



Department of Civil and Construction Engineering Undergraduate Programs

What is Civil and Construction Engineering?

Special points of interest:

- Interviews with 4 current WMU students
- Student activities and student life in the College of Engineering and Applied Sciences, on WMU campus, and around Kalamazoo area.



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Civil and Construction Engineering is a professional engineering discipline that deals with the design, construction, and maintenance of the physical and natural built environment. It is generally broken into several sub-disciplines, which are described below in alphabetical order.

- Coastal Engineering is the study of processes ongoing at the shoreline and construction within the coastline zone. It involves aspects of near-shore oceanography, marine geology, and civil engineering often directed at erosion of coasts or providing access.

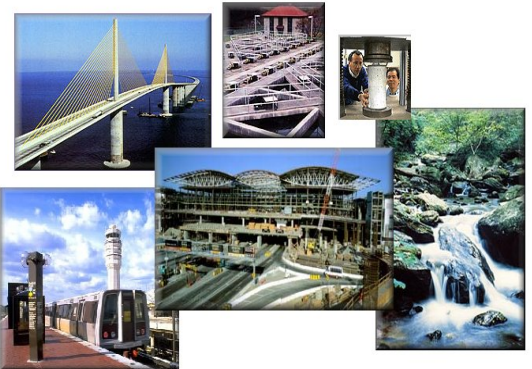
- Construction Engineering/Project Management involves planning and execution of the designs from engineers. Construction management tends to take on a role that is more business-like, to include: drafting, reviewing contracts, evaluating logistical operations, and closely monitoring prices of supplies.

- Environmental and Water Resource Engineering deals with the treatment of chemical, biological, and thermal waste, the purification of water and air, and the remediation of contaminated sites, due to prior waste disposal or accidental contamination. Environmental concerns in relation to groundwater have spawned a new area of study called geoenvironmental engineering, where biology and chemistry are important.

- Geotechnical Engineering is concerned with the rock and soil that civil engineering systems are supported by. Knowledge from fields of geology, material science and testing, mechanics, and hydraulics are applied to safely and economically design foundations, retaining walls, and similar structures.

- Materials Engineering involves creating construction materials with broad applications, such as Portland Cement Concrete, hot mix asphalt concrete, and metals such as aluminum and steel. Current research areas focus around increased strength, durability, workability, and reduced cost.

- Structural Engineering deals with the design of structural systems with the purpose of supporting and resisting various loads. It can also play an essential role in designing machinery.



Structures, materials testing, transportation, and hydrology are a few disciplines.

- Transportation Engineering involves moving people and goods safely, efficiently, and in a manner conducive to a vibrant community. It involves specifying, designing, constructing, and maintaining transportation infrastructure (streets, canals, highways, rail systems, airports, and mass transit).

The civil and Construction engineering profession is constantly evolving. Consequently, there are new subspecialty areas that develop based on the societal need. Some of these are described below.

- Real-time Monitoring is monitoring and measuring environmental developments with technology and communications systems that provide time-relevant information to the public in an easily understood format.

- Stress Analysis determines the stress in materials and structures subjected to static or dynamic forces or loads. It involves determining the type of loads acting on a structure—tension, compression, shear, torsion, bending, or a combination of these.

- Health Monitoring is a new approach to collect data about critical structural elements, using sensors to provide indication when some anomalies are detected in a structure. It includes detection of changes in chemical and electrical properties of materials related to deterioration, corrosion, fatigue, pH, humidity, and also physical properties, which includes loadings, stresses, strains, cracks, etc.

Why Study at Western

Marji Vanhoorelbeke is a fourth year civil engineering student at WMU. She chose to attend WMU because of its renowned engineering program and the brand new campus for the College of Engineering and Applied Sciences. She made the decision to attend during her senior year of high school, choosing civil engineering because of her ability to problem solve and her understanding of math and science. She also chose this field because of its wide range of opportunities to choose from after graduation.

Marji said that it is “very exciting to be involved in a field that deals with the latest technology. Civil engineering helps improve the daily life of everyday people by making the things around them more convenient and efficient.”



Marji has also pointed out that with such small class sizes, it is easier to connect with the professors on a personal level. This makes it easier to ask questions during class and to get help when needed. Students are also close with other students because they tend to stay in the same classes with each other throughout their college career. This helps make labs and group projects more efficient.

Marji is making the best of her college experience by involving herself in student activities. She is part of the American Society of Civil Engineers (ASCE), where they are building a concrete canoe for a competition. She is also President of the Society of Women Engineers (SWE).

She said, “My experience at WMU has been really great and I am excited to begin my career in civil engineering.”

Mike Peake is a junior in the Civil Engineering program. He enjoys working with other students in the program because he feels they are down-to-earth, friendly young men and women. The students are all dedicated to hard work and getting good grades, but also know how to have a good time! Mike said, “The people you meet is not limited to students in the same discipline. Because the engineering building includes all disciplines of engineering, you can meet and become friends with many other students that have the same interests as you.”



