

# Construction Engineering (BS)

## Construction Engineering Degree

The Construction Engineering curriculum is designed for the student interested in the planning, design, direction, and management of construction projects. It includes the core course requirements in mathematics, the physical sciences, and the humanities and social sciences. After exposure to engineering fundamentals and design of facilities, the curriculum provides a series of specialty courses in construction engineering related to building construction and systems, construction equipment, construction estimating and planning, and legal aspects of contracting. The student also develops skills in accounting, communication, and management. The curriculum is designed for students interested in delivering sustainable construction projects safely and efficiently by using appropriate resources, and means and methods.

## Educational Objectives in Construction Engineering

*Within a few years of graduation alumni of the Construction Engineering program will:*

1. Function successfully in careers emphasizing the application of construction engineering and management principles with the ability to solve a broad set of engineering problems in construction.
2. Practice construction engineering including the design and management of the construction process to achieve needed safety, quality, durability, sustainability, schedule, and economic objectives for various stakeholders.
3. Function in team-oriented, multi-disciplinary, open-ended engineering activities considering the societal and economic impacts of construction, and the professional and ethical responsibilities of the construction engineer.
4. Engage in life-long learning through graduate study, self study, or continuing education; pursue licensure; provide mentoring to those under their supervision and influence; and provide leadership in their employment organizations, industry associations and professional societies.

## Plan Requirements

Code	Title	Hours
<b>College Requirements</b>		
E 101 & E 115	Introduction to Engineering & Problem Solving and Introduction to Computing Environments	2
EC 205	Fundamentals of Economics	3
or EC 201	Principles of Microeconomics	
or ARE 201	Introduction to Agricultural & Resource Economics	
E 102	Engineering in the 21st Century	2
<b>Math</b>		
MA 141	Calculus I	4
MA 241	Calculus II	4
MA 242	Calculus III	4
<b>Sciences</b>		
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory	4

PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory	4
PY 208 & PY 209	Physics for Engineers and Scientists II and Physics for Engineers and Scientists II Laboratory	4

### CE Major

CE 214	Engineering Mechanics-Statics	3
CE 225	Mechanics of Solids	3
CE 263	Introduction to Construction Engineering	3
CE 282	Hydraulics	3
CE 301	Civil Engineering Surveying and Geomatics	3
CE 327	Reinforced Concrete Design	3
CE 332	Civil Engineering Materials	4
CE 342	Engineering Behavior of Soils and Foundations	4
CE 365	Construction Equipment and Methods	3
CE 367	Mechanical and Electrical Systems in Buildings	3
CE 463	Construction Estimating, Planning, and Control	3
CE 464	Legal Aspects of Contracting	3
CE 466	Building Construction Engineering	3
CE 469	Construction Engineering Project	3
Engineering Elective (p. 2)		6

### Other Major

CSC 111	Introduction to Computing: Python	3
MEA 101	Geology I: Physical	3
ACC 280	Survey of Financial and Managerial Accounting	3
TDE 220	Civil Engineering Graphics	3
MSE 200	Mechanical Properties of Structural Materials	3
ST 370	Probability and Statistics for Engineers	3
COM 110	Public Speaking	3
or ENG 331	Communication for Engineering and Technology	
Management Science Elective (p. 2)		3

### Basic Science Elective (choose one of the following) 3

SSC 200	Soil Science	
FOR 260	Forest Ecology	
FW 221	Conservation of Natural Resources	

### GEP Courses

ENG 101	Academic Writing and Research	4
GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )		6
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )		2
GEP US Diversity, Equity, and Inclusion ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/</a> )		3
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )		3
GEP Global Knowledge ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/</a> )		
GEP Foundations of American Democracy ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-fad/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-fad/</a> ) (verify requirement)		

World Language Proficiency (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/>) (verify requirement)

