

# CIVIL ENGINEERING

COLLEGE OF ENGINEERING | MONTANA STATE UNIVERSITY

## WHAT IS CIVIL ENGINEERING?

Civil engineers (CEs) provide society with vital infrastructure such as roads, buildings, bridges, dams, transit systems, and water treatment systems, while protecting the environment. Their projects safeguard people from natural disasters such as high winds, earthquakes, avalanches, and floods. CEs tackle challenges of pollution, traffic congestion, drinking water and energy needs, community planning, and more.

Civil engineering is traditionally broken into several sub-disciplines including

- environmental engineering
- construction engineering
- geotechnical engineering
- materials engineering
- structural engineering
- surveying
- transportation engineering
- water resources engineering

## IS CIVIL ENGINEERING FOR YOU?

If you like working with people and have solid math and science skills, engineering could be your perfect fit. As an engineer, you'll apply science to enhance people's lives.

As a student, you'll learn how to use modern materials, computational methods, and scientific developments. Upon graduating, you'll join teams that solve technical and social problems by designing physical systems that are efficient and sustainable.

Society's future will be closely tied to energy, the environment, and our ability to thrive in a global economy. As a CE, you'll fill a vital role in linking these themes. Whether you choose design, construction, research, teaching, or management, civil engineering offers a wide range of careers.

## COURSEWORK

In the first two years, you'll study chemistry, physics, math, computer analysis, engineering mechanics, materials, graphics, and surveying. As a junior, you'll explore each subarea of CE, where you'll solve engineering problems and extend your scientific background and analytic abilities.

In your senior year, you'll choose professional electives in areas that interest you and you will engage in a senior capstone project. You'll be on a design team challenged to solve an open-ended, real-world problem. To find a workable solution, you and your classmates will synthesize knowledge from a broad range of subjects and follow professional engineering practices.

As an engineer, your job will include communicating your designs to those you work with, so you'll take classes to sharpen your oral and written communication skills. By taking courses in humanities and social sciences, you will gain awareness of and sensitivity to critical aspects of society.

The civil engineering program is accredited by the Engineering Accreditation Commission of ABET, [www.abet.org](http://www.abet.org).

### For additional information, contact:

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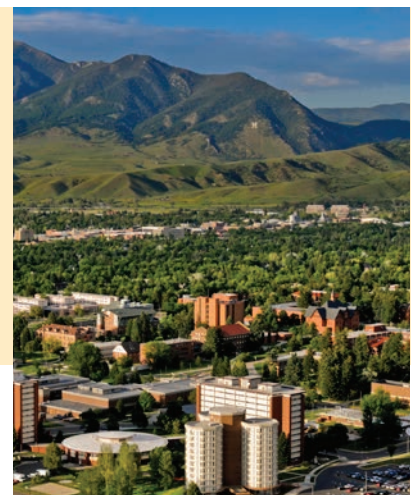
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**1** Students learn about how things work through hands-on activities, such as the one in this hydraulics lab. **2** Many Civil Engineering students belong to MSU's Engineers Without Borders student chapter, which works in Kenya. **3** Civil engineers work on challenging projects in spectacular places, such as Yellowstone National Park. **4** The Subzero Science and Engineering Research Facility is a unique, state-of-the-art suite of laboratories where researchers study avalanches, the strength of building materials, corrosion, and many other cold-related topics.



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## Job Opportunities

Our graduates have been highly successful in beginning their engineering careers immediately after graduation. Graduates tend to find employment in

- consulting engineering and architectural firms
- federal, state, and local agencies
- and construction.

We also have a high placement record in graduate engineering programs and have students with ROTC coursework move on to military careers.

## Facilities

The Civil Engineering Department has laboratories devoted to undergraduate education. These include hydraulics and water resources engineering, geotechnical engineering, structural engineering and surveying. Our computer facilities are state-of-the-art and use current versions of engineering software and hardware. Many of our courses have strong computer components.

## Length of Study and Preparation for Graduate Studies

The curriculum is designed to be completed in four years. Some lower division courses are available in the summer. The program prepares students for licensing as professional engineers (PE) and is an excellent precursor for graduate studies in civil engineering.

**5** McCarthy Building Companies, Inc., one of the top 10 U.S. commercial builders, employs alumni of MSU's Civil Engineering program. The firm built the Banner Gateway Medical Center in Gilbert, Ariz., shown at right.

## COURSES

COLLEGE REQUIREMENTS	CREDITS	CIVIL ENGINEERING REQUIREMENTS	CREDITS
Calculus and Differential Equations	16	Engineering Analysis	1
Chemistry	8	Surveying	3
Basic Science Elective	3-4	Engineering Design Graphics	3
Physics	8	Engineering Mechanics	12
Humanities and Social Sciences	12	Structures	6
Written & Oral Communications	9	Hydrology/Hydraulics	4
Economics and Statistics	5	Engineering Science Elective	3
Engineering Design	3	Construction Engineering	3
		Environmental Engineering	3
		Geotechnical Engineering	3
		Transportation Engineering	3
		Senior Design	5
		Engineering Electives	15
		<b>TOTAL</b>	<b>128</b>

## PROFESSIONAL ELECTIVES

The scope of civil engineering is demonstrated by a review of the professional elective courses available. These include the following:

- Advanced Engineering Hydrology
- Advanced Mechanics of Solids
- Advanced Survey Computations
- Air Pollution Control
- Building Information Modeling in Construction
- Closed Conduit Hydraulics
- Cold Regions Engineering
- Construction Estimating & Bidding Practice
- Construction Project Planning & Scheduling
- Design of Masonry Structures
- Design of Wood & Timber Structures
- Earth & Foundation Engineering
- Fluid Dynamics
- Geotechnical Structures
- Groundwater Supply & Remediation
- Hazardous Waste Management
- Hazardous Waste Treatment
- Heavy Construction Equipment & Methods
- Highway Geometric Design
- Highway Pavements
- Individual Problems
- Internship
- Legal Principles in Surveying
- Natural Treatment Systems
- Photogrammetry
- Project Design in Surveying
- Public Land Survey System
- Public Transit System Design
- Reinforced Concrete Design
- Steel Design
- Survey Data Collection/Analysis
- Traffic Engineering
- Transportation Planning
- Undergraduate Research/Creative Activity Instruction
- Undergraduate Research/Creative Activity
- Water Chemistry for Environmental Engineers



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