2017-2018

Civil Engineering
Guide Book

UNIVERSITY OF
EVANSVILLE®
EST 1854

CIVIL ENGINEERING PROGRAM GUIDE BOOK 2017-18

Table of Contents

Web Page

www.evansville.edu/majors/civilengineering

The civil engineering program at the University of Evansville (UE) is accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc., www.abet.org, telephone 410-347-7700.

Revised 2017

CIVIL ENGINEERING AT THE UNIVERSITY OF EVANSVILLE

Civil engineering is the oldest engineering profession, dedicated to improving the quality of life in a sustainable manner. Community, societal, and environmental needs are met through the planning, design, construction, and maintenance of public and private facilities. Civil engineers apply their technical knowledge and skills to diverse projects including stadiums, buildings, dams, highways, bridges, airports, foundations, storm water management systems, and facilities for environmental remediation and compliance. Civil engineering career opportunities exist in industry, government, and the private sector. Practice areas include design, construction, project management, consulting, research, and teaching.

In accordance with the ABET accreditation criteria, the faculty, in cooperation with the Civil Engineering Advisory Council, have established program educational objectives and outcomes for students majoring in civil engineering at the University of Evansville. The purpose of these is to ensure that graduates of the program are adequately prepared to enter the practice of civil engineering. Recognizing that the performance of students and graduates is an important consideration in the evaluation of an institution, a system of ongoing assessment is conducted by the faculty to continuously improve the effectiveness of the program.

Civil Engineering Program Educational Objectives and Student Outcomes

"Graduates" are defined as civil engineering alumni within 3-5 years of graduation.

Objective 1 Graduates will be actively engaged in a professional career as a civil engineer or pursuing advanced study.

Objective 2 Graduates will understand professional practice issues and demonstrate a commitment to professional licensure and continuing education.

Objective 3 Graduates, guided by the principles of sustainable development and global interconnectedness, will understand how civil engineering projects affect society and the environment.

"Students" are defined as civil engineering students at the time of graduation from the University of Evansville. Student will have

Outcome a: an ability to apply knowledge of mathematics, science, and engineering.

Outcome b: an ability to design and conduct experiments, as well as to analyze and interpret data.

Outcome c: an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

Outcome d: an ability to function on multidisciplinary teams.

Outcome e: an ability to identify, formulate, and solve engineering problems.

Outcome f: an understanding of professional and ethical responsibility.

Outcome g: an ability to communicate effectively.

Outcome h: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

Outcome i: a recognition of the need for, and an ability to engage in lifelong learning.

Outcome j: a knowledge of contemporary issues.

Outcome k: an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The civil engineering undergraduate program is designed to provide students with a rigorous, thorough understanding of mathematics, basic sciences, humanities, social sciences, communication skills, and the civil engineering discipline. The curriculum prepares students to meet present and future challenges in the profession and to develop insights into economical, physical, social, and political constraints affecting the engineering decision-making process. Today's engineers must be adept at working in a global marketplace. To assist engineers in meeting that challenge, the University of Evansville provides students with an opportunity for an international study abroad experience at Harlaxton College in Grantham, England.

Students follow a curriculum that provides a well-rounded fundamental understanding of civil engineering concepts in accordance with current practice. This is achieved through a set of required core courses in construction materials, structural engineering, hydraulic engineering, geotechnical engineering, surveying, transportation engineering, and environmental engineering. In addition, the curriculum provides options for students to take upper division elective courses in structural analysis and design, engineering economics, engineering hydrology, environmental engineering, and special topics in civil engineering.

Civil engineers are problem solvers, and the engineering curriculum allows students to develop the skills necessary to identify, formulate, and solve engineering problems. Components of professional and ethical responsibility are incorporated in most civil engineering courses to prepare students for professional practice.

Students are introduced to engineering design in the fall of their freshman year in Engineering 101. The small number of freshmen in each section of this course facilitates close interaction with a faculty member who is also the students' advisor. Past freshmen projects include the design of balsa wood bridges and paper columns that are load tested in the laboratory.

After students gain an understanding of fundamental concepts, design education is continued during the junior year through a variety of design projects such as a concrete baseball bat in Civil Engineering 331 and an elevated steel walkway in Civil Engineering 341. Design is heavily emphasized in the Civil Engineering 400-level required and elective courses and is developed through the use of both individual and team projects. Students use 3-D graphics software in the design process.

