

# CIVIL ENGINEERING

Civil Engineering is the oldest and most diverse branch of engineering. In its broadest sense, the civil engineer adapts the physical features of the earth to the needs of society. Civil engineering engages approximately one out of four engineers.

## About this Program

- **College:** Herbert Wertheim College of Engineering (<http://catalog.ufl.edu/UGRD/colleges-schools/UGENG/>)
- **Degree:** Bachelor of Science in Civil Engineering
- **Credits for Degree:** 128

*To graduate with this major, students must complete all university, college, and major requirements.*

## Department Information

**Website** (<https://www.essie.ufl.edu/civil-coastal-engineering/>)

### Curriculum

- Civil Engineering
- Combination Degrees
- Industrialized Construction Engineering

Civil engineering includes the design and construction of bridges, buildings, dams, waterways, coastal protection works, airports, pipelines, space launching facilities, railroads, highways, sanitary systems, ocean structures and facilities, foundations, harbors, waterworks and many other systems and structures upon which modern civilization depends.

## Department Requirements

A minimum grade of C is required for all courses marked below. A minimum GPA of 2.0 is required for all civil engineering courses. Before graduating, all BSCE students must take the Fundamentals of Engineering exam.

The basic program provides the minimum education for practice. Beyond the bachelor's degree, advanced degrees are available in geosensing, transportation, water resources, structural engineering, geotechnical engineering, construction, public works, civil engineering materials, and coastal and oceanographic engineering.

## Educational Objectives

The undergraduate program in civil engineering will prepare graduates to

- Meet the needs and expectations of civil engineering employers and proceed toward the attainment of a Professional Engineering (P.E.) license;
- Continue their education and pursue advanced degrees if they so desire.

## Goals

- To develop civil engineering professionals with proficiency in the fundamentals of science and engineering;
- To develop an understanding of the planning, design, construction and operation of civil engineering projects;
- To develop enhanced communication skills;
- To develop an appreciation of professionalism and ethics in the practice of engineering.

## Mission

The department strives to build upon a leading program of exceptional teaching, innovative research and dedicated service by maintaining a strong curriculum, a highly qualified and committed faculty, outstanding facilities and essential funding.

### Critical Tracking

Critical Tracking records each student's progress in courses that are required for progress toward each major. Please note the critical-tracking requirements below on a per-semester basis.

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites (<https://cpm.flvc.org/advance-search/>) may be used for transfer students.

## Semester 1

- Complete 1 of 7 critical-tracking courses with a minimum grade of C within two attempts: CHM 2045 or CHM 2095, MAC 2311, MAC 2312, MAC 2313, MAP 2302, PHY 2048, PHY 2049
- 2.5 GPA required for all critical-tracking courses (lower division)
- 2.0 UF GPA required

## Semester 2

- Complete 1 additional critical-tracking course with a minimum grade of C within two attempts
- 2.5 GPA required for all critical-tracking courses (lower division)
- 2.0 UF GPA required

## Semester 3

- Complete 2 additional critical-tracking courses with minimum grades of C within two attempts
- 2.5 GPA required for all critical-tracking courses (lower division)
- 2.0 UF GPA required

## Semester 4

- Complete 2 additional critical-tracking courses with minimum grades of C within two attempts
- 2.5 GPA required for all critical-tracking courses (lower division)
- 2.0 UF GPA required

## Semester 5

- Complete final lower division critical-tracking course and EGM 3400 with minimum grades of C
- Complete EGM 3520 with minimum grade of C
- 2.0 UF GPA required

## Semester 6

- Complete CWR 3201, CGN 3501C, and CES 3102 with minimum grades of C
- 2.0 UF GPA required

## Semester 7

- Complete 3 second-level core courses (of CEG 4012, CES 4702, CGN 4503, CWR 4202, EIN 3354) and CEG 4011
- 2.0 UF GPA required

## Semester 8

- Complete CGN 4806 or CGN 4910
- Complete all remaining Civil Engineering required courses
- 2.0 UF GPA required

### Model Semester Plan

To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold. These courses must be completed by the terms as listed above in the Critical Tracking criteria.

