

# BACHELOR OF ENGINEERING IN CIVIL ENGINEERING 4+1 GRADUATE TRACK

## Introduction

Civil engineers are responsible for planning, designing, and supervising construction of infrastructure including buildings, bridges, highways, levees, dams, drinking water and wastewater treatment facilities, ports, railroads, airports, etc. The undergraduate program in Civil Engineering (CE) at YSU offers a Bachelor of Engineering (B.E.) in Civil Engineering degree through an ABET accredited curriculum designed for students to graduate in four years. Students receive a fundamental background in math and science to prepare for core courses in civil engineering. They not only learn from faculty lectures, but also gain real-world experience through participating in co-ops/internships, undergraduate research, laboratory activities, and building concrete canoe and steel bridge from scratch and competing in regional and national competitions.

Civil engineers make the world a better place. With that philosophy in mind, we educate our students to undertake challenging civil engineering jobs and leadership roles in building our community and infrastructure. At the time of graduation, our students are well-prepared to enter the workforce in all five sub-disciplines of civil engineering including structural, transportation, geotechnical, water resources, and environmental. Faculty members have the highest degree in their respective sub-disciplines and the professional engineering licensure that requires them to remain active in the profession through continuing education and research.

In order to support ASCE's 'Bachelor+30' initiative to facilitate lifelong learning and to improve knowledge base of future civil engineers, an accelerated 4+1 BE/MSE in Civil Engineering track is being offered. Students already in the YSU Civil Engineering undergraduate program can apply for admission into this accelerated track after completing 78 semester hours with a GPA of 3.3 or higher. After being admitted into the accelerated track, students will be allowed a maximum of nine semester hours of graduate coursework to be double-counted towards both Bachelor's and Master's degrees upon approval by the Graduate Program Director. An additional 6000 level graduate coursework of three semester hours can be completed as an undergraduate and used exclusively for graduate credit. This will allow students to obtain a graduate degree with 30 semester hours or more within a year after the Bachelor's degree.

For more information about the 4+1 BE/MSE in Civil Engineering track, please contact:

**Anwarul Islam, PhD, PE, F.ASCE**  
Professor and Program Coordinator  
Civil Engineering  
2415 Moser Hall  
One University Plaza  
Youngstown, OH 44555  
Tel: (330) 941-2421  
Fax: (330) 941-3265  
Email: aaislam@ysu.edu

## Bachelor of Engineering program

COURSE	TITLE	S.H.
<b>First Year Requirement - Student Success</b>		
YSU 1500	Success Seminar	1-2
or YSU 1500S	Youngstown State University Success Seminar	
or HONR 1500	Intro to Honors	

### General Education Requirements

ENGL 1550	Writing 1	3-4
or ENGL 1549	Writing 1 with Support	
ENGL 1551	Writing 2	3
CMST 1545	Communication Foundations	3
Mathematics requirement (met with MATH in major)		
Select one Arts and Humanities:		3
PHIL 2625	Introduction to Professional Ethics	
PHIL 2626	Engineering Ethics	
PHIL 2628	Business Ethics	
Arts and Humanities (Select 1 course)		3
Natural Science (met with CHEM and PHYS required for major)		
Social Sciences (6 S.H., Select 2 courses)		6
General Education Electives (6 S.H., Select 2 courses)		6
<b>Civil Engineering Courses</b>		
CEEN 2601	Statics	3
CEEN 2602	Strength of Materials	3
CEEN 2602L	Strength of Materials Lab	1
CEEN 2610	Surveying	3
CEEN 2610L	Surveying Laboratory	1
CEEN 2660	Computer Aided Design and Drafting	2
CEEN 3716	Fluid Mechanics	3
CEEN 3716L	Fluid Mechanics Lab	1
CEEN 3717	Hydraulic Design	4
CEEN 3720	Transportation Engineering	3
CEEN 3736	Fundamentals of Environmental Engineering	3
CEEN 3749	Structural Analysis 1	3
CEEN 3749L	Structural Analysis 1 Lab	1
CEEN 4812	Construction Management	3
CEEN 4863	Integrated Design Project	3
CEEN 4881	Geotechnical Engineering	3
CEEN 4881L	Geotechnical Lab	1
CEEN 5855	Reinforced Concrete Design	3
CEEN 5856	Steel Design	3
CEEN Elective 1: Must be a design elective. Select one course.		3
CEEN 4835	Highway Design	
CEEN 5820	Pavement Material and Design	
CEEN 5837	Environmental Engineering Design	
CEEN 5869	Design of Air Pollution Control Systems	
CEEN 5882	Foundation Engineering	
CEEN 5883	Bridge Engineering	
CEEN Electives 2 & 3: Select two courses.		6
CEEN 3751 & 3751L	Water Quality Analysis and Water Quality Analysis Lab	
CEEN 4835	Highway Design	
CEEN 4879	Civil Engineering Analysis	
CEEN 5820	Pavement Material and Design	
CEEN 5829	Civil Engineering Materials - Concrete	
CEEN 5832	Natural Systems Engineering	
CEEN 5836	Environmental Water Chemistry	
CEEN 5837	Environmental Engineering Design	
CEEN 5849	Structural Analysis 2	
CEEN 5869	Design of Air Pollution Control Systems	
CEEN 5880	Advanced Hydraulics	
CEEN 5882	Foundation Engineering	
CEEN 5883	Bridge Engineering	
CEEN 5884	Solid and Hazardous Waste Management	
<b>General Engineering Courses</b>		