All civil engineering students are required to take the Fundamentals of Engineering exam. Although passing the exam is not required for graduation, it is the first step toward licensure as a professional engineer.

The civil engineering curriculum includes a good balance of course work in basic mathematics, science, and engineering topics. The engineering topics are divided into approximately two-thirds engineering science and one-third engineering design. The allocation between analysis and design prepares civil engineering graduates to enter the practice of engineering or further their education in graduate school. Student chapters of the American Society of Civil Engineers (ASCE), Chi Epsilon (civil engineering honor society), and the Society of Women Engineers (SWE) are sponsored by the department to support and encourage the professional development of the student.

The University of Evansville is an intermediate size, private university with a strong emphasis on undergraduate education. UE is a liberal arts and sciences university. High quality education that emphasizes both the liberal arts and specific professional degree programs, such as engineering, business, education, and nursing, is offered. This emphasis allows engineering students to obtain a quality, well-rounded education. Engineering faculty interact with their colleagues in humanities, fine arts, social sciences, and other professional schools. The University's size of about 2,500 full-time students and its large variety of degree programs with over 80 options gives it a dynamic combination of close, faculty-student interaction and diversity.

The civil engineering curriculum is typical of most EAC-ABET accredited colleges and universities. What differentiates UE's civil engineering program from larger university programs is the following:

- Students have the opportunity to study abroad at Harlaxton College in England and still complete their civil engineering degree in eight semesters.
- Class sizes are small, allowing for close personal contact between students and professors and for design project opportunities.
- The faculty is dedicated to teaching, which gives the program great flexibility. Course content is kept up-to-date, and innovative instruction techniques, such as multidisciplinary team projects, active learning, and problem-based learning, are used in the classroom.
- All civil engineering laboratory equipment is dedicated to serving undergraduate engineering students. Labs are taught by professors, not graduate students.
- Emphasis is placed on preparing students to enter the practice of civil engineering upon graduation.
- A personalized co-op program, featuring alternating terms of paid, full-time professional employment and university attendance is available.
- The University's size and diversity facilitates the ability of engineering students to interact with students and faculty in other programs, thus allowing free intellectual and social interchange.
- Students are mentored to develop a love of learning and discovery that will motivate them to be lifelong learners.

CIVIL ENGINEERING DEGREE PROGRAM

FIRST YEAR	
Fall	**Spring**
Calculus I	Calculus II
Principles of Chemistry	Calculus Physics I
Introduction to Engineering	Science Elective
First-Year Seminar (FYS 112)	General Education
Foreign Language 111	Foreign Language 112

During the first year of the civil engineering program, students take two semesters of calculus which cover differentiation and integration with applications of each. Calculus II contains a brief introduction to differential equations. There is one semester of chemistry which assumes that students have had a high school chemistry course as a prerequisite. The first semester of calculus-based physics is taken in the spring of the freshman year; it covers mechanics, thermodynamics, and sound. First-Year Seminar 112 emphasizes writing and includes a range of global and interdisciplinary topics. Students will encounter challenging texts, perform critical analysis, and engage in expository writing.

The first semester of the freshman year includes the Introduction to Engineering course (Engineering 101). This course meets three times a week and is taught by the students' academic advisor. Students spend the semester designing and building a project in addition to learning team skills, presentation skills, and design and analysis software. A recent project was the design, construction, and evaluation of a variety of small scale bridges. The bridges were constructed of balsa wood and load tested to failure. Student teams made PowerPoint® presentations to their peers.

Students take a science elective that is selected from geology, biology, and environmental science courses. The goal of the science elective is to provide students with breadth in their engineering education.

A year of foreign language may be taken in the freshman year for students who come into the program without the equivalent of one year of college level foreign language proficiency. The student with foreign language proficiency may take general education electives in lieu of foreign language.

SECOND YEAR	
Fall	**Spring**
Calculus III	Differential Equations
Calculus Physics II	Dynamics
Statics	Mechanics of Materials
Surveying	Construction Management
General Education Elective	Free Elective
Co-op Orientation	General Education Elective
Health and Wellness	

During the first semester of the second year, civil engineering students complete the calculus sequence with Calculus III. This course covers some advanced topics including infinite series, multiple integrals, and line and surface integrals. The calculus sequence is followed by a course in differential equations and linear algebra. This course includes standard solution methods, difference equations, numerical techniques, some nonlinear methods, and an introduction to linear algebra. Calculus Physics II is taken in the first semester of the sophomore year and covers electricity, magnetism, optics, and an introduction to nuclear physics. As an alternative, students may elect to take an organic or inorganic chemistry course instead of Calculus Physics II.