Mike also likes the resources available within the engineering building. Students will sometimes be at the building all day, so it is nice to have the cafeteria downstairs. They have a variety of food and drinks to satisfy any student’s cravings. Besides the food, there are also the labs used as a part of class and the large computer lab, equipped with new computers and updated with the latest software.

The classrooms are a good size and have appropriate technology to be able to optimize learning. The projection screens are large and there are whiteboards to write on, so it is easy to take notes from anywhere in the room. Instead of having individual desks with each chair, the desks are a continuous table, with comfortable, rolling chairs behind them. There is more room to take notes and complete exams. “The only down side is I miss civilization sometimes! It would have been nice to have had the room to build the engineering building on main campus so we could interact with more people.”

Allison Porrett is a junior in the Civil Engineering program. She has been interested in math, science, and art since she was a little kid and was always encouraged to pursue a job along the path of architecture. When she reached high school, she job shadowed an architect and then met a civil engineer whose job was like that of an architect, but more on the analytical side. She realized it would be the perfect job for her!



It did prove to be the correct career path for Allison because she loves it here at WMU and likes the multiple choices she will have upon graduation. Allison is from the Detroit-Metro area, so it was important to her to stay somewhat close to her family. She also looked for a University with an atmosphere that was conducive to learning and that was enjoyable. Western has the new College of Engineering building, so it was a great place to start a new chapter in her life. She likes the fact that Western is always improving itself for the students and offers the latest technology and information.

Allison has formed a tight bond with the other engineering students through classes and various societies. She is the secretary of the Society of Women Engineers and a member of the American Society of Civil Engineers concrete canoe team. After graduating, she plans on working with a company specializing in either structural or environmental engineering. Eventually, she would also like to receive a Master’s Degree, possibly even here at Western!

Britney Richmond is a junior in the civil engineering program. She has been fascinated with structures and buildings since she was a young child. She always said to herself, “I want to be an architect!” During high school that thought changed because she learned about the profession of Civil Engineering, a growing field for women. While deciding on Universities, she looked into degrees offered, location, scholarships available, and size. Western fit all of these needs.

The College of Engineering and Applied Sciences is part of the Business, Technology, and Research park, making it easier to network opportunities between companies and students. Britney said, “On main campus I feel like a small fish in the ocean, but at Parkview Campus, I see a lot of familiar faces, feeling more at home.” She also pointed out that she gets the best of both atmospheres by being part of a large University, but in the College of Engineering it feels like a smaller university or community college. After growing up in a small town, it has been an easy and great transition for her.



Britney is more than happy with her choice. She has met a lot of new people with common interests as herself. She has been an active member of ASCE by being secretary of the Concrete Canoe Team. She has also had the opportunity to travel within the U.S. to share a service-learning design project targeting middle school students. Once graduating, Britney plans to either pursue a career in structural engineering or go straight to graduate school to obtain an M.S. in structural engineering, architecture, or land planning. The fields are all closely related and she is glad she chose to start with Civil Engineering here at WMU.

Facilities at WMU

Civil and Construction engineering is a very hands-on program. The use of labs along with a lecture provide an optimum learning experience for the students. The Civil and Construction Engineering Department at Western Michigan University is well equipped with up-to-date laboratories, equipment, along with tools to give the students practical and applied perspective of the profession.

In this field, it is important to know how to design concrete mix and actually test and mix it. To some it may look like mixing dirt and water, but to

civil engineers, it is a science and an art! There are two labs in the building that are used for measuring and mixing concrete. Students are required to design their own mix, make it, and test cured cylinders of the concrete. These two labs are also used to analyze soil, and as a facility for surveying equipment.

The other main lab used by undergraduate students is the Civil Engineering Measurements lab. In this lab, students are taught to build circuits on breadboards with resistors and to analyze them. Civil engineering is applied even more when they are asked to apply sensors, solder

wires, and analyze strain, forces and moments on an aluminum beam.

For the design students, a new capstone design lab was made for Civil and Construction majors. It is mostly used for senior design projects. There is also the Intelligent Transportation lab and the Construction Systems lab. These are used by graduate students for research and work more than undergrads.

The main lab used by all engineering students is the computer lab. It is updated with the newest software programs, which are needed for student projects and assignments.



Students performing a soil mechanics lab.



The surveying lab provides great field and teamwork skills.

Practical Training Opportunities

Cooperative education at WMU is an optional program that integrates classroom study and practical work experience. The work performed by a student must provide educational opportunities consistent with each student's course of study. A student's overall education is enriched, as is their value for future employers.

Employers are asked to provide a job description detailing the tasks to be performed by a student. They also provide an on-site supervisor to oversee the day-to-day work of the co-op student and to fill out an evaluation form so it can be recorded as academic credit. It looks great on a resume and

increases the chances for students to be hired after graduation.

The College of Engineering and Applied Sciences is located within a larger development area call the Business, Technology, and Research Park. This includes engineering and/or engineering-related firms, which students are encouraged to apply and work at. There are many other civil and construction engineering firms in and around the Kalamazoo and Portage area that are currently seeking students. Not only is this a great opportunity for students to get real-life experience, but they also get paid very well! These firms are also flexible with working hours

for students.