ENGR 1500	Engineering Orientation	1
ENGR 1550	Engineering Concepts	2
ENGR 1560	Engineering Computing	2
<b>Engineering Fundamentals Courses</b>		
MECH 2641	Dynamics	3
ISEN 2624	Engineering Economy	3
<b>Mathematics/Statistics Courses</b>		
MATH 1571	Calculus 1	4
MATH 1572	Calculus 2	4
MATH 2673	Calculus 3	4
MATH 3705	Differential Equations	3
ISEN 2610	Engineering Statistics	3-4
or STAT 3743	Probability and Statistics	
<b>Basic Science Courses</b>		
CHEM 1515	General Chemistry 1	3
CHEM 1515L	General Chemistry 1 Laboratory	1
PHYS 2610	General Physics 1	4
GEOL 2611	Geology for Engineers	3
or BIOL 2601	General Biology 1: Molecules and Cells	
CHEM 1516 & 1516L	General Chemistry 2 and General Chemistry 2 Laboratory	4
or PHYS 2611	General Physics 2	
<b>Total Semester Hours</b>		<b>128-131</b>

#### 4+1 BE/MSE in civil engineering

**Students already in the YSU Civil Engineering undergraduate program can apply for admission into the 4+1 BE/MSE in Civil Engineering track after completing 78 semester hours with a GPA of 3.3 or higher. After being admitted into this accelerated track, students will be allowed a maximum of nine semester hours of graduate coursework to be double-counted towards both Bachelor's and Master's degrees upon approval by the Graduate Program Director. An additional 6000 level graduate coursework of three semester hours can be completed as an undergraduate and used exclusively for graduate credit. This will allow students to obtain a graduate degree with 30 semester hours or more within a year after their Bachelor's degree.**

#### Dual credit courses

COURSE	TITLE	S.H.
CEEN 5820	Pavement Material and Design	9-12
CEEN 5829	Civil Engineering Materials - Concrete	
CEEN 5832	Natural Systems Engineering	
CEEN 5836	Environmental Water Chemistry	
CEEN 5837	Environmental Engineering Design	
CEEN 5849	Structural Analysis 2	
CEEN 5855	Reinforced Concrete Design	
CEEN 5856	Steel Design	
CEEN 5869	Design of Air Pollution Control Systems	
CEEN 5880	Advanced Hydraulics	
CEEN 5882	Foundation Engineering	
CEEN 5883	Bridge Engineering	
CEEN 5884	Solid and Hazardous Waste Management	
CEEN 6956	Advanced Soil Mechanics	
CEEN 6958	Structural Dynamics	

Select 3 of these courses at 5800 level, as only 3 courses can be double-counted. You can select an additional 6000 level course that will only be counted towards the Master's degree.