Sophomore civil engineering students take Statics (rigid body mechanics) during the fall semester. In this course, students learn basic problem-solving strategies to determine forces, moments, and torques required to keep a component or component assembly in equilibrium. Students also obtain their first exposure to trusses typically used in steel structures.

During the fall semester civil engineering students take an introductory course in surveying where they learn to use sophisticated surveying equipment. Students generate planimetric and topographic maps using data collected in the field with total stations and AutoCAD software as a graphics tool.

During the spring semester, students take Dynamics. In this course, students study the forces necessary to move and accelerate components. Dynamics introduces a variety of methods, including energy balances, to obtain solutions to problems.

Mechanics of Materials studies how materials deform under applied loads and is a prerequisite for structural engineering courses.

Construction Management covers general principles of project management, construction safety, contracting, planning and schedules, cost estimating, and project economics. Project scheduling and cost estimation software is introduced.

By the end of the sophomore year, students have completed many of the courses that are fundamental to an understanding of engineering design and analysis. They have developed an approach for solving engineering problems and have a basic understanding of how engineering components behave. Just as important, they have begun the process of obtaining the broad education necessary to understand the impact of engineering solutions in a global context.

THIRD YEAR	
Fall	**Spring**
Engineering Mathematics	Design of Steel Structures
Engineering Elective	Soil Mechanics and Soil Behavior
Structural Analysis	Environmental Engineering I
Fluid Mechanics	Transportation Engineering
Hydraulics Laboratory	Construction Materials
General Education Elective	Soil Mechanics Laboratory

In the junior year, civil engineering students begin to concentrate in their major. They take required core courses to expand the breadth of their understanding of civil engineering.

Applied Engineering Mathematics introduces students to applied linear algebra and probability and statistics.

An engineering elective allows students to select an electrical circuits, material science, thermodynamics, or programming course.

Structural Analysis involves the analysis of loaded beams, frames, and trusses for internal forces and displacements. Structural analysis software is introduced and applied. The course prepares students for structural design courses in structural steel and reinforced concrete.

Fluid Mechanics introduces civil engineering students to the physical properties of fluids, fluid statics, and fluid flow with applications in pipe systems and open channel flow.

The Hydraulics Laboratory course allows students to study properties of fluids and the application of continuity, energy, and momentum principles by performing numerous laboratory experiments.

During the spring semester, students take Design of Steel Structures using AISC and ASCE code requirements. Design projects, such as walkways and auditoriums, are completed by students.

Soil Mechanics and Soil Behavior introduces the student to soils and rocks as civil engineering materials. Concurrently, students take the Soil Mechanics Laboratory where tests such as Atterberg Limits, permeability, Proctor compaction, consolidation, and direct shear are performed.

The first course in Environmental Engineering offers the student an introduction to a variety of topics including global warming, air pollution, water supply and treatment, groundwater contamination, hazardous and solid waste disposal, risk analysis, and environmental law.

Transportation Engineering involves the design of highways, airports, railways, traffic systems, and mass transit. Students analyze pavement systems and are exposed to transportation planning.

The Construction Materials course covers a variety of materials including steel, concrete, asphalt, and timber. The civil engineering materials lab allows students to gain experience with concrete batch designs and destructive and nondestructive testing.

In the senior year civil engineering students complete the required structural engineering sequence with reinforced concrete design.

FOURTH YEAR	
Fall	**Spring**
Design of Concrete Structures	CE Senior Project II
Geotechnical Engineering	Technical Elective
Hydraulic Structures	General Education Elective
CE Senior Project I	General Education Elective
Technical Elective	Free Elective

Geotechnical Engineering focuses on design applications involving earth-retaining structures, foundations, and embankments.

Design of Hydraulic Structures includes an in-depth study of open channel flow and the design and analysis of pipe networks. Students use numerical models such as HEC-RAS and WaterCAD to complete design projects.

The civil engineering senior design sequence challenges students with a multifaceted design problem which involves the coordinated effort of all design team members. This two-semester capstone sequence provides project design experience and explores professional and ethical issues in engineering. The project design portion of the course is divided into Phases I and II. Phase I includes the selection of the design project and members of the design team, preparation of a proposal and scope of work, field work, development of alternative solutions and a decision matrix,

and completion of a preliminary engineering report and materials cost estimate. Phase I concludes with the submission of the preliminary engineering report and an oral presentation to the project sponsor, peers, faculty, and engineering professionals.

