

## Routing for On-Campus Approval of Degree Program Actions

**Type of Action:** Enter "X" for Action Type(s) and list Title and Prefix(s) as indicated

<input checked="" type="checkbox"/> New Degree Program	Proposed Program Title: <u>ABM in Civil and Environmental Engineering</u>
<input type="checkbox"/> New Certificate Program	Proposed Certificate Program Title _____
<input type="checkbox"/> New Minor Program	Proposed Minor Program Title _____
<input type="checkbox"/> Change in Degree Program Title	Current Degree Program Title _____
<input type="checkbox"/> Change in Certificate Program Title	Current Certificate Program Title _____
<input type="checkbox"/> Change in Minor Program Title	Proposed Certificate Program Title _____
	Current Minor Program Title _____
	Proposed Minor Program Title _____
<input type="checkbox"/> Change in Course Prefix	Current Course Prefix _____ Proposed Course Prefix _____
<input type="checkbox"/> Program Discontinuation	

Proposed Effective Date 08/16/2018 Program Contact: Murthy Guddati (ABM coordinator), Ranji Ranjithan (DGP)  
 Proposed CIP Code (see <https://nces.ed.gov/ipeds/cipcode/default.aspx?y=55>): 14.08

**Routing of Action:** Indicate date when the following occurs  
**Completed Request to Plan and 1-page Concept Paper**

N/A Council of Dean's- Approval to Plan [Not needed per Melissa Nosbisch, since the informal program is already in place – started this year]

**Completed Proposal**

- 3.12.18 Department Head endorses\*
- 4.25.18 College Curriculum Committee (undergraduate or graduate) recommends\*
- 4.26.18 College Dean endorses\*

**Proposal moves to Undergraduate or Graduate office for routing**

- RM 5/9/18 Recommended by Vice Provost, DELTA, if applies\*
- \_\_\_\_\_ Substantive Change Review Team (SCRT) informed
- \_\_\_\_\_ If SACS notification is required, SCRT prepares letter for Chancellor to send to SACS
- \_\_\_\_\_ University Courses & Curriculum Committee or Administrative Board of the Graduate School recommends
- \_\_\_\_\_ Associate Deans Council or Graduate Operations Council informed
- \_\_\_\_\_ Dean (Graduate School or DASA) approves\*

**Proposal move to the Executive Vice Chancellor Provost's office for routing**

- \_\_\_\_\_ Vice-Provosts informed
- \_\_\_\_\_ Deans' Council recommends\*
- \_\_\_\_\_ Executive Vice Chancellor and Provost approves\*
- \_\_\_\_\_ Chancellor's Executive Officer's (EOM) recommend
- \_\_\_\_\_ University Council informed
- \_\_\_\_\_ Board of Trustees subcommittees recommend
- \_\_\_\_\_ Chancellor approves\*
- \_\_\_\_\_ Accreditation Liaison notifies SACS, if applicable
- \_\_\_\_\_ Submitted to UNC-General Administration by Provost's Office

\* Signature is required on the signature page for the action

**Accelerated Bachelor's to Master's Degree Programs**  
**Department of Civil, Construction, and Environmental Engineering (CCEE)**  
**North Carolina State University**

This request has been reviewed and approved by the appropriate campus committees and authorities.

**Endorsed By:**



4/14/18

\_\_\_\_\_  
Head, Department/Director of Graduate Program (Printed Name and Signature)

\_\_\_\_\_  
Date

**Recommended By:**

 John J. Classen  
Chair, College Graduate Studies Committee (Printed Name and Signature)

4/26/2018

\_\_\_\_\_  
Date

**Endorsed By:**




4/26/2018

\_\_\_\_\_  
College Dean

\_\_\_\_\_  
(Printed Name and Signature)

\_\_\_\_\_  
Date

**Recommended By:**

 Thomas K. Miller III  
Vice Provost, DELTA (if DE degree) (Printed Name and Signature)

5/9/18

\_\_\_\_\_  
Date

**Approved By:**

\_\_\_\_\_  
Dean of the Graduate School

\_\_\_\_\_  
(Printed Name and Signature)

\_\_\_\_\_  
Date

**Recommended By:**

\_\_\_\_\_  
Dean's Council

\_\_\_\_\_  
(Printed Name and Signature)