CEEN 6967	Biological Treatment Processes	
CEEN 6973	Watershed Modeling	
CEEN 6977	Hydrology	
CEEN 6979	Water Quality Modeling	

## FOUR-YEAR PLAN

Year 1		
Fall		S.H.
YSU 1500	Success Seminar	1
ENGL 1550 or ENGL 1549	Writing 1 or Writing 1 with Support	3-4
CHEM 1515	General Chemistry 1	3
CHEM 1515L	General Chemistry 1 Laboratory	1
ENGR 1500	Engineering Orientation	1
ENGR 1550	Engineering Concepts	2
MATH 1571	Calculus 1	4
GER AH-1: Arts & Humanities Elective		3
PHIL 2625 or PHIL 2626  or PHIL 2628	Introduction to Professional Ethics or Engineering Ethics or Business Ethics	
<b>Semester Hours</b>		<b>18-19</b>

Spring		
ENGL 1551	Writing 2	3
ENGR 1560	Engineering Computing	2
MATH 1572	Calculus 2	4
CMST 1545	Communication Foundations	3
GER AH-2: Arts & Humanities Elective		3
<b>Semester Hours</b>		<b>15</b>

Year 2		
Fall		
MATH 2673	Calculus 3	4
CEEN 2610	Surveying	3
CEEN 2610L	Surveying Laboratory	1
CEEN 2601	Statics	3
PHYS 2610	General Physics 1	4
<b>Semester Hours</b>		<b>15</b>

Spring		
MATH 3705	Differential Equations	3
CEEN 2602	Strength of Materials	3
CEEN 2602L	Strength of Materials Lab	1
GEOL 2611 or BIOL 2601	Geology for Engineers or General Biology 1: Molecules and Cells	3
CEEN 2660	Computer Aided Design and Drafting	2
PHYS 2611 or CHEM 1516 <b>and</b> CHEM 1516L	General Physics 2 or General Chemistry 2 <b>and</b> General Chemistry 2 Laboratory	4
<b>Semester Hours</b>		<b>16</b>

Year 3		
Fall		
CEEN 3716	Fluid Mechanics	3
CEEN 3716L	Fluid Mechanics Lab	1
CEEN 3720	Transportation Engineering	3
CEEN 3736	Fundamentals of Environmental Engineering	3
CEEN 3749	Structural Analysis 1	3
CEEN 3749L	Structural Analysis 1 Lab	1

ISEN 2610 or STAT 3743	Engineering Statistics or Probability and Statistics	3-4
<b>Semester Hours</b>		<b>17-18</b>

Spring		
CEEN 3717	Hydraulic Design	4
CEEN 4881	Geotechnical Engineering	3
CEEN 4881L	Geotechnical Lab	1
CEEN Elective 1: CE Elective		3
GER-1: General Education Elective		3
GER-2: General Education Elective		3
<b>Semester Hours</b>		<b>17</b>

Year 4		
Fall		
CEEN 4812	Construction Management	3
CEEN 5855	Reinforced Concrete Design	3
CEEN 5856	Steel Design	3
CEEN Elective 2: CE Design Elective		3
ISEN 2624	Engineering Economy	3
<b>Semester Hours</b>		<b>15</b>

Spring		
CEEN 4863	Integrated Design Project	3
MECH 2641	Dynamics	3
CEEN Elective 3: CE Elective. May substitute with approval of CE Program Coordinator.		3
GER SS-1: Social Science Elective		3
GER SS-2: Social Science Elective		3
<b>Semester Hours</b>		<b>15</b>
<b>Total Semester Hours</b>		<b>128-130</b>

## Program Educational Objectives

The Civil Engineering program will provide graduates with the foundation of knowledge and skills necessary for productive and rewarding careers. The program prepares graduate to achieve the following educational objectives within a few years after graduation:

1. Perform essential functions on multidisciplinary teams in their professional careers in civil engineering.
2. Demonstrate necessary communication, management, leadership, and interdisciplinary technical skills to excel in engineering and non-engineering sectors.
3. Continue their intellectual, social, and professional growth through lifelong learning and advanced degrees.
4. Obtain professional engineering licensure.

## Student Outcomes

The YSU undergraduate program in Civil Engineering adopted the following student outcomes that prepare its graduates to attain the program educational objectives listed above. At the time of graduation, the program graduates should have:

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.