The professional portion of the course is seminar-based with class discussions, assigned readings and case studies related to ethics, professional licensure, public policy, project management, business, leadership, and the impact of civil engineering projects on society.

Phase II involves the completion of the design proposed during Phase I, culminating in a written report and oral presentation before peers, the project sponsor, faculty, and engineering professionals. Student teams prepare a technical paper and present it at a regional conference.

Recent senior design projects have included the design of a church and sports complex in the Dominican Republic; a bridge and highway interchange in Evansville; a 7-mile long multiuse trail; residential street and traffic facilities in Evansville; two new buildings in Mongolia; a new earth dam, spillway, lake, multiuse path in Fairfield, Illinois; an Ohio River unloading facility; a new 40-acre park in Gibson County, Indiana; and green infrastructure facilities to eliminate Combined Sewer Overflow (CSO) on a site in Evansville.

Students complete the last of their general education requirements and select electives in their area of specialization during both semesters of their senior year. During the spring semester, senior civil engineering students take the Fundamentals of Engineering exam as the first step in becoming licensed as a professional engineer.

AREAS OF SPECIALIZATION

Technical electives can be taken in several different areas:

- Intermediate Structural Analysis
- Advanced Structural Design
- Advanced Pavement Design and Management
- Engineering Hydrology
- Environmental Engineering II
- Engineering Economics
- Special Topics in Civil Engineering: Earth Dams, Open Channel Hydraulics, Advanced Transportation Engineering, and Computer Modeling and Visualization
- Independent Study in Civil Engineering

In addition to this list, students may choose an elective in mechanical engineering.

CO-OP AND INTERN PROGRAMS

Civil engineering majors are encouraged to participate in cooperative education. In the co-op program, a student completes the Bachelor of Science in Civil Engineering (BSCE) degree requirements in five years but at the end of that time the student has a degree plus a minimum of three terms of experience as a civil engineer.

The typical civil engineering co-op student attends classes the first two years as a traditional student. At the end of the sophomore year the co-op student begins summer work with a private company, government agency, or construction company. The student attends classes in the fall, then returns to work in the spring. Thereafter, the co-op student alternates between work and school.

CO-OP CALENDAR			
Year	**Fall**	**Spring**	**Summer**
1	School 1	School 2	Work option
2	School 3	School 4	Work 1
3	School 5	Work 2	School 6
4	Work 3	School 7	Work 4
5	School 8	School 9	

Students who are exceptionally well prepared to enter the work force may begin their co-op period in the summer after the freshman year. This is unusual, and most students begin after the sophomore year.

To enter the co-op program, students enroll in EXED 090. This is a non-credit course which is taken during the fall of the sophomore year. This course covers topics such as résumé writing, interviewing, job descriptions, and employer expectations. During the spring semester of the sophomore year the typical co-op student interviews with prospective employers. The Center for Career Development contacts employers and arranges interviews for students. Actual placement in a co-op position is dependent on the outcome of the interview process.

Internships are available as full-time jobs during the summer or as part-time jobs during the school year. Co-op students in civil engineering and interns have a wide range of employers to choose from. Employers are located in the immediate Evansville area, in the surrounding region of Indiana, Kentucky, and Illinois, and at various places throughout the country. If a student wants to work for a company that has not been a co-op employer with UE, the Center for Career Development will contact that company and attempt to establish a program. To qualify as a legitimate co-op employer, the company has to provide a civil engineering opportunity for a student that is relevant to the student's education and chosen profession. Some of the companies that have provided co-op or intern opportunities for UE civil engineering students are listed below:

American Structure Point
Lochmueller Group
Bowen Engineering Corp.
Burns and McDonnell
CH2M Hill
CHA Consulting
City of Evansville
Cives Steel Company
Commonwealth Engineers
City of Indianapolis
Indiana DNR
Indiana DOT
Morley and Associates
Parsons Corporation
Patriot Engineering
PCI/Skanska
Stantec
Traylor Brothers
US Army Corps of Engineers
US Navy

The value of the co-op program is the experience that it provides the student. A co-op job can be a financial benefit, but one term at work does not typically cover the cost of one term in education. The co-op program gives employers an opportunity to examine a student as a prospective employee without making a commitment to long-term employment. Likewise, the co-op program gives the student a chance to examine a company and gain experience before entering the workforce as a working professional.