*This semester plan represents an example progression through the major. Actual courses and course order may be different depending on the student's academic record and scheduling availability of courses. Prerequisites still apply.*

Course	Title	Credits
<b>Semester One</b>		
Quest 1 (Gen Ed Humanities) <sup>1</sup>		3
CGN 2002	Introduction to Civil Engineering	1
Select one:		3
CHM 2045	General Chemistry 1 ( <b>Critical Tracking</b> ; Gen Ed Physical Sciences) <sup>1</sup>	
CHM 2095	Chemistry For Engineers 1 ( <b>Critical Tracking</b> ; Gen Ed Physical Sciences)	
CHM 2045L	General Chemistry Laboratory (Gen Ed Physical Sciences)	1

ENC 1101	Expository and Argumentative Writing (State Core Gen Ed Composition ( <a href="http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext">http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext</a> ); Writing Requirement: 6,000 words) <sup>1</sup>	3
MAC 2311	Analytic Geometry and Calculus 1 ( <b>Critical Tracking</b> ; Gen Ed Mathematics) <sup>1</sup>	4
<b>Credits</b>		<b>15</b>
<b>Semester Two</b>		
ENC 2256	Writing in the Disciplines (Gen Ed Composition; Writing Requirement: 6,000 words) <sup>1</sup>	3
MAC 2312	Analytic Geometry and Calculus 2 ( <b>Critical Tracking</b> ; State Core Gen Ed Mathematics) <sup>1</sup>	4
PHY 2048	Physics with Calculus 1 ( <b>Critical Tracking</b> ; State Core Gen Ed Physical Sciences) <sup>1</sup>	3
PHY 2048L	Laboratory for PHY 2048 (Gen Ed Physical Sciences)	1
State Core Gen Ed Humanities ( <a href="http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext">http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext</a> ) <sup>1</sup>		3
State Core Gen Ed Social and Behavioral Sciences ( <a href="http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext">http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext</a> ) <sup>1</sup>		3
<b>Credits</b>		<b>17</b>
<b>Semester Three</b>		
Quest 2 <sup>2,3</sup>		3
COP 2273	Python Programming for Engineers	3
MAC 2313	Analytic Geometry and Calculus 3 ( <b>Critical Tracking</b> ; Gen Ed Mathematics) <sup>1</sup>	4
PHY 2049	Physics with Calculus 2 ( <b>Critical Tracking</b> ; Gen Ed Physical Sciences) <sup>1</sup>	3
STA 3032 or STA 2023	Engineering Statistics or Introduction to Statistics 1	3
<b>Credits</b>		<b>16</b>
<b>Semester Four</b>		
CGN 2328	Technical Drawing and Visualization	3
EEL 3003	Elements of Electrical Engineering	3
EGM 2511	Engineering Mechanics: Statics <sup>1</sup>	3
MAP 2302	Elementary Differential Equations ( <b>Critical Tracking</b> ; Gen Ed Mathematics) <sup>1</sup>	3
Gen Ed Social and Behavioral Sciences with International; Writing Requirement: 6,000 words		3
<b>Credits</b>		<b>15</b>
<b>Semester Five</b>		
CGN 3501C	Civil Engineering Materials ( <b>Critical Tracking</b> )	4
CGN 4160	Civil Engineering Practice <sup>1</sup>	4
EIN 3354	Engineering Economy	3
EGM 3520	Mechanics of Materials ( <b>Critical Tracking</b> ) <sup>1</sup>	3
Select one:		3
ARC 4310C	Building Information Modeling	
ARC 4511	Structural Modeling	
GIS 3072C	Geographic Information Systems	
SUR 3103C	Geomatics	
SWS 4720C	GIS in Soil and Water Science	
URP 4273	Survey of Planning Information Systems	
<b>Credits</b>		<b>17</b>
<b>Semester Six</b>		
CEG 4011	Soil Mechanics ( <b>Critical Tracking</b> )	4
CES 3102	Mechanics of Engineering Structures ( <b>Critical Tracking</b> ) <sup>1</sup>	4
CWR 3201	Hydrodynamics ( <b>Critical Tracking</b> ) <sup>1</sup>	4
EGM 3400	Elements of Dynamics ( <b>Critical Tracking</b> ) <sup>1</sup>	2
TTE 4004C	Transportation Engineering <sup>1</sup>	4
<b>Credits</b>		<b>18</b>
<b>Semester Seven</b>		
CGN 3421	Computer Methods in Civil Engineering	3
Second-Level Core courses ( <b>Critical Tracking</b> )		9
Approved Technical elective		3
<b>Credits</b>		<b>15</b>
<b>Semester Eight</b>		
Second-Level Core course		3
CGN 4806 or CGN 4910	Transportation-Water-Materials Design ( <b>Critical Tracking</b> ) or Structures-Geotechnical-Construction Comprehensive System Design	3
Approved Design elective		3

Approved Technical electives	6
<b>Credits</b>	<b>15</b>
<b>Total Credits</b>	<b>128</b>

<sup>1</sup> Minimum grade of C required.