**Total Hours** **126**

## Management Science Electives (p. 2)

Code	Title	Hours
SOC 205	Jobs and Work	3
SOC 301	Human Behavior	3
SOC/AFS 305	Racial and Ethnic Relations	3
PS 202	State and Local Government	3
PS 310	Public Policy	3
PS 312	Introduction to Public Administration	3
PS 314	Science, Technology and Public Policy	3
PS 320	U.S. Environmental Law and Politics	3

## Engineering Elective

Code	Title	Hours
CE 305	Introduction to Transportation Systems	3
CE 325	Structural Analysis I	3
CE 339	Civil Engineering Systems	3
CE 373	Fundamentals of Environmental Engineering	3
CE 383	Hydrology and Urban Water Systems	3
CE 401	Transportation Planning	3
CE 402	Traffic Operations	3
CE 403	Transportation System Design	3
CE 405	Railroad System Planning, Design, and Operation	3
CE 413	Principles of Pavement Design	3
CE 426	Structural Steel Design	3
CE 435	Engineering Geology	3
CE 443	Seepage, Earth Embankments and Retaining Structures	3
CE 444	An Introduction to Foundation Engineering	3
CE 475	Renewable Energy and the Grid	3
CE 478	Energy and Climate	3
CE 479	Air Quality	3
CE 487	Introduction to Coastal and Ocean Engineering	3
CE 499	Undergraduate Research Thesis in Civil, Construction and Environmental Engineering	1-3
CE 484	Water Supply and Waste Water Systems	3

## Semester Sequence

This is a sample.

## Term Sequence

First Year		
Fall Semester		Hours
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory	4
E 101	Introduction to Engineering & Problem Solving	1
E 115	Introduction to Computing Environments	1

ENG 101	Academic Writing and Research	4
MA 141	Calculus I	4
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )		1

**Hours** **15**

### Spring Semester

EC 205	Fundamentals of Economics <sup>1</sup>	3
MA 241	Calculus II	4
PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory	4
E 102	Engineering in the 21st Century <sup>1</sup>	2
GEP Requirement ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> ) <sup>1</sup>		3

**Hours** **16**

### Second Year

#### Fall Semester

CSC 111	Introduction to Computing: Python	3
CE 214	Engineering Mechanics-Statics	3
TDE 220	Civil Engineering Graphics	3
MA 242	Calculus III	4
CE 263	Introduction to Construction Engineering	3

**Hours** **16**

#### Spring Semester

PY 208 & PY 209	Physics for Engineers and Scientists II and Physics for Engineers and Scientists II Laboratory	4
ST 370	Probability and Statistics for Engineers	3
CE 225	Mechanics of Solids	3
CE 365	Construction Equipment and Methods	3
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )		1
GEP Requirement ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> ) <sup>1</sup>		3

**Hours** **17**

### Third Year

#### Fall Semester

CE 301	Civil Engineering Surveying and Geomatics	3
CE 327	Reinforced Concrete Design	3
CE 282	Hydraulics	3
CE 463	Construction Estimating, Planning, and Control	3
MSE 200	Mechanical Properties of Structural Materials	3

**Hours** **15**

#### Spring Semester

CE 332	Civil Engineering Materials	4
CE 342	Engineering Behavior of Soils and Foundations	4
CE 367	Mechanical and Electrical Systems in Buildings	3
MEA 101	Geology I: Physical	3

Engineering Elective (p. 2)		3
<b>Hours</b>		<b>17</b>
<b>Fourth Year</b>		
<b>Fall Semester</b>		
CE 466	Building Construction Engineering	3
ACC 280	Survey of Financial and Managerial Accounting	3
COM 110 or ENG 331	Public Speaking or Communication for Engineering and Technology	3
Select one of the following Basic Science Electives:		3
FOR 260	Forest Ecology	
FW 221	Conservation of Natural Resources	
SSC 200	Soil Science	
Engineering Elective (p. 2)		3
<b>Hours</b>		<b>15</b>
<b>Spring Semester</b>		
CE 464	Legal Aspects of Contracting	3
CE 469	Construction Engineering Project	3
Management Science Elective (p. 2) <sup>1,2</sup>		3
GEP Requirement ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> ) <sup>1</sup>		3
GEP Requirement ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> ) <sup>1</sup>		3
<b>Hours</b>		<b>15</b>
<b>Total Hours</b>		<b>126</b>

<sup>1</sup> GEP Requirements to be selected from the appropriate lists in consultation with the advisor.