Co-op students normally get a higher salary offer upon graduation than non co-op students. In many cases the co-op employer provides a long-term employment opportunity for the co-op student upon graduation. Internships are available to students who would like to gain actual engineering work experience but still complete their degree in four years.

HARLAXTON COLLEGE OPTION

The University of Evansville's Harlaxton College is located just outside of Grantham, England, in the rolling English countryside. Harlaxton College is about a one hour train ride north of London. Engineering students who choose to spend a semester studying at Harlaxton have easy access to England's culture, history, and entertainment.

Harlaxton College is housed in a large Victorian manor where about 200 students and faculty live and hold classes. The manor has a state dining room and a number of historic state rooms where classes are held. A soccer field, sports hall, student lounges, bistro, and tennis courts are available on the grounds.

Engineering students who wish to study one semester in England are encouraged to do so during the first semester of their sophomore year. At Harlaxton, engineering students typically take calculus, British studies, and general education courses. Harlaxton College is on the semester system and all classes earn credit at the University of Evansville in the same way they would if they were taken in Evansville. General education courses can be selected that will count as required courses toward the civil engineering degree. Tuition at Harlaxton is the same as tuition at the Evansville campus and all scholarships and loans may be applied to Harlaxton costs.

Students at Harlaxton are encouraged to travel on weekends. The college arranges eight to ten weekend field trips to locations such as Bath, Wales, London, and Scotland. During some semesters, less frequent but longer trips are arranged to Ireland and the continent.

Harlaxton College has resident British faculty as well as visiting faculty from the University of Evansville and other selected campuses in the United States. Likewise, students at Harlaxton come from the Evansville campus and various other campuses around the United States.

It is also possible to attend a five-week summer session at Harlaxton and take Independent Study in Civil Engineering (Civil Engineering 498) and investigate an English design of the Industrial Revolution.

Harlaxton College Costs

While the tuition at Harlaxton College is the same as on the Evansville campus and all scholarships apply to Harlaxton, there are additional costs associated with travel. The typical airplane round trip is $1,500 and students at Harlaxton College will spend up to an additional $4,000 on weekend trips, souvenirs, and other miscellaneous expenses. Additional expenses should be less during the summer session.

HONORS PROGRAM – CIVIL ENGINEERING

The Honors Program is open to selected civil engineering majors on entrance to the University. Admittance to the Honors Program is determined by the University Honors Committee on the basis of standardized test scores (minimum 1900 SAT or minimum 29 ACT), an essay, and high school unweighted GPA 3.5 or above. The program provides participants with the opportunity to interact with other Honors Program students both socially and academically. Challenging honors courses and other academic events are available for honors students both in general education and in the major. Honors students have special library privileges, are able to register early, and may choose to stay in Powell Residence Hall where honors students are given preference.

In civil engineering, honors students must meet the following requirements:

1. Honors students must have a grade point average of 3.5 or better at the time of graduation.

2. Honors students must acquire a total of at least 21 points in the Honors Program made up of the following:

   Course Work (required; 15 points)
   Honors Courses (generally three points each) are offered on a regular basis. They include First-Year Seminar 112, various courses which fulfill the general education requirements, honors courses in other departments which are not part of the general education requirements, and honors science labs.

   Major Courses (generally three points each) are courses within the major which are given a section designation of H.

   Alternate Courses (points vary)
   Alternate honors courses include courses taken for independent study and contract courses. A contract course is a non-honors course in which a written contract, which requires additional or alternative course work, is prepared. The contract must be pre-approved by the instructor, the department chair and the honors director.

   Honors Project and Research (required; 3 points)
   In civil engineering this requirement is satisfied by the senior project sequence (Civil Engineering 495/497). This is a year-long sequence in which civil engineering students write a proposal during the spring semester of their junior year and complete a comprehensive civil engineering design project. The honors project in civil engineering is typically more challenging, has a significant design component, and is presented at a regional or national conference.

Study Abroad (optional; points vary)
Study at Harlaxton College during the fall or spring semester earns two points. Completion of a Harlaxton summer semester earns one point. Students studying abroad in other locations can obtain points based on the length of stay and Honors learning experience

3. Students must participate in the Honors Program each semester.

STUDENT ORGANIZATIONS

ASCE Student Chapter
The American Society of Civil Engineers (ASCE) is the oldest national engineering society in the United States. The mission of ASCE is to enhance the quality of life worldwide by advancing professional knowledge and improving the practice of civil engineering in service to humanity. Founded in 1852, ASCE has more than 120,000 members, including over 15,000 student members.

