

Civil Engineering

(A division of the Mechanical Engineering Department)



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<http://www.byui.edu/MechEngr/>

Civil Engineering

The program of Civil Engineering has two engineering programs from which to select a career path. These are:

- 4-Year Bachelor of Science in Civil Engineering, BSCE (465)
- 2-Year Associate of Applied Science in Engineering (351)

The Bachelor of Science degree program in Civil Engineering has been developed in accordance with ABET standards. The Civil Engineering program will apply for formal ABET accreditation at the earliest possible time in conjunction with ABET accreditation requirements. Accreditation is anticipated to be granted retroactively to the first graduating class.

Using techniques, skills, and modern engineering modeling tools, students must demonstrate their abilities to apply mathematics, engineering science, and technology principles necessary for analyzing, modeling, and solving engineering problems. Students must communicate effectively in written and oral presentation. Each student must gain an understanding of professional and ethical behavior in the workplace. Finally, students should understand that learning is a life-long process and develop a desire to continue to enhance their abilities as a professional engineer.

The Civil Engineering program prepares students for professional careers in a wide range of areas including structures, water resources, environmental, transportation and geotechnical engineering. Civil engineers are involved in a variety of activities such as the design and analysis of buildings, bridges, air frames, highways, airports, pipeline systems, dams, flood control structures, and waste water treatment plants.

The 4-year bachelor of science program in Civil Engineering (BSCE - 465) provides students with a solid foundation in mathematics, engineering science, solid mechanics, structural, geotechnical, transportation and water resources engineering. In addition, students choose a focus area in computer aided engineering, systems design, engineering management, engineering mechanics, environmental/water resources, construction, geotechnical, material science, mining/petroleum, pre-medical, or general engineering.

Students in the BSCE program are required to take the Fundamentals of Engineering (FE) exam before they graduate. This is an important milestone of achievement for each civil engineering student in preparing him/her for future licensing as a Professional Engineer. Students will also be required to pass a competency exam in order to register for any 300 and 400 level courses.

The 2-year associate program in Engineering (351) allows students

to continue their engineering education at a 4-year university in engineering fields other than civil engineering. Areas of emphasis available in the associate program include chemical, civil, electrical, and mechanical engineering.

These programs are designed to provide students with the competencies necessary to work in a variety of exciting fields within Civil Engineering. These programs offer excellent placement potential, professional job satisfaction, and substantial salaries. Students entering any of these programs can expect a well-designed and rigorous curriculum based on industry standards.

The bachelor of science program in Civil Engineering (465) and associate program in Engineering (351) are available to students entering Brigham Young University-Idaho on any admission track.

Program Educational Objectives.

Program Educational Objectives for the baccalaureate degree in Civil Engineering are to produce engineering graduates who:

1. Demonstrate and maintain faith in God, and exhibit high standards of personal integrity and professional ethics through lifelong service to family, church, profession, and community. [Service]
2. Provide leadership in their chosen field of endeavor through the application of effective interpersonal, communication, and teamwork skills. [Leadership]
3. Apply fundamental principles of design and analysis to develop innovative solutions in an industrial and societal context. [Design]
4. Maintain currency in their field through continued learning and education. [Lifelong Learning]

Student Outcomes.

To achieve the educational objectives, the following outcomes will be measured during the course of study within the BSCE program. Assessment methods consistent with accreditation recommendations will be used to determine how each student meets these outcomes. The Civil Engineering program at BYU-Idaho is designed to give students the ability to:

1. Apply knowledge of fundamental math, science, and engineering principles. (Fundamentals)
2. Design and conduct experiments and analyze the resulting data. (Experiments)
3. Design components, systems, or processes necessary to meet product specifications and design constraints. (Engineering Design)
4. Function well within a multidisciplinary team. (Team Work)
5. Identify, formulate, and solve engineering problems (Model & Solve)
6. Maintain high ethical, moral, and professional standards. (Ethics)
7. Communicate effectively in both oral and written format. (Communication)
8. Understand the impact engineering has on the world. (Global Impact)
9. Recognize the need for, and engage in life-long learning. (Continued Learning)
10. Understand contemporary issues. (Contemporary Issues)
11. Use the techniques, skills, and modern engineering tools necessary for engineering practice. (Engineering Tools)
12. Apply knowledge in environmental, geotechnical, structural, transportation and water resources engineering. (Technical Breadth)
13. Explain basic concepts in management, business, public policy, leadership, and the importance of professional licensure. (Professional Breadth)

Civil Engineering

Brigham Young University-Idaho 2013-2014

General Information

Mathematics and physical sciences are critical components of any engineering curriculum. The normal entry-level mathematics class for the civil engineering program is Calculus (FDMAT 112). Entering freshman students should consult with their advisor to ensure they are beginning with the mathematics course for which they are prepared. Students with weak mathematics skills are advised to enroll in a preparatory mathematics course to strengthen their skills.

It is imperative that students develop and follow a plan of study that will allow them to complete all the required courses within the credit hour limits. Students should consult with their advisor/mentor early to make sure their educational plan is correct. Sample curriculum flow charts can be found at <http://www2.byui.edu/MechEngr/>.