<sup>2</sup> Management Science Elective (2nd Soc Sci GEP) - Select one: SOC 205, SOC 301, SOC 305/AFS 305 (USD), PS 202, PS 310, PS 312, PS 314, or PS 320.

<sup>3</sup> Basic Science Elective - Select one: SSC 200, FOR 260, or FW 221

\* World Language Proficiency at the WL\_102 level is required for graduation.

Code	Title	Hours
<b>GEP Courses</b>		
GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )		6
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )		2
GEP Additional Breadth ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> ) (Humanities/Social Sciences/Visual and Performing Arts)		3
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )		3
GEP U.S. Diversity ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-us-diversity/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-us-diversity/</a> ) (verify requirement)		
GEP Global Knowledge ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/</a> ) (verify requirement)		

World Language Proficiency (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/>) (verify requirement)

## Career Opportunities

Society will always need constructed facilities to live, work, and sustain their lives and environment, and civil, construction, and environmental engineers will always be needed to plan, design, and construct these facilities. Civil, construction, and environmental engineering comprise such diversified fields that graduates have a wide choice in types and locations of employment. Our students are equipped with core engineering skills that help them to succeed in many fields. As such, recent graduates have also gone on to use their expertise in a wide array of diverse fields such as medicine or management. Core construction careers range from jobs with federal, state, or municipal agencies to a variety of manufacturing and processing industries, consulting firms or construction companies. The work may be performed partially or wholly in an office or in the field and may be located in a small community, a big city, an industrial center, or even in a foreign country. Careers in either professional practice or teaching and research are common for many graduates who complete advanced degrees.

## Career Titles

- Civil Engineer
- Construction Engineer
- Construction Site Supervisor
- Cost Engineer
- Facilities Engineer
- Energy Engineer
- Engineering Professor
- Land Developer
- Real Estate Developer
- Program Manager
- Project Engineer
- Urban and Regional Planner

## Learn More About Careers

NCcareers.org (<https://nccareers.org/>)

Explore North Carolina's central online resource for students, parents, educators, job seekers and career counselors looking for high quality job and career information.

Occupational Outlook Handbook (<https://www.bls.gov/ooh/management/construction-managers.htm>)

Browse the Occupational Outlook Handbook published by the Bureau of Labor Statistics to view state and area employment and wage statistics. You can also identify and compare similar occupations based on your interests.

Career One Stop Videos (<https://www.careeronestop.org/>)

View videos that provide career details and information on wages, employment trends, skills needed, and more for any occupation. Sponsored by the U.S. Department of Labor.

Focus 2 Career Assessment (<https://careers.dasa.ncsu.edu/explore-careers/career-assessments/>) (NC State student email address required)  
This career, major and education planning system is available to current NC State students to learn about how your values, interests, competencies, and personality fit into the NC State majors and your

future career. An NC State email address is required to create an account. Make an appointment with your career counselor (<https://careers.dasa.ncsu.edu/about/hours-appointments/>) to discuss the results.

Focus 2 Apply Assessment (<https://www.focus2career.com/Portal/Register.cfm?SID=1929>) (Available to prospective students)

A career assessment tool designed to support prospective students in exploring and choosing the right major and career path based on your unique personality, interests, skills and values. Get started with Focus 2 Apply and see how it can guide your journey at NC State.

Associated General Contractors of America (<https://www.agc.org/>)

National Society of Professional Engineers (<https://www.nspe.org/>)

American Society of Civil Engineers (<https://www.asce.org/>)

American Concrete Institute (<https://www.concrete.org/>)

Construction Specifications Institute (<https://www.csiresources.org/home/>)