ASCE sponsors specialty conferences and continuing education courses, provides the government with technical assistance on civil engineering related issues, conducts an active public awareness program, and is the largest publisher of civil engineering information in the world. Within the society, there are more than 500 technical and management committees working to advance the theory and practice of the profession.

UE students as well as the local chapter have been recognized for accomplishments and achievements. Several seniors have received awards in the national Daniel W. Mead Essay competition. In 2015, Chris Unzicker from UE won the national Mead Competition. In 2003 and 2008, the student chapter hosted the Great Lakes Regional Conference, and in 2011, they hosted the National Concrete Canoe championship. In 2014, 2015, 2016, and 2017, the chapter was awarded a Certificate of Commendation for all their activities, one of only 25 of the 330 civil engineering programs to be so recognized. In 2005, 2006, 2009, 2011, 2012, 2013, and 2015 the UE concrete canoe team participated in the National Concrete Canoe Competition and placed in the top 20 nationally. The team received the ASCE National Innovation Award in 2013. ASCE presented UE's civil engineering program with the Walter LeFevre Award in 2009.

The local student chapter participates in a variety of social and technical activities.

- Student chapter meetings
- Construction and industrial tours
- Joint meetings with the local ASCE professional branch
- Attend and participate in regional and national ASCE meetings
- Network with guest speakers from business and industry
- Gain leadership skills as an officer in the student chapter

- Scholarship opportunities through ASCE
- Participate in the senior presentation competition at the ASCE Indiana Section meeting in Indianapolis
- Sponsor the regional balsa wood bridge competition
- Concrete canoe competition
- Steel bridge competition
- Other technical competitions

Civil Engineering seniors won first place in the ASCE state design presentation competition in 2012 and 2014, ahead of design teams from other Indiana universities.

Chi Epsilon
Chi Epsilon is the national civil engineering honor society. It is dedicated to recognizing civil engineering students with high scholastic ability, moral integrity, and social poise. Eligibility is limited to juniors and seniors who rank in the upper one-third of their class. In 2014, UE's Chi Epsilon chapter was given the Susan B. Brown Award at the biannual national conference, one of only eight universities to receive the award.

SWE
The Society of Women Engineers is a national organization with student sections on each engineering campus. The section is an interdisciplinary organization with membership spanning all the engineering disciplines and is open to men who are interested in the mission and activities of the group.

The mission of SWE is to encourage women to achieve their full potential in careers as engineers and leaders, to expand the image of the engineering profession as a positive force in improving the quality of life, and to demonstrate the value of diversity.

NCEES
The University of Evansville's civil engineering program was presented with a 2014 NCEES Engineering Award for connecting professional practice and education. UE was one of only six universities to receive an award in this national competition.

DEGREE REQUIREMENTS – BSCE

The Bachelor of Science in Civil Engineering requires at least 126 credit hours, distributed as follows:

General Education *(37 hours)*

First-Year Seminar 112 (3 hours); General education electives: Fine Arts (3 hours), Humanities (9 hours), Social Science (6 hours), and Health and Wellness (1 hour); Mathematics 221 (4 hours); Chemistry 118, Physics 210 (8 hours), and the four course overlay requirement. In addition, the University proficiency requirements in a foreign language and writing in English must be met (see University degree requirements). The senior seminar requirement is fulfilled by Civil Engineering 495 (3 hours).

Lower Division Required Courses *(36 hours)*

Mathematics 222, 323, 324; Physics 211; Engineering 101, 212, 213, 232; engineering elective selected from Electrical Engineering 210, Engineering 230, Mechanical Engineering 362, or Engineering 123; Civil Engineering 183; one science elective from Biology 100, 107, 110, 112, 201, Environmental Studies 103, 360, Geology 130.

Note: Chemistry 240 or 280 may be substituted for Physics 211 with advisor's approval.

Upper Level Required Courses *(41 hours)*

Engineering 366, 390; Civil Engineering 324, 331, 338, 339, 340, 341, 342, 350, 374, 380, 438, 469, 497. Students are required to take the Fundamentals of Engineering (FE) exam as a requirement for graduation.

Electives *(12 hours)*

Two of Civil Engineering 443, 449, 450, 468, 475, 498, 499; Engineering 409; or Mechanical Engineering 432, 434, 446, 448, 463, 466 (6 hours); at least one technical elective must be a CE4xx course; 6 hours free elective.

