

**DEGREE: BACHELOR OF SCIENCE IN CONSTRUCTION ENGINEERING AND MANAGEMENT (BSCEM)**

**MAJOR: CONSTRUCTION ENGINEERING AND MANAGEMENT (CEM)**

For students graduating in calendar year 2022 and for student date of entry under UG Catalog 2020-2021

CREDITS REQUIRED FOR GRADUATION: 130

FALL SEMESTER FIRST YEAR		Credits	SPRING SEMESTER FIRST YEAR		Credits
CHEM 1035 General Chemistry (C-) Co: MATH 1025 or 1225	3		ENGE 1216 Foundations of Engineering (C-) Pre: ENGE 1215 (C-)	2	
CHEM 1045 General Chemistry Lab (C-) Co: CHEM 1035	1		ENGL 1106 First-Year Writing Pre: ENGL 1105	3	
ENGE 1215 Foundations of Engineering (C-)	2		MATH 1226 Calculus of a Single Variable (C-) Pre: MATH 1225 (C-)	4	
ENGL 1105 First-Year Writing	3		MATH 2114 Introduction to Linear Algebra Pre: MATH 1225 (B) or MATH 1226	3	
MATH 1225 Calculus of a Single Variable (C-) Pre: Math Ready	4		PHYS 2305 Foundations of Physics Pre: (MATH 1205 or MATH 1205H or MATH 1225) or (MATH 1206 or MATH 1206H or MATH 1226); Co: PHYS 2325 or (MATH 1206 or MATH 1206H or MATH 1226)	4	
Pathways 2	3				
<b>TOTAL</b>	<b>16</b>		<b>TOTAL</b>	<b>16</b>	
FALL SEMESTER SECOND YEAR		Credits	SPRING SEMESTER SECOND YEAR		Credits
CEM 2104 Introduction to CEM (C-)	3		BC 2114 IT in Design & Construction Pre: BC 1224 or CEM 2104	3	
ESM 2104 Statics Pre: MATH 1226 Co: MATH 2204 or MATH 2204H or MATH 2406H	3		CEE 2814 <sup>(1)</sup> CEE Measurements (C-) Pre: ENGE 1216 (C-) or ENGE 1114 or ENGE 1414 or BC 1224, MATH 1226 (C-) or MATH 1206 or MATH 1206H	4	
GEOS 2104 Elements of Geology (C-)	3		ECON 2005 Principles of Economics (Pathway 3)	3	
MATH 2204 Intro Multivariable Calculus Pre: MATH 1226	3		ESM 2204 Mechanics of Deformable Bodies (C-) Pre: (ESM 2104 or ESM 2114), (MATH 2224 or MATH 2224H or MATH 2204 or MATH 2204H)	3	
PHYS 2306 Foundations of Physics Pre: MATH 1226 or MATH 1206 or MATH 1206H, PHYS 2305	4		MATH 2214 Intro Differential Equations Pre: MATH 1226, MATH 2114 or MATH 2114H or MATH 1114 or MATH 2405H	3	
<b>TOTAL</b>	<b>16</b>		<b>TOTAL</b>	<b>16</b>	
FALL SEMESTER THIRD YEAR		Credits	SPRING SEMESTER THIRD YEAR		Credits
BC 3114 Building Systems Technology Pre: CEM 2104 or CNST 2104 or BC 2024, PHYS 2305	3		BC 3064 Integrated Construction II Pre: (CEM 2104, BC 3114, PHYS 2305) or (BC 2064, BC 3114, PHYS 2305)	3	
CEE 3404 <sup>(1)</sup> Introduction to Structural Engineering (C-) Pre: ESM 2204 (C-)	3		CEE 3434 Design of Steel Structures I Pre: (CEE 3404 (C-), CEE 3684 (C-)) or BC 2044 (C-)	4	
CEE 3684 <sup>(1)</sup> CEE Materials (C-) Pre: CHEM 1035 (C-), CHEM 1045 (C-), ESM 2204 (C-), CEE 2814 (C-), GEOS 2104 (C-)	4		CEE 3514 <sup>(1)</sup> Intro to Geotechnical Engr Pre: ESM 2204 (C-), GEOS 2104 (C-)	4	
CEM 3024 <sup>(1)</sup> Construction Estimating & Scheduling Pre: CEM 2104 (C-)	3 <sup>[F]</sup>		CEE 4074 <sup>(1)</sup> Construction Engineering Means & Methods Pre: CEM 2104 (C-) or CEE 3014 (C-)	3 <sup>[S]</sup>	
ECON 2006 Principles of Economics Pre: ECON 2005 (Pathway 3)	3		CEM 3084 Construction Economy Pre: CEM 2104 or BC 2024	3	
<b>TOTAL</b>	<b>16</b>		<b>TOTAL</b>	<b>17</b>	
FALL SEMESTER FOURTH YEAR		Credits	SPRING SEMESTER FOURTH YEAR		Credits
BC 4064 Integrated Construction III Pre: BC 3064	3		CEM/BC 3134 <sup>(1)</sup> Temporary Structures in Construction Pre: CEE 3684 or (BC 2044, BC 2024)	3	
CEE 3424 Reinforced Concrete Structures I Pre: (CEE 3404 (C-), CEE 3684 (C-)) or BC 2044	3		CEM 4024 Construction Law & Contract Administration Pre: Senior Standing	3 <sup>[S]</sup>	
CEM 3164 Construction Health and Safety Pre: CEM 2104	3 <sup>[F]</sup>		CEM 4446 CEM Capstone II Pre: CEM 3084, CEM 4445	3 <sup>[S]</sup>	
CEM 4445 CEM Capstone I Pre: BC 3064, Senior Standing Co: BC 4064	3 <sup>[F]</sup>		Engineering Elective	3	
Business Elective	3		Pathways 6a	3	
Pathways 2,7	3				
<b>TOTAL</b>	<b>18</b>		<b>TOTAL</b>	<b>15</b>	