<sup>2</sup> Choose Quest 2 course that fulfills either the Gen Ed Physical/Biological Science or Additional Basic Science Requirement, while also meeting any International or Writing requirements. The Additional Basic Science Requirement is met by completing one of the following courses: BSC 2005, BSC 2010, BSC 2862, GEO 2242, GEO 3250, GLY 2030C, GLY 2038, OCE 1001, SWS 2007, WIS 2552

<sup>3</sup> Upper-division transfer students with 60 credit hours or an approved AA degree are exempt from the Quest 2 course requirement. However, they must still fulfill The Additional Basic Science Requirement.

## Approved Electives

## Second-Level Core Classes

Code	Title	Credits
CEG 4012	Geotechnical Engineering	3
CES 4702	Analysis and Design in Reinforced Concrete	3
CGN 4404 or CGN 4304	Applied Data Science in Civil and Environmental Engineering Machine Learning Applications in Civil Engineering	3
CWR 4202	Hydraulics	3
TTE 4106 or TTE 4824	Urban Transportation Planning Transportation Facility Design	3

## Technical Electives

Code	Title	Credits
CCE 4015	Civil Engineering Estimating	3
CCE 4811	Construction Engineering Design	3
CEG 4104	Retaining Wall and Embankment Design	3
CEG 4111	Foundation Engineering Design	3
CES 4605	Analysis and Design in Steel	3
CGN 4600	Public Works Engineering and Management Practices	3
CWR 4306	Urban Stormwater Systems Design	3
CWR 4542	Water Resources Engineering	3
SUR 4463	Subdivision Design	3
TTE 4106	Urban Transportation Planning	3
TTE 4201	Traffic Engineering	3
TTE 4300	Transportation Systems Analysis	3
TTE 4824	Transportation Facility Design	3

One technical course at 3000/4000 level from outside CE department in geology, environmental engineering, building construction/architecture or urban and regional planning (or other as approved by advisor)

## Design Electives | Select at Least One

Code	Title	Credits
CCE 4811	Construction Engineering Design	3
CEG 4104	Retaining Wall and Embankment Design	3
CEG 4111	Foundation Engineering Design	3
CES 4605	Analysis and Design in Steel	3
CGN 4503	Pavement Design	3
CWR 4306	Urban Stormwater Systems Design	3
SUR 4463	Subdivision Design	3
TTE 4201	Traffic Engineering	3

## Academic Learning Compact

Civil Engineering is the oldest and most diverse branch of engineering and includes the design and construction of bridges, buildings, dams, waterways, coastal protection works, airports, pipelines, space launching facilities, railroads, highways, sanitary systems, ocean structures and facilities, foundations, harbors, waterworks and many other systems and structures upon which modern civilization depends. In its broadest sense, the civil engineer adapts the physical features of the earth to the needs of society. Approximately one out of four engineers is engaged in civil engineering.

The Civil Engineering BS Program is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org> (<https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.abet.org%2F&data=05%7C01%7CDMAYH%40eng.ufl.edu%7C71f1da0d2bb2405acf0908db1519ea82%7C0d4da0f84a314d76ace60a62331e1b84%7C0%7C0%7C638126973271573797%7CUnknown%7CTWFpbGZsb3d8eyJWljiMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6IjEhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=Dc6bpEcUU8fM3vMsOTj6pGPQgYLzoSeoS8v2s%2BFVnBE%3D&reserved=0>), under the General Criteria and the Program Criteria for Civil and Similarly Named Engineering Programs.

## Before Graduating Students Must

- Pass an assessment by two or more faculty and/or industry practitioners of performance on a major design experience.
- Pass an assessment in two courses of individual assignments targeted to each learning outcome. Assessment will be provided by the instructor of the course according to department standards.
- Complete the Fundamentals of Engineering examination.
- Complete an exit interview in your final semester.
- Complete requirements for the baccalaureate degree, as determined by faculty.

## Students in the Major Will Learn to

### Student Learning Outcomes | SLOs

#### Content

1. Apply knowledge of mathematics, science, and engineering principles to civil engineering problems.
2. Conduct civil engineering experiments, analyzing and interpreting the data.

#### Critical Thinking

3. Design a civil engineering system, component or process to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.

#### Communication

4. Communicate technical data and design information effectively in writing and in speech to other civil engineers.

## Curriculum Map

*I = Introduced; R = Reinforced; A = Assessed*

Courses	SLO 1	SLO 2	SLO 3	SLO 4
CEG 4011		A		
CES 3102	A		R	
CES 4702	A		A	
CGN 3501C	R	R		R
CGN 4806			A	A
CGN 4910			A	A
CWR 3201		A		A
EGM 2511	I		I	
EGM 3520	R		R	
ENC 3254				I
PHY 2048L		I		
FE Exam	A		A	
Exit, Employer Surveys	A	A	A	A

## Assessment Types

- Laboratory reports
- Exams
- Design projects
- Presentations
- Additional assessments include:
  - The Fundamentals of Engineering (FE) exam
  - The exit and employer surveys