\_\_\_\_\_  
Date

**Approved By:**

\_\_\_\_\_  
Executive Vice Chancellor and Provost

\_\_\_\_\_  
(Printed Name and Signature)

\_\_\_\_\_  
Date

**Approved By:**

\_\_\_\_\_  
Chancellor

\_\_\_\_\_  
(Printed Name and Signature)

\_\_\_\_\_  
Date

(revised August 2015)

# **Accelerated Bachelor's to Master's Degree Programs**

Department of Civil, Construction, and Environmental Engineering (CCEE)

*Proposed by CCEE Graduate Programs Committee  
April 2018*

## **I. Introduction**

The Department of Civil, Construction, and Environmental Engineering (CCEE) wants to encourage exceptional undergraduate students to undertake master's degrees by taking advantage of the Graduate School's framework of Accelerated Bachelor's to Master's (ABM) program. The proposed ABM program would permit double counting of graduate-level credits towards both the Bachelor's of Science (BS) and Master's degrees. With this structure, students could obtain a BS and Professional Master's degree (i.e. "Master of") within 5 years from the start of the BS program. The research-based Master's degree (i.e. "Master of Science in") with a thesis would take students 5 ½ years (i.e. obtaining the MS degree within 18 months after receiving the BS degree). In both cases, this represents a savings of one full semester.

The graduate programs committee (GPC), the director of graduate programs (DGP), and the director of undergraduate programs (DUP) would work closely to administer the ABM program, from application processing to guiding the students towards successful completion.

The proposed ABM program would follow closely the Graduate School Guidelines, with two exceptions: (a) Students could double-count only up to 9 credit hours from their BS degree toward completion of the Master's degree, instead of the 12 credit hour limit listed in the Graduate School Guidelines. This reduction results from the constraints imposed by some subdisciplines on pre-requisites, and by the lack of available courses in some subdisciplines. (b) Given this credit-hour reduction, the time limit for completing the Professional Master's degree is increased to 18 months after completion of the BS degree, from the Graduate School's limit of 12 months. Such expanded time window is provided to facilitate some Professional Master's students to take specific courses that are not otherwise available (due to conditions on pre-requisites). Consistent with this increase, the time window for the research-based Master of Science is increased to 24 months. Note that the 18 and 24 months represent the upper limit for professional master's and MS degrees respectively. It is expected that many students would complete their degrees in 12 and 18 months respectively, which is consistent with the graduate school recommendations for ABM.

## **II. Degree Programs Involved**

Graduate Programs:

- Master of Science in Civil Engineering with thesis (MSCE)
- Master of Civil Engineering (MCE)
- Master of Science in Environmental Engineering with thesis (MSENE)
- Master of Environmental Engineering (MENE)

Undergraduate Programs:

- Bachelor of Science in Civil Engineering (BSCE)
- Bachelor of Science in Environmental Engineering (BSENE)
- Bachelor of Science in Construction Engineering (BSCON)

Proposed ABM Programs:

- Accelerated Bachelor's to Master's in Civil Engineering towards MSCE or MCE
- Accelerated Bachelor's to Master's in Environmental Engineering, towards MSENE or MENE

### III. Proposed Effective Date: January 2019

#### IV. Program Eligibility

- Students may apply once they have completed a minimum of seventy-five (75) credit hours in their BS program, including credits earned from advanced placement, but they must apply before completing the BS degree.
- Transfer students who apply must have completed a minimum of two semesters as a full-time student at NC State, i.e. a minimum of 24 credit hours.
- Students must have a minimum in-major grade point average (GPA) of 3.25 and a minimum overall GPA of 3.5 at NC State at the time of admission into the ABM degree program.

