

# 2017-2018 Catalog

## Bachelor of Science in Civil Engineering

This document corresponds to a Catalog Term of Fall 2016. Determine your Catalog Term by performing a Degree Evaluation in Trailhead. Important: this document is an advising tool for students and faculty -- not an official document. Students are responsible for complying with all graduation requirements as stated in the CSM Catalog that corresponds to their Catalog Term.

### LEGEND

	Required by the CSM Core Curriculum
	Distributed Science Courses
	Assessed for ABET Accreditation

‡ indicates a course that applies to the in-major GPA. In addition to a 2.0 minimum overall GPA, students must maintain a 2.0 minimum in-major GPA for graduation.

FRESHMAN YEAR	FALL	4.0 hr. <b>MATH 111</b> Calculus for Scientists and Engineers I	4.0 hr. <b>GEGN 101</b> Intro. to Earth/Env. Sys. <i>(GEGN 101 is recommended, but BIOL110 Biology is also accepted.)</i>	4.0 hr. <b>CHGN 121</b> Principles of Chemistry I	0.5 hr. <b>CSM 101</b> Freshman Success Seminar	4.0 hr. <b>LAIS 100</b> Nature and Human Values	0.5 hr. <b>PAGN</b> Physical Education <i>(any PAGN course)</i>	
	SPRING	4.0 hr. <b>MATH 112</b> Calculus for Scientists and Engineers II <i>Pre-req: C or better in MATH 111</i>	4.5 hr. <b>PHGN 100</b> Physics I - Mechanics <i>Co-req: MATH 112</i>	4.0 hr. <b>CHGN 122</b> Principles of Chemistry II <i>Pre-req: C- or better in CHGN 121</i>	3.0 hr. <b>EPIC 151</b> Introduction to Design		0.5 hr. <b>PAGN</b> Physical Education <i>(any PAGN course)</i>	
SOPHOMORE YEAR	FALL	4.0 hr. <b>MATH 213</b> Calculus for Scientists and Engineers III <i>Pre-req: C or better in MATH 112</i>	4.5 hr. <b>PHGN 200</b> Physics II - Electromagnetism & Optics <i>Pre-req: C- in PHGN 100; Co-req: MATH 213</i>	3.0 hr. <b>CEEN 241‡</b> Statics <i>Pre-req: PHGN 100 and co-req: MATH 112</i>	1.5 hr. <b>CEEN 210‡</b> Intro. to Civ. Infrastr.	3.0 hr. <b>LAIS 200</b> Human Systems <i>Pre-req: LAIS 100</i>	0.5 hr. <b>PAGN</b> Physical Education <i>(any PAGN course)</i>	
	SPRING	3.0 hr. <b>MATH 201</b> Probability and Statistics for Engineers <i>Pre-req: MATH 213</i>	3.0 hr. <b>CEEN 310‡</b> Fluid Mechanics for Civil & Env. Eng. <i>Co-req: CEEN 241</i>	3.0 hr. <b>CEEN 311‡</b> Mechanics of Materials <i>Pre-req: CEEN 241</i>	3.0 hr. <b>EPIC 267*</b> EPICS II: Civil Engineering <i>Pre-req: EPIC 151</i>	1.5 hr. <b>EGGN 350</b> MEL II <i>Co-Req: CEEN 310 &amp; CEEN 311</i>	2.0 hr. min. <b>CSCI 260 (Fortran), CSCI 261 (C++), or EGGN 205 (Matlab)</b> <i>Note: CSCI 260 is 2.0 hr.; CSCI 261 and EGGN 205 are 3.0 hr.</i>	0.5 hr. <b>PAGN</b> Physical Education <i>(any PAGN course)</i>
SUMMER		3.0 hr. <b>CEEN 331‡</b> Civil Engineering Field Session <i>Pre-req: EPICS II (267, 251, 261, 262, etc.)</i>						
JUNIOR YEAR	FALL	3.0 hr. <b>MATH 225</b> Differential Equations <i>Pre-req: C or better in MATH 112</i>	3.0 hr. <b>EBGN 201</b> Principles of Economics	3.0 hr. <b>CEEN 314‡</b> Structural Theory <i>Pre-req: CEEN 311</i>	3.0 hr. <b>CEEN 312‡</b> Soil Mechanics <i>Pre-req: CEEN 311</i>	1.0 hr. <b>CEEN 312L‡</b> Soil Mechanics Lab <i>Co-req: CEEN 312</i>	3.0 hr. <b>CEEN 350‡</b> Civil Engineering Materials <i>Pre-req: CEEN 311</i>	
	SPRING	3.0 hr. Civil Engineering Breadth Elective <sup>†**</sup> <i>Pre-req: Varies, see Catalog</i>	3.0 hr. Civil Engineering Breadth Elective <sup>†**</sup> <i>Pre-req: Varies, see Catalog</i>	3.0 hr. Structural Design Elective <sup>‡***</sup> <i>Pre-req: CEEN 314</i>	3.0 hr. <b>CEEN 415‡</b> Foundation Engineering <i>Pre-req: CEEN 312</i>	3.0 hr. <b>MEGN 315</b> Dynamics <i>Pre-req: CEEN 241, MATH 225</i>	3.0 hr. <b>LAIS/EBGN*****</b> H&SS Restricted Elective I <i>Co-req: LAIS 200</i>	
SENIOR YEAR	FALL	3.0 hr. <b>CE ELECT *****</b> Civil Engineering Technical Elective	3.0 hr. <b>CE ELECT *****</b> Civil Engineering Technical Elective	3.0 hr. <b>EGGN 491</b> Senior Design I <i>Pre-req: CEEN 331; Co-req: CEEN 443 or CEEN 445 or CEEN 440 or CEEN 415</i>	3.0 hr. <b>FREE</b> Free Elective	3.0 hr. <b>FREE</b> Free Elective	3.0 hr. <b>LAIS/EBGN*****</b> H&SS Restricted Elective II <i>Co-req: LAIS 200</i>	
	SPRING	3.0 hr. <b>CE ELECT *****</b> Civil Engineering Technical Elective	3.0 hr. <b>CE ELECT *****</b> Civil Engineering Technical Elective	3.0 hr. <b>EGGN 492</b> Senior Design II <i>Pre-req: EGGN 491</i>	3.0 hr. <b>FREE</b> Free Elective	3.0 hr. <b>FREE</b> Free Elective	3.0 hr. <b>LAIS/EBGN*****</b> H&SS Restricted Elective III <i>Co-req: LAIS 200</i>	