BS in Civil Engineering (465)

Take required Foundations courses***

Major Requirements

No Double Counting of Major Courses - Students must maintain a minimum grade of C- in their major courses

Entry Courses	<i>Choose a 12 credit emphasis from the following list</i>			
<i>Take these courses your first 2 semesters:</i>				
CHEM 105	4	Computer Aided Engineering	*Environmental/Water Resources	*Mining Engineering
ME 101	1	<i>Take these course:</i>	<i>Take these course:</i>	<i>Take these course:</i>
ME 142	3	ME 342	GEOL 111	GEOL 111
ME 172	3	ME 425	GEOL 111L	GEOL 111L
	3	ME 438	ME 460	GEOL 140
	11	ME 460		GEOL 351
				GEOL 352
				ME 465
Core Courses		*Construction	*Geotechnical	*Petroleum Engineering
<i>Take these courses:</i>		<i>Choose 12 credits:</i>	<i>Take these courses:</i>	<i>Choose 12 credits:</i>
CE 321	3	ARCH 300	GEOL 111	<i>Take these course:</i>
CE 341	3	DCM 120	GEOL 111L	GEOL 111
CE 351	3	CONST 320	GEOL 140	GEOL 111L
CE 361	3	CONST 330	GEOL 140	<i>Choose 8 credits:</i>
CE 424	3	CONST 380	GEOL 340	GEOL 140
CE 433	3	CONST 420	GEOL 404	GEOL 340
CE 470	3		GEOL 435	GEOL 435
CONST 340	3			GEOL 425
MATH 215	4	**Engineering Management		ME 465
MATH 316	4	<i>Take these courses:</i>	Material Science	
MATH 330	3	B 101	<i>Choose 12 credits:</i>	
ME 201	2	B 301	CHEM 106	
ME 202	3	B 321	CHEM 220	
ME 204	3	<i>Take 3 credits:</i>	CHEM 351	
ME 250	3	B 361	CHEM 352	
ME 250L	1	B 383	CHEM 461	
ME 360	3	CIT 380	CHEM 462	
PH 123	3		ME 445	
	53	Engineering Mechanics	PH 220	
		<i>Take this course:</i>		
<i>Take 1 option:</i>		ME 425		
GEOL 111	3	<i>Take 9 credits:</i>		
GEOL 111L	1	ME 337		
or		ME 370		
BIO 221	3	ME 445		
	3	ME 460		
Experiential Learning				
<i>Take 1 credit:</i>				
ME 299	1			
ME 398R	1			
ME 490R	1			
	1			

Program Notes:

COMPETENCY EXAM Students must complete the Mechanical Engineering Competency Exam.
 *Per discussion with applicable departments, ME core satisfies other imbedded prerequisites.
 ***See list of specific Foundations courses for Civil Engineering in this section of the catalog.

Total Major Credits=80

This major is available on the following tracks:

Fall-Winter---- YES	Winter-Spring---- YES	Spring-Fall---- YES
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Civil Engineering

Brigham Young University-Idaho 2013-2014

Foundation Requirements for BS in Civil Engineering

Major Requirements

Students must maintain a minimum grade of C- in their major courses

Academic Fundamentals	Science	Cultural Awareness	Eternal Truths	
Quantitative Reasoning <i>Take these courses:</i> FDMAT 112 4 FDMAT 108T 1 <hr style="width: 50px; margin-left: 0;"/> 5	Science Foundations <i>Take this course:</i> FDSCI 101 2 2 <hr style="width: 50px; margin-left: 0;"/> 2	American Foundations <i>Take this course:</i> FDAMF 3 3 <hr style="width: 50px; margin-left: 0;"/> 3	Family Foundations <i>Take this course:</i> FDREL 200 2 2 <hr style="width: 50px; margin-left: 0;"/> 2	Other Religion Courses <i>Take 4 credits:</i> FDREL 100 2 FDREL 130 2 FDREL 150 2 FDREL 215 2 FDREL 234 2 FDREL 235 2 FDREL 261 2 FDREL 264 2 FDREL 333 2 FDREL 341 2 FDREL 342 3 FDREL 343 3 FDREL 351 2 FDREL 352 2 FDREL 370 2 FDREL 431 2 FDREL 471 2 FDREL 475 2 <hr style="width: 50px; margin-left: 0;"/> 4
Reading and Writing <i>Take these courses:</i> FDENG 101 3 FDENG 201 3 <hr style="width: 50px; margin-left: 0;"/> 6	Science Issues <i>Take this course:</i> PH 121 3 3 <hr style="width: 50px; margin-left: 0;"/> 3	Choose 1 option Humanities Foundations <i>Take this course:</i> FDCA 101 3 3 <hr style="width: 50px; margin-left: 0;"/> 3	Book of Mormon <i>Take these courses:</i> FDREL 121 2 FDREL 122 2 <hr style="width: 50px; margin-left: 0;"/> 4	
		AND International Foundations <i>Take 1 course:</i> FDCA 201 2 FDCA 202 2 FDCA 203 2 FDCA 204 2 FDCA 205 2 FDCA 206 2 <hr style="width: 50px; margin-left: 0;"/> 2	Scripture Based Courses <i>Take 4 credits:</i> FDREL 211 2 FDREL 212 2 FDREL 301 2 FDREL 302 2 FDREL 324 2 FDREL 325 2 <hr style="width: 50px; margin-left: 0;"/> 4	
		OR World Foundations <i>Take these courses:</i> FDWLD 101 2 FDWLD 201 3 <hr style="width: 50px; margin-left: 0;"/> 5		
		Connections <i>Take this course:</i> FDCNC 350 2 2 <hr style="width: 50px; margin-left: 0;"/> 2		

