

Code Title Credits

CIV ENGR 159 Civil Engineering Graphics (was ME 170 before Fall 2023) 2-3

or M E 231 Geometric Modeling for Design and Manufacturing

CIV ENGR/G L E 291 Problem Solving Using Computer Tools 4

Total Credits 6-7

CIVIL ENGINEERING BREADTH REQUIREMENT

Code Title Credits

CIV ENGR 311 Hydrosience 3

CIV ENGR 320 Environmental Engineering 3

CIV ENGR/
G L E 330 Soil Mechanics 3

CIV ENGR 340 Structural Analysis I 3

CIV ENGR 370 Transportation Engineering 3

CIV ENGR 494 Civil and Environmental Engineering Decision Making 3

CIV ENGR 498 Construction Project Management 3

Total Credits 21

CIVIL ENGINEERING DESIGN REQUIREMENT

Code Title Credits

CIV ENGR 578 Senior Capstone Design 4

Every student must take at least one class in at least two of the following CEE disciplines, for a total of 6 credits. One of the two classes MUST be completed BEFORE taking CIV ENGR 578 Senior Capstone Design. 6

Water Resources

CIV ENGR 414 Hydrologic Design

Environmental

CIV ENGR 426 Design of Wastewater Treatment Plants

CIV ENGR 427 Solid and Hazardous Wastes Engineering

CIV ENGR 428 Water Treatment Plant Design

CIV ENGR 522 Hazardous Waste Management

Structural

CIV ENGR 445 Steel Structures I

CIV ENGR 447 Concrete Structures I

Geological

CIV ENGR/
G L E 530 Seepage and Slopes

CIV ENGR/
G L E 532 Foundations

Transportation

CIV ENGR 573 Geometric Design of Transport Facilities

CIV ENGR 574 Traffic Control

CIV ENGR 576 Advanced Pavement Design

Note: If a student takes three or more courses from the above list, two of those courses will count toward this civil engineering design requirement and the other classes will count towards the electives requirement (see section below).

Total Credits 10

ENGINEERING ELECTIVES REQUIREMENT

- Students must take at least 3 credits of coursework from an ABET-accredited degree-granting program outside of the Bachelor of Science in Civil Engineering program. INTEREGR and E P D courses do not qualify for meeting this requirement; any courses cross-listed with Civil Engineering (CIV ENGR) do not qualify for meeting this requirement.
- Students must take at least 3 credits of CEE coursework in addition to the civil engineering design requirement. **Note:** Students in the Construction Engineering Management or Environmental Engineering option programs must select from a set of CIV ENGR courses approved for those options.^{1,2,3}
- Students must take at least 7 credits of coursework that meets at least one of the following^{1,2,3}:
 - Any course offered by an engineering department, including but not limited to CIV ENGR.
 - Any Intermediate or Advanced level course with a breadth designation of Biological Sciences, Physical Sciences and/or Natural Sciences. These courses cannot also carry a breadth designation of Social Sciences, Humanities or Literature.
 - Any of the following business courses: INTEREGR 303 Applied Leadership Competencies in Engineering, ACCT I S 300 Accounting Principles, FINANCE/ECON 300 Introduction to Finance, GEN BUS 301 Business Law, M H R 300 Managing Organizations, REAL EST/A A E/ECON/URB R PL 306 The Real Estate Process

Total Credits: 13

¹ Up to three credits of CIV ENGR 1 Cooperative Education Program may be used towards Item 2 or 3.

² Up to six credits of research work (CIV ENGR 299 Independent Study, CIV ENGR 489 Honors in Research, and/or CIV ENGR 699 Independent Study) may be used towards Item 2 or 3.

³ CIV ENGR 121 Sustainability Engineering for Non-Engineers, CIV ENGR 150 Introduction to Architectural Theory, CIV ENGR 151 Architectural Making I, CIV ENGR 152 Architectural Making II, CIV ENGR 155 Architectural Thinking, and CIV ENGR 250 Architectural Visualization cannot be used in Items 2 or 3 above.

COMMUNICATIONS

Code	Title	Credits
Communications A (choose one)		3
ENGL 100	Introduction to College Composition	
LSC 100	Science and Storytelling	
COM ARTS 100	Introduction to Speech Composition	
ESL 118	Academic Writing II	
Speech-Related Course (choose one)		2
INTEREGR 275	Technical Presentations (was EPD 275) ¹	

COM ARTS 181	Elements of Speech-Honors Course	
COM ARTS 262	Argumentation and Debate	
COM ARTS 266	Theory and Practice of Group Discussion	
Writing-Related Course		3
INTEREGR 397	Engineering Communication	
Total Credits		8

¹ INTEREGR 275 Technical Presentations is strongly recommended.