### Notes:

- \* Can also be fulfilled with EPIC251 (The Practice of Design), EPIC262 (EPICS II AutoCAD), or EPIC261 (EPICS II GIS). Other EPICS II courses are also acceptable but require a course substitution form.
- \*\* Select from CEEN 301‡ (Fundamentals of Environmental Science and Engineering I), CEEN 360‡ (Introduction to Construction Engineering), and CEEN 381‡ (Hydrologic & Water Resources Engineering).
- \*\*\* Select either CEEN 443‡ (Design of Steel Structures) or CEEN 445‡ (Design of Reinforced Concrete Structures).
- \*\*\*\* The list of courses that can be used as Civil Engineering Technical Electives is on the reverse side of this document.
- \*\*\*\*\* The list of classes that qualify for this requirement is revised yearly and posted on the CSM website. At least one of the 3 courses must be at the 400-level; at least one must have an LAIS prefix.

**135.5 Credit Hours**

# Civil Engineering Technical Electives

## Construction Engineering

- CEEN 360<sup>†</sup> INTRODUCTION TO CONSTRUCTION ENGINEERING
- CEEN 421<sup>†</sup> HIGHWAY & TRAFFIC ENGINEERING
- CEEN 423<sup>†</sup> SURVEYING FOR ENGINEERS AND INFRASTRUCTURE DESIGN

## Structural Engineering

- CEEN 430<sup>†</sup> ADVANCED STRUCTURAL ANALYSIS
- CEEN 433<sup>†</sup> MATRIX STRUCTURAL ANALYSIS
- CEEN 440<sup>†</sup> TIMBER & MASONRY DESIGN
- CEEN 441<sup>†</sup> INTRODUCTION TO THE SEISMIC DESIGN OF STRUCTURES
- CEEN 443<sup>†</sup> DESIGN OF STEEL STRUCTURES
- CEEN 445<sup>†</sup> DESIGN OF REINFORCED CONCRETE STRUCTURES

## Environmental Engineering and Science

- CEEN 301<sup>†</sup> FUNDAMENTALS OF ENVIRONMENTAL SCIENCE & ENGINEERING I
- CEEN 302<sup>†</sup> FUNDAMENTALS OF ENVIRONMENTAL SCIENCE & ENGINEERING II
- CEEN 303<sup>†</sup> ENVIRONMENTAL ENGINEERING LABORATORY
- CEEN 461<sup>†</sup> FUNDAMENTALS OF ECOLOGY
- CEEN 470<sup>†</sup> WATER & WASTEWATER TREATMENT PROCESSES
- CEEN 471<sup>†</sup> WATER & WASTEWATER TREATMENT SYSTEMS ANALYSIS & DESIGN
- CEEN 474<sup>†</sup> SOLID WASTE MINIMIZATION & RECYCLING
- CEEN 475<sup>†</sup> SITE REMEDIATION ENGINEERING
- CEEN 476<sup>†</sup> POLLUTION PREVENTION: FUNDAMENTALS & PRACTICE
- CEEN 480<sup>†</sup> CHEMICAL FATE & TRANSPORT IN THE ENVIRONMENT