**General Information about the Checksheet:** Superscripted annotation after the course number <sup>(1)</sup> indicates core course of the degree. Additionally, [F,S] in credits column indicates that a course is known to be offered only in terms when shown (F=Fall Only and S=Spring Only). Course offerings are subject to change due to the availability of sufficient resources. Students should confirm course offerings in advance with their department.

### Pathways to General Education (Pathways)

Consult the pathways courses table: <https://www.pathways.prov.vt.edu/about/table.html>. Pathways courses need to be completed prior to graduation.

<b>Pathway 1:</b> Discourse (6 hrs foundational, 3 hrs advanced)	<i>Foundational:</i> ENGL 1105	(3)	<i>Foundational:</i> ENGL 1106	(3)
	<i>Advanced:</i> CEM 2104+3084+4446			(3)
<b>Pathway 2*:</b> Critical Thinking in the Humanities (6 hrs)		(3)		(3)
<b>Pathway 3:</b> Reasoning in the Social Sciences (6 hrs)	ECON 2005	(3)	ECON 2006	(3)
<b>Pathway 4:</b> Reasoning in the Natural Sciences (8 hrs)	PHYS 2305	(4)	PHYS 2306	(4)
<b>Pathway 5:</b> Quantitative and Computational Thinking (8 hrs foundational, 3 hrs advanced)	<i>Foundational:</i> MATH 1225	(4)	<i>Foundational:</i> MATH 1226	(4)
	<i>Advanced:</i> MATH 2214			(3)
<b>Pathway 6:</b> Critique and Practice in Design and the Arts (3 hrs arts, 4 hrs design)	<i>Arts:</i>			(3)
	<i>Design:</i> ENGE 1215	(2)	<i>Design:</i> ENGE 1216	(2)
<b>Pathway 7*:</b> Critical Analysis of Identity and Equity in the United States (3 hrs)	*Pathway 7 should be double counted with either Pathway 2 or 6a to avoid taking additional credit hours.			(3)

### Business Electives

The CEM degree requires 3 hours of a business elective. A business elective may be selected from the following list:

- ACIS 2115 (3) - Principles of Accounting (Pre: Sophomore Standing)
- BIT 2405 (3) - Introduction to Business Statistics, Analytics, & Modeling (Pre: MATH 1225, 1226, 2114)
- CEM 4964 <sup>[F]</sup> (1-19)\* - Field Work/Practicum
- ECON 3104 (3) - Microeconomic Theory (Pre: ECON 2005 (C), MATH 1225 (C-), MATH 1226 (C-), MATH 2114 (C-))
- ECON 3214 (3) - Money and Banking (Pre: ECON 2005 & ECON 2006)
- ECON 4014 <sup>[F]</sup> (3) - Environmental Economics (Pre: ECON 2005)
- FIN 3054 (3) - Legal and Ethical Environment of Business (Pre: Junior Standing)
- MGT 3064 (3) - Cornerstones of Entrepreneurship (Pre: Completion of 45 credit hours and two CLE Area 5 courses)
- MGT 3304 (3) - Management Theory and Leadership Practice (Pre: Sophomore Standing)
- REAL/UAP 2004 (3) - Principles of Real Estate
- UAP 4374 <sup>[F]</sup> (3) - Land Use and Environment: Planning and Policy (Pre: Junior Standing)
- UAP 4754 <sup>[F]</sup> (3) - Legal Foundations of Planning (Pre: Junior Standing)

\* Course must be taken for 3 credit hours.