LIBERAL STUDIES REQUIREMENTS

Code	Title	Credits
College of Engineering Liberal Studies Requirements		
Complete Requirements (https://guide.wisc.edu/undergraduate/engineering/#requirements-text) ¹		16
Requirements specific to Civil Engineering:		
<i>An economics course must be selected from the following list:</i>		
ECON 101	Principles of Microeconomics	
ECON 102	Principles of Macroeconomics	
ECON 111	Principles of Economics-Accelerated Treatment	
<i>A minimum of three credits of environmental studies course that meets the breadth designations of humanities, literature, and/or social science. Courses that also carry breadth designations of Biological Sciences, Natural Sciences, or Physical Sciences will not count towards this requirement.</i>		
Total Credits		16

¹ All liberal studies credits must be identified with the letter H, S, L, or Z. Language courses are acceptable without the letter and are considered humanities. An economics elective and an environmental studies elective are required.

Note: See a CEE academic advisor for additional information.

HONORS IN RESEARCH

Students in civil engineering that have completed at least two semesters on the Madison campus with a cumulative GPA of **at least** 3.5 may apply to participate in the Honors in Research program. Students may register for 1 to 3 credits per semester. A grade of P (Progress) will be assigned each semester until the student completes the honors in research program or drops out of the program, at which time a final grade is assigned (based on research progress and the written thesis, if completed). This becomes the grade for all credits taken in CIV ENGR 489 Honors in Research.

A senior thesis worth 3 credits of CIV ENGR 489 is required. The senior thesis is a written document reporting on a substantial piece of work that is prepared in the style of a graduate thesis. The thesis advisor determines the grade which the student receives for the thesis. A bound copy of the thesis must be submitted to the Department of Civil and Environmental Engineering office to complete the program.

The designation "Honors in Research" will be recorded on the student's transcript if the following criteria are met:

- Satisfaction of requirements for an undergraduate degree in Civil Engineering.

2. A cumulative grade-point average of at least 3.3.
3. Completion of a total of at least 8 credits in CIV ENGR 489.
4. Completion of a senior honors thesis with a final grade of B or better.

Students interested in the Honors in Research program should contact their advisor or the BSCE chair for more information. Applications to the program are to be submitted to the BSCE chair with a supporting letter from the student's academic and thesis advisors. Decisions regarding acceptance are made by the BSCE chair.

NAMED OPTIONS

View as listView as grid

- **CIVIL ENGINEERING: CONSTRUCTION ENGINEERING AND MANAGEMENT** ([HTTPS://GUIDE.WISC.EDU/UNDERGRADUATE/ENGINEERING/CIVIL-ENVIRONMENTAL-ENGINEERING/CIVIL-ENGINEERING-BS/CIVIL-ENGINEERING-CONSTRUCTION-ENGINEERING-MANAGEMENT-BS/](https://guide.wisc.edu/undergraduate/engineering/civil-environmental-engineering/civil-engineering-bs/civil-engineering-construction-engineering-management-bs/))

UNIVERSITY DEGREE REQUIREMENTS

Total Degree To receive a bachelor's degree from UW-Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.

Residency Degree candidates are required to earn a minimum of 30 credits in residence at UW-Madison. "In residence" means on the UW-Madison campus with an undergraduate degree classification. "In residence" credit also includes UW-Madison courses offered in distance or online formats and credits earned in UW-Madison Study Abroad/Study Away programs.

Quality of Work Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.