Note: Courses numbered MATH 202 or lower, CHEM 10x, or PHYS 1xx, software application courses, English language courses may not be used as free electives.

Bachelor of Science in Civil Engineering

FALL			SPRING		
		FRESHMAN			
CHEM 118	Principles of Chemistry	4	MATH 222	Calculus II	4
ENGR 101	Introduction to Engineering	3	PHYS 210	Calculus Physics I	4
				Foreign Language 112*	3
FYS 112	First-Year Seminar	3		Science Elective	3
MATH 221	Calculus I	4		General Education	3
	Foreign Language 111*	3			17
		17			
		SOPHOMORE			
CE 183	Surveying	3	CE 324	Construction Management	3
ENGR 212	Statics	3	ENGR 213	Dynamics	3
EXED 090	Building Your Professional Image	0	ENGR 232	Mechanics of Materials	3
			MATH 324	Differential Equations	3
HE 100	Concepts of Health and Wellness	1		General Education	3
				Free Elective	3
MATH 323	Calculus III	4			18
PHYS 211	Calculus Physics II	4			
	General Education	3			
		18			
		JUNIOR			
CE 340	Structural Analysis	3	CE 331	Construction Materials	3
CE 380	Hydraulics Lab	1	CE 338	Soil Mechanics and Soil Behavior	3
ENGR 366	Fluid Mechanics	3			
ENGR 390	Applied Engineering Mathematics	3	CE 339	Soil Mechanics Lab	1
			CE 341	Design of Steel Structures	3
	Engineering Elective	3			
	General Education	3	CE 350	Transportation Engineering	3
		16			
			CE 374	Environmental Engineering I	3
					16
		SENIOR			
CE 342	Design of Concrete Structures	3	CE 497	CE Design Project II	3
				Free Elective	3
CE 438	Geotechnical Engineering	3		General Education	3
				General Education	3
CE 469	Design of Hydraulic Structures	3		Technical Elective	3
					15
CE 495	CE Design Project I	3			
	Technical Elective	3			
		15			

*Note: Only if necessary to meet University foreign language requirement.

Harlaxton College Option Plan of Study

FALL			SPRING		
		FRESHMAN			
CHEM 118	Principles of Chemistry	4	ENGR 212	Statics	3
ENGR 101	Introduction to Engineering	3	MATH 222	Calculus II	4
			PHYS 210	Calculus Physics I	4
FYS 112	First-Year Seminar	3		Foreign Language 112*	3
MATH 221	Calculus I	4		General Education	3
	Foreign Language 111*	3			
		17			17
		SOPHOMORE			
ID H282/283	The British Experience	6	CE 324	Construction Management	3
MATH 324	Differential Equations	3			
	General Education	6	ENGR 213	Dynamics	3
		15	ENGR 232	Mechanics of Materials	3
			MATH 323	Calculus III	4
				Science Elective	3
					16
		JUNIOR			
CE 183	Surveying	3	CE 331	Construction Materials	3
	Engineering Elective	3	CE 338	Soil Mechanics and Soil Behavior	3
CE 340	Structural Analysis	3			
CE 380	Hydraulics Lab	1	CE 339	Soil Mechanics Lab	1
ENGR 366	Fluid Mechanics	3	CE 341	Design of Steel Structures	3
PHYS 211	Calculus Physics II	4	CE 350	Transportation Engineering	3
		17			
			CE 374	Environmental Engineering I	3
					16
		SENIOR			
CE 342	Design of Concrete Structures	3	CE 497	CE Design Project II	3
			ENGR 390	Applied Engineering Mathematics	3
CE 438	Geotechnical Engineering	3			
			HE 100	Concepts of Health and Wellness	1
CE 469	Design of Hydraulic Structures	3		Free Elective	3
CE 495	CE Design Project I	3		Free Elective	3
	Technical Elective	3		Technical Elective	3
	General Education	3			16
		18			

*Note: Only if necessary to meet University foreign language requirement.

Engineering Management Minor

A minor in engineering management is offered by the College of Engineering and Computer Science in cooperation with the Schroeder Family School of Business Administration. For civil engineering students, the engineering management minor can be earned by taking the following courses.