### Engineering Electives

The CEM degree requires 3 hours of an engineering elective. An engineering elective may be selected from the following list:

- CEE 3104 (3) - Intro to Environmental Engineering (Pre: CHEM 1035 (C-), 1045 (C-), MATH 1226 (C-), PHYS 2305 (C-))
- CEE 3274 (3) - Introduction to Land Development Design (Pre: CEE 2814 (C-))
- CEE 3604 (3) - Intro to Transportation Engineering (Pre: Junior Standing)
- CEE 3804 (3) - Computer Applications for Civil and Environmental Engineers (Pre: Junior Standing)
- CEE 3954 <sup>[S]</sup> (1-19)\* - Study Abroad
- CEE 4134 <sup>[S]</sup> (3) - Environmental Sustainability - A Systems Approach (Pre: MATH 2214, Senior Standing)
- CEE 4264 <sup>[F]</sup> (3) - Sustainable Land Development (Pre: Senior Standing)
- CEE 4454 <sup>[S]</sup> (3) - Masonry Structural Design (Pre: CEE 3424 (C-), CEE 3684 (C-))
- CEE 4554 <sup>[S]</sup> (3) - Natural Disaster Mitigation and Recovery (Pre: Senior Standing)
- CEE 4514 <sup>[F]</sup> (3) - Methods in Geotechnical Engineering (Pre: CEE 3514 (C-))
- CEE 4534 (3) - Earth Pressures and Foundation Structures (Pre: CEE 3514 (C-))
- CEE 4544 <sup>[S]</sup> (3) - Design of Earth Structures (Pre: CEE 3514 (C-))

**Engineering Electives (continued)**

- CEE 4614 <sup>[F]</sup> (3) - Advanced Structural Concretes (Pre: CEE 3684 (C-))
- CEE 4634 <sup>[S]</sup> (3) - Infrastructure Condition Assessment (Pre: CEE 3684 (C-))
- CEM 3064 <sup>[F]</sup> (3) - Intro to Lean Construction (Pre: CEM 2104)
- CEM 3074 (3) - Global Design and Construction for Sustainable Development (Pre: Junior Standing)
- CEM 3154 <sup>[S]</sup> (3) - Smart Construction (Pre: CEM 2104, BC 2114)
- CEM 4974 (1-19)\* - Independent Study
- CEM 4994 (1-19)\* - Undergraduate Research
- ECE 3054 (3) - Electrical Theory (Pre: PHYS 2305; Co: MATH 2214)
- ESM 3054 (3)- Mechanical Behavior of Materials (Pre: ESM 2204, CEE 3684)
- ISE 4004 <sup>[F]</sup> (3) - Theory of Organization
- SBIO 4314 <sup>[F]</sup> (3) - Design of Wood Structures (Pre: CEE 3404)

\* Course must be taken for 3 credit hours.

**Change of Major Requirements:** Please see [https://enge.vt.edu/undergraduate/Undergraduate\\_changing\\_major.html](https://enge.vt.edu/undergraduate/Undergraduate_changing_major.html).

**Foreign Language Requirements:** Students must have had 2 years of a foreign language in high school or one year at the college level (6 credit hours) of the same language. College-level credits used to meet this requirement do not count towards the degree.

**Satisfactory Progress Towards Degree:** University Policy 91 outlines university-wide minimum criteria to determine if students are making satisfactory progress towards the completion of their degrees. The Myers-Lawson School of Construction fully supports this policy. Specific expectations for satisfactory progress for CEM majors are as follows:

- Each student must meet the minimum University-wide criteria as described in Policy 91 and summarized in the Undergraduate Catalog (<http://www.undergradcatalog.registrar.vt.edu>.)
- Upon completion of 70 hours, students must have completed CEM 2104 and CEE 2814 with a C- or better and have a minimum 2.0 in-major and a minimum 2.0 overall GPA.

**In-Major GPA:** consists of all courses taken under the CEE, CEM and BC designation.

**Statement of Hidden Prerequisites:** Pre-requisites for each course are listed after the course title. The letter grade notation, such as (C-) indicates the minimum grade students must earn in the pre-requisite course. There are no hidden pre-requisites in this program of study.

**Graduation Requirements:** Students must pass all required courses and both the in-major and overall GPA must be at least 2.0 for graduation.