There are also opportunities for students to work as a graduate assistant for research projects. This is when students work for professors in their field. It is a good way for students to become closer to their professors and learn more about their field.

Brandon Widmyer likes working for his professor because it gives him the chance and opportunity to learn more specifics about his field than what can be taught in the classroom. It is a hands-on experience that he can take with him to his future employer. Phil Clapp is the supervisor for the students that co-op with MDOT (Michigan Department of Trans-

portation). He said the assistance from the students working in the field is the most beneficial reason to hire students later on after graduation. If the state has an opening, students who have worked a co-op or interned with MDOT have a much better chance of getting hired after graduation than students who have not worked there before.

Andy Brooks has been an intern with MDOT for two years. He said that the benefit of being an intern/co-op is it gives you the opportunity to get hands-on experience in your field. It also allows you to meet people to use as future contacts and possibly references. Andy works about 20 hours during the school year, and 40 or more hours in the summer.

Student Activities

There are many activities a student can become involved in. In the College of Engineering and Applied Sciences alone, there are more than 25 student organizations, many of which are affiliated with professional societies.

In the Civil and Construction Engineering Department there are four organizations: American Society of Civil Engineers (ASCE), Associated General Contractors (AGC), National Association of Women in Construction (NAWC), and the Institute of

Transportation Engineers (ITE). There is also the Society of Women Engineers, which is open to all disciplines of engineering.

Some of the engineering fraternities and honor societies include Tau Alpha Pi, Tau Beta Pi, and Theta Tau. For a full list of all engineering student organizations go to www.wmich.edu/engineer/student-organizations.htm.

As a member of these organizations, a student can join in competitions and go to conferences around the state. It is a great



Members of ASCE with the completed concrete canoe.

way to stay involved in the community, keep updated on the latest technology, and they usually provide free food at the meetings! Meetings are also not mandatory, it just depends on how involved a student chooses to be. Some

organizations may require a small fee and application if a student wants to become a member of the professional society as well as the student chapter.

Western Michigan University



The Civil and Construction Engineering undergraduate degree programs are accredited by:

ABET, Inc.

111 Market Place, Suite 1050
Baltimore, MD 21202-4012

Program Objectives

Civil engineering is changing to respond to the national needs and goals. These changes are incorporated in our programs to include globalization concepts, sustainability requirements, emerging technology, and increased complexity with the corresponding need to identify, define, and solve problems at the boundaries and integrated with other disciplines. As always, civil engineers are and will be responsible for protecting public safety, health, and welfare



Department of Civil and Construction
Engineering (CCE)
College of Engineering and Applied Sciences
Western Michigan University
1903 W. Michigan Ave.
Kalamazoo, MI 49008-5316

Phone: 269.276.3210

Fax: 269.276.3211

Information regarding admissions, housing, financial aid, etc., can be found at the following link www.wmich.edu/admissions.

If you would like to schedule a tour of the engineering campus or talk to an advisor, please e-mail to: CCE-programs@wmich.edu or contact College recruiting Office at (269) 276-3270.

Brochure prepared by: Stephanie Regis

www.wmich.edu/CCE



Student Life

There are many activities a student can participate in and outside of the engineering college. WMU has over 300 organizations to offer to students and has activities to participate throughout the year. The city of Kalamazoo also has many things to offer to students and residents of the city.

In the beginning of every school year, WMU holds the Bronco Bash. Hundreds of organizations, fraternities, sororities, club sports, etc., set up stations so that students can walk around and become familiar with what WMU has to offer. They give away free prizes and thousands of students attend each year. It is a great way to get involved in activities and to get to know WMU's campus along with interacting with other WMU students from all walks of life

For engineering students, WMU created a program called FYEE (First Year Engineering Experience). It is for engineering stu-

dents only who are placed in small learning communities with other engineering students. They share the same career interests and have the same core classes together, resulting in formation of study groups, friendships and academic support. For more information go to <http://www.wmich.edu/step/FYEE-details.htm>.

Miller Auditorium has entertainment events all year long. Students get a great discount on tickets. They also have a Miller Movie night where student tickets are only \$1! They show big title movies when they come out on DVD. They also show musicals, plays, comedians, and more. The members of the Campus Activities Board (CAB) are the students responsible for providing the community with the entertainment and acts.

The Bernhard Center is another area to find many students. There are several restaurants, tables, and a computer center in

the basement. In the floors above are the bookstore and many meeting rooms that hold events, including a career fair, during the school year.

There is a wonderful Student Recreation Center, which has an indoor track, several courts, and a great weight room. It is also where most IM sports are held. It is the perfect way to keep in shape and keep off the freshman 15!

Downtown Kalamazoo is also a great place for students to become familiar with as well. There are great and unique restaurants along with brew pubs, the new Rave Theater, Kalamazoo Institute of Arts, the Kalamazoo Valley Museum, and much more. It is always a busy place where a mix of students and locals of all ages are welcome! Kalamazoo is also only forty minutes from Lake Michigan beaches and surrounded by ski areas from thirty minutes to just a few hours away.