Engineering Management Minor *(18 hours)*

ECON 101	Principles of Macroeconomics (General Education Elective)
or	
ECON 102	Principles of Microeconomics
ENGR 390	Applied Engineering Mathematics (Required)
ENGR 409	Engineering Economy and Decision Making (Technical Elective)
COMM 380	Intercultural Communication (General Education Elective)
or	
ID 150	The American Corporation
MGT 331	International Business Strategy
or	
MGT 377	Organizational Behavior (Free Elective)
MGT 310	Production/Operations Management (Free Elective)

With careful curriculum planning, civil engineering students can earn an engineering management minor without taking any additional courses. The note in parenthesis following each course shows where the course might fit into the BSCE curriculum plan.

Mathematics Minor

A minor in mathematics is offered by the College of Arts and Sciences. Civil engineering students can earn a mathematics minor by taking the following courses.

Mathematics Minor *(20 hours)*

ENGR 390	Applied Engineering Mathematics (Required)
MATH 221	Calculus I (Required)
MATH 222	Calculus II (Required)
MATH 323	Calculus III (Required)
MATH 324	Differential Equations (Required)
MATH 3xx	300- or 400-level Course in Mathematics (Free Elective)

With careful curriculum planning, civil engineering students can earn a mathematics minor without taking any additional courses. Upper level math courses require faculty approval. The note in parenthesis following each course shows where the course might fit into the BSCE curriculum plan.

Energy Engineering Certificate

A certificate in energy engineering is available to students in the civil engineering program. Students may earn the certificate by completing the following requirements.

Energy Engineering Certificate *(12 hours or equivalent)*
EE 430 Energy Conversion Systems (Free Elective)

Any three of the following:
CE 374 Environmental Engineering I (Required)
EE 330 Introduction to Power Systems (Free Elective)
ME 463 Principles of Turbomachinery (Technical Elective)
ME 470 Combustion (Technical Elective)
ME 472 Energy Systems (Technical Elective)
ME 476 Power Plant Engineering (Technical Elective)

CE 497 or EE 497 or ME 497
(with an approved energy-focused project)
or
COOP 91 - 95 or EXED 71 - 73
(with an approved energy-focused employer).

With careful curriculum planning, including an approved energy-focused project or co-op, civil engineering students can earn an energy engineering certificate without taking any additional courses. The note in parenthesis following each course shows where the course might fit into the BSCE curriculum plan.

COURSES

Visit our website at www.evansville.edu/majors/civilengineering/courses.cfm for course descriptions.

CE 183 Surveying

CE 324 Construction Management

CE 331 Construction Materials

CE 338 Soil Mechanics and Soil Behavior

CE 339 Soil Mechanics Laboratory

CE 340 Structural Analysis

CE 341 Design of Steel Structures

CE 342 Design of Concrete Structures

CE 350 Transportation Engineering

CE 374 Environmental Engineering I

CE 380 Hydraulics Laboratory

CE 438 Geotechnical Engineering

CE 443 Intermediate Structural Analysis

CE 449 Advanced Structural Design

CE 450 Advanced Pavement Design and Management

CE 468 Engineering Hydrology

CE 469 Design of Hydraulic Structures

CE 475 Environmental Engineering II

CE 495 Civil Engineering Design Project I

CE 497 Civil Engineering Design Project II

CE 498 Independent Study in Civil Engineering

CE 499 Special Topics in Civil Engineering

ENGR 101 Introduction to Engineering

ENGR 212 Statics

ENGR 213 Dynamics

ENGR 230 Materials Science

ENGR 232 Mechanics of Materials

ENGR 366 Fluid Mechanics

ENGR 390 Applied Engineering Mathematics

ENGR 409 Engineering Economy and Decision Making

FACULTY AND STAFF

James Allen, PhD, PE Associate Professor	812-488-2416 ja82@evansville.edu
Becky Buxton Administrative Assistant	812-488-2652 bb78@evansville.edu
S. Immanuel Selvaraj, PhD, PE Associate Professor	812-488-2085 ss476@evansville.edu
Ray Shelton Technician	812-488-2292 rs249@evansville.edu
Brian Swenty, PhD, PE Interim Dean and Professor	812-488-2661 bs3@evansville.edu
David Unger, PhD, PE Professor	812-488-2899 du2@evansville.edu
Mark Valenzuela, PhD, PE Associate Professor	812-488-2590 mv23@evansville.edu

NOTES

NOTES

UNIVERSITY OF
EVANSVILLE®

Department of Mechanical
and Civil Engineering

1800 Lincoln Avenue
Evansville, Indiana 47722
812-488-2652