## Geotechnical Engineering and Engineering Geology

- CEEN 410<sup>†</sup> ADVANCED SOIL MECHANICS
- CEEN 411<sup>†</sup> SOIL DYNAMICS
- CEEN 412<sup>†</sup> UNSATURATED SOIL MECHANICS
- GEEN 468 ENGINEERING GEOLOGY & GEOTECHNICS
- GEEN 473 GEOLOGICAL ENGINEERING SITE INVESTIGATION
- MNGN 321 INTRODUCTION TO ROCK MECHANICS
- MNGN 404 TUNNELING
- MNGN 405 ROCK MECHANICS IN MINING
- MNGN 406 DESIGN & SUPPORT OF UNDERGROUND EXCAVATIONS

## Water Resources and Hydrologic Engineering

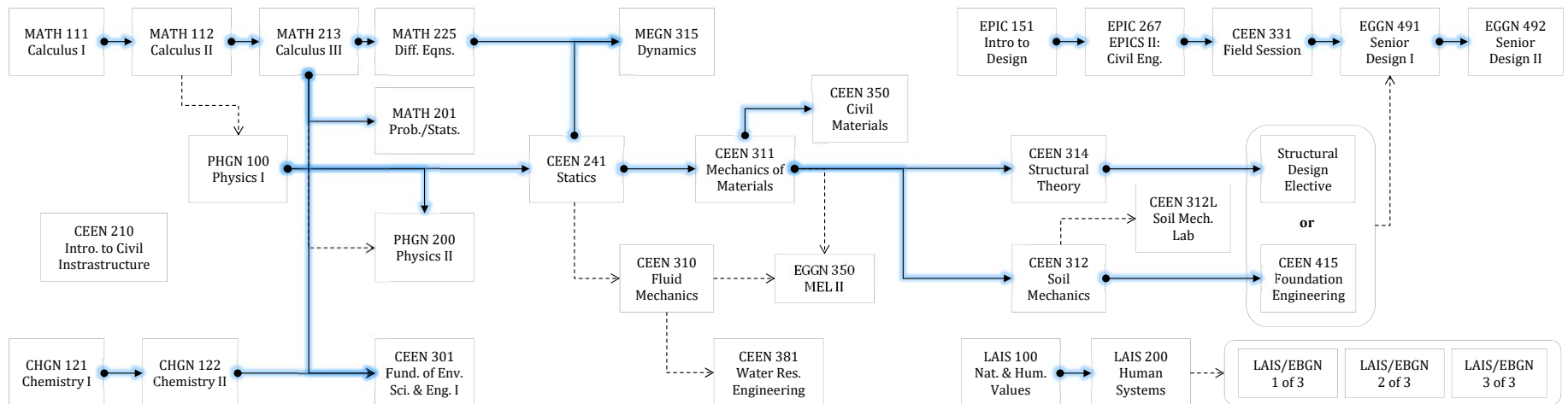
- CEEN 381<sup>†</sup> HYDROLOGIC AND WATER RESOURCES ENGINEERING
- CEEN 472<sup>†</sup> ONSITE WATER RECLAMATION & REUSE
- CEEN 473<sup>†</sup> HYDRAULIC PROBLEMS
- CEEN 482<sup>†</sup> HYDROLOGY & WATER RESOURCES LABORATORY
- GEEN 466 GROUNDWATER ENGINEERING

## Interdisciplinary, Cross-Disciplinary, and Miscellaneous

- CEEN 405<sup>†</sup> NUMERICAL METHODS FOR ENGINEERS
- CEEN 406<sup>†</sup> FINITE ELEMENT METHODS FOR ENGINEERS
- CEEN 477<sup>†</sup> SUSTAINABLE ENGINEERING DESIGN
- CEEN 492<sup>†</sup> ENVIRONMENTAL LAW
- MEGN 416 ENGINEERING VIBRATION
- MEGN 424 COMPUTER-AIDED ENGINEERING
- EBGN 321 ENGINEERING ECONOMICS

**Special Topics Courses (CEEN 498) and 500-level courses** - with advisor pre-approval

## Prerequisite / Corequisite Relationships for Selected Courses



## Combined BS + MS Program

In this program, students can receive the Bachelor's degree in Civil Engineering and the Master's degree in Civil and Environmental Engineering in just five years. Key advantages of this program include early provisional acceptance into graduate school and the ability to earn credit towards the graduate degree while still enrolled as an undergraduate. Contact Tim VanHaverbeke (tvanhave@mines.edu) for detailed information.