LEARNING OUTCOMES

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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

FOUR-YEAR PLAN

FOUR-YEAR PLAN SAMPLE FOUR-YEAR PLAN

First Year

Fall	Credits Spring	Credits
MATH 221	5 MATH 222	4
CHEM 109	5 E M A 201	3
INTEREGR 170	3 CIV ENGR 159 or M E 231	2
or LIBERAL STUDIES	LIBERAL STUDIES or	3
COMMUNICATIONS A	3 INTEREGR 170	
	GEOSCI 100 or 106	3
	16	15

Second Year

Fall	Credits Spring	Credits
MATH 234	4 MATH 319 or 320	3
E M A 202	3 E M A 303	3
CIV ENGR 320	3 E M A/M E 307	1
BIOLOGY ELECTIVE	3 CIV ENGR 310	3
STAT 324	3 INTEREGR 275 (was EPD 275)	2
	ECON 101, 102, or 111	4
	16	16

Third Year

Fall	Credits Spring	Credits
CIV ENGR 311	3 CIV ENGR 340	3
CIV ENGR/G L E 330	3 CIV ENGR/E M A 395	3
CIV ENGR/G L E 291	4 CIV ENGR 498	3
ETHNIC STUDIES	3 CIV ENGR 370	3
INTEREGR 397	3 PHYSICS 202 or 208	5
	16	17

Fourth Year

Fall	Credits Spring	Credits
CIV ENGR DESIGN ELECTIVE	3 CIV ENGR 578	4
ENGR ELECTIVE	3 CIV ENGR DESIGN ELECTIVE	3
CIV ENGR ELECTIVE	3 ENGR ELECTIVE	3
CIV ENGR 494	3 LIBERAL STUDIES	3
ENV STUDIES ELECTIVE	3 ENGR OUTSIDE OF CIV ENGR	3

ENGR ELECTIVE	1	
	16	16
Total Credits 128		

ADVISING AND CAREERS

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ADVISING

Every College of Engineering undergraduate has an assigned academic advisor (<https://engineering.wisc.edu/student-services/undergraduate-student-advising/>). Academic advisors support and coach students through their transition to college and their academic program all the way through graduation.

Advisors help students navigate the highly structured engineering curricula and course sequencing, working with them to select courses each semester.

When facing a challenge or making a plan toward a goal, students can start with their academic advisor. There are many outstanding resources at UW-Madison, and academic advisors are trained to help students navigate these resources. Advisors not only inform students about the various resources, but they help reduce the barriers between students and campus resources to help students feel empowered to pursue their goals and communicate their needs.

Students can find their assigned advisor in their MyUW Student Center.

ENGINEERING CAREER SERVICES

Engineering Career Services (<https://ecs.wisc.edu>) (ECS) assists students in finding work-based learning experiences such as co-ops and summer internships, exploring and applying to graduate or professional school, and finding full-time professional employment.

ECS offers two large career fairs per year, assists students with resume building and developing interviewing skills, hosts skill-building workshops, and meets one-on-one with students to discuss offer negotiations.

Students are encouraged to engage with the ECS office early in their academic careers. For more information on ECS programs and workshops, visit: <https://ecs.wisc.edu>.

CERTIFICATION/LICENSURE

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Licensure as a Professional Engineer is expected of civil engineers. Information on steps needed to obtain licensure is available from the National Council for the Examination of Engineers and Surveyors (NCEES) at <https://ncees.org/engineering/>.

ACCREDITATION

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Accredited by the Engineering Accreditation Commission of ABET (<https://www.abet.org/>), <https://www.abet.org>, under the commission's General Criteria and Program Criteria for Civil and Similarly Named Engineering Programs.

PROGRAM#EDUCATIONAL OBJECTIVES#FOR THE BACHELOR OF SCIENCE IN CIVIL ENGINEERING

We recognize that our graduates will choose to use the knowledge and skills that they have acquired during their undergraduate years to pursue a wide variety of career and life goals, and we encourage this diversity of paths. Whatever path our graduates may choose, we expect them to be meeting the following objectives at least three to five years after graduation:

1. Design and construct both natural and built processes and systems to efficiently meet determined needs using technical knowledge; modern tools; design principles; ethical practice; and communication, leadership, and team skills.
2. Investigate natural and built systems by using measurements, experiments, and analysis tools.
3. Understand, anticipate, and incorporate economic, environmental, political, social, safety, ethical and global considerations in the design, investigation, and construction of natural and built systems.
4. Engage in lifelong learning to keep pace with the continuous evolution of policies, procedures, technologies and tools for engineering analysis, design, and decision making.
5. Serve others through participation in professional and/or civic activities and responsibilities.

Note: Undergraduate Student Outcomes, number of degrees conferred, and enrollment data are made publicly available at the Civil Engineering#Undergraduate Program website (<https://engineering.wisc.edu/programs/degrees/civil-engineering-bs/>). (In this Guide, the program's Student Outcomes are available through the "Learning Outcomes" tab.)