Total Foundation Credits for Civil Engineering=40

AAS in Engineering (351)

Take required Foundations courses (17 credits)

Major Requirements

No Double Counting of Major Courses - Students must maintain a minimum grade of C- in their major courses

Core Courses	Select One Option			
Take these courses: CHEM 105 4 MATH 113 3 MATH 214 3 MATH 316 4 PH 220 3 <hr style="width: 50px; margin-left: 0;"/> 17	Chemical Engineering Option <i>Take these courses:</i> CHEM 106 4 CHEM 351 4 CHEM 352 4 ME 142 3 PH 121 3 <hr style="width: 50px; margin-left: 0;"/> 18	Civil Engineering Option <i>Take these courses:</i> CONST 340 3 ME 142 3 ME 172 3 ME 201 2 ME 202 3 ME 204 3 ME 250 3 ME 250L 1 PH 123 3 <hr style="width: 50px; margin-left: 0;"/> 24	Electrical Engineering Option <i>Take these courses:</i> CS 124 3 CS 165 3 CS 235 3 CS 237 3 ECEN 150 3 ECEN 160 3 ECEN 250 4 PH 121 3 <hr style="width: 50px; margin-left: 0;"/> 25	Mechanical Engineering Option <i>Take these courses:</i> ME 101 1 ME 142 3 ME 172 3 ME 201 2 ME 202 3 ME 204 3 ME 231 3 ME 250 3 ME 250L 1 PH 123 3 <hr style="width: 50px; margin-left: 0;"/> 25
<i>For Chemical Engineering and Civil Engineering options take 1 additional elective credit</i>	Take 6 credits: CHEM 461 3 MATH 341 3 ME 201 2 ME 202 3 ME 330 3 PH 123 3 <hr style="width: 50px; margin-left: 0;"/> 6			

Total Major Credits=41

Additional Elective Credits Required for Graduation=2

This major is available on the following tracks:

Fall-Winter---- YES

Winter-Spring--- YES

Spring-Fall---- YES

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Brigham Young University-Idaho 2013-2014

Course Descriptions

Credits*

CE 321 Structural Analysis

(3:3:0)

Prerequisites: ME 142; ME 202

Concurrent Course: MATH 316

Deflection analysis by the method of virtual work. Analysis of statically indeterminate structures by the flexibility method, the stiffness method, and moment distribution.

Computer analysis of structures.

(Fall, Winter, Spring)

CE 341 Elementary Soil Mechanics

(3:2:4)

Prerequisites: ME 202

Determination of stresses in soils, soil strength, consolidation, and settlement. Applications in fluid flow, lateral earth pressure, bearing pressure, and slope stability.

(Fall, Winter, Spring)

CE 351 Environmental Engineering

(3:3:0)

Prerequisites: CHEM 105 and (ME 330 or MATH 330)

Environmental concerns, problems, and evaluation methodology; pollution control, and engineering management approaches.

(Fall, Winter, Spring)

CE 361 Introduction to Transport Engineering

(3:3:2)

Prerequisites: ME 142; ME 172; CONST 340; (ME 330 or MATH 330)

Transportation system characteristics, traffic engineering, traffic operations, transportation planning, highway geometric design, pavement design, highway safety, public transport.

(Fall, Winter, Spring)

CE 421 Structural Steel Design

(3:3:0)

Prerequisites: ME 250; CE 321; CE 341

Compression and tension of steel members, beams, and beam-columns. Elastic and inelastic lateral-torsional buckling. Structural fasteners. Emphasizes LFRD.

(Fall, Winter, Spring)

CE 424 Reinforced Concrete Design

(3:3:0)

Prerequisites: ME 250; CE 321; CE 341

Theory and design of reinforced concrete, including columns, beams, slabs, and footings; elastic and ultimate-strength methods of analysis.

(Fall, Winter, Spring)

CE 433 Hydraulic Engineering

(3:3:0)

Prerequisites: ME 360; CE 351

Application of fluid mechanics principles to analysis and design of hydraulic structures and systems.

(Fall, Winter, Spring)

CE 470 Civil Engineering Practice and Design

(3:2:2)

Co-requisites: CE 424; CE 433

Engineering economic analysis, professional practice issues, and experience in completion of a civil engineering design project by applying appropriate engineering standards and multiple realistic constraints.

(Fall, Winter, Spring)