#### V. Application Process

- Subdiscipline Selection: Students can only be admitted into sub-disciplinary-specific ABM tracks. *Note that these are not separate ABM programs, but simply tracks within the proposed ABM programs, consistent with the tracks that we have in our existing Master's programs.* Students seeking ABM programs that combine more than one subdiscipline would have their cases reviewed on a case-by-case basis. The specific subdisciplines include
  - Computing and Systems (CAS)
  - Construction Engineering (CON)
  - Environmental, Water Resources and Coastal Engineering (EWC)
  - Geotechnical Engineering (GT)
  - Mechanics and Materials (MM)
  - Structural Engineering and Mechanics (SEM)
  - Transportation Materials (TR-M)
  - Transportation Systems (TR-S)
- After identifying a subdiscipline, the student must consult with the ABM advisor for the specific subdiscipline and agree on a tentative ABM Plan of Work (PoW). The ABM advisors, who are designated by the departmental GPC, coordinate the process with the Director of Undergraduate Programs (DUP) and the director of Graduate Programs (DGP). The ABM PoW must clearly indicate the courses that would be double-counted (maximum of 9 credit hours, which must be at the 500 level), and a tentative list of courses that would be taken during the graduate program if admitted. The ABM PoW must clearly contain the accelerated graduation plan, following the examples given in the last four pages of this proposal, paying attention to the course list in Section VI.
- The student then formally submits the application to the department, which will be reviewed by the ABM advisor, DUP and DGP, and the decision will be communicated to the student.

## VI. Curriculum Requirements

If the student has 9 hours of double-counted 500-level courses, the requirements for the graduate degree are:

- Professional Master's: 21 course credit-hours + 1 seminar credit hour (if required);
- Research-based Master's: 15 course credit-hours + 6 thesis credit hours + 1 seminar credit hour.

In the event the student has fewer than 9 hours of double-counted credits, he or she will need to take additional credit hours as part of the Master's degree to complete 30 or 31 credit hour requirement per the corresponding Master's degree requirements. The courses taken by the student must individually satisfy the BS degree requirements as well as the requirements for the Master's degree in the specific subdiscipline.

The courses that can be double-counted depend on the subdiscipline to which the ABM student is admitted. The current (as of April 2018) courses that can be double-counted are:

- Computing and Systems (CAS)
  - CE 536 - Introduction to Numerical Methods for Civil Engineers
  - CE 537(437) - Computer Methods and Applications
  - CE 538 - Information Technology and Modeling
  - CE 590 - Civil Engineering Systems
- Construction Engineering (CON)
  - CE 561 - Construction Project Management
  - CE 562 - Lean Construction Concepts and Methods
  - CE 563 - Const. Est, Planning & Control
  - CE 564 - Legal Aspects of Contracting
  - CE 565 - Construction Safety Management
  - CE 567 - Risk and Financial Management in Construction
  - CE 592 - Special Topics in Construction Engineering
- EWC - Water Resources, Coastal
  - CE 581 - Fluid Mechanics in Natural Environments
  - CE 583 - Engineering Aspects of Coastal Processes
  - CE 584 - Hydraulics of Ground Water
  - CE 586 - Engineering Hydrology
  - CE 588 - Water Resources Engineering
  - CE 596 - Coastal Engineering
  - CE 596 - Water Quality
- EWC – Environmental Process Engineering
  - CE 571 - Physical Principles of Environmental Engineering
  - CE 573 - Biological Principles of Environmental Engineering
  - CE 574 - Chemical Principles of Environmental Engineering
  - CE 576 - Air Pollution Control
  - CE 577 - Engineering Principles of Solid Waste Management
  - CE 578 - Energy and Climate
  - CE 596 - Global Sanitation
- EWC - Air
  - CE 578 - Energy and Climate

- CE 579 - Air Quality Engineering
- Geotechnical Engineering (GT)
  - CE 548 - Engineering Properties of Soils I
  - CE 549 - Soil and Site Improvement
  - CE 584 - Hydraulics of Ground Water
- Structural Engineering and Mechanics (SEM) / Mechanics and Materials (MM)
  - CE 515 - Advanced Strength of Materials
  - CE 522 - Theory and Design of Prestressed Concrete
  - CE 523 - Theory and Behavior of Steel Structures
  - CE 524 - Analysis and Design of Masonry Structures
  - CE 526 - Finite Element Method in Structural Engineering
  - CE 527 - Structural Dynamics
  - CE 528 - Structural Design in Wood
  - CE 529 - FRP Strengthening and Repair of Concrete Structures
  - CE 530 - Properties of Concrete and Advanced Cement-Based Composites
- Transportation Materials (TR-M)
  - CE 515 – Advanced Strength of Materials
  - CE 548 - Engineering Properties of Soils I
  - CE 595A - Asphalt and Bituminous Materials
- Transportation Systems (TR-S)
  - CE 501 - Transportation Systems Engineering
  - CE 502- Traffic Operations
  - CE 503 - Highway Design
  - CE 504 - Airport Planning and Design
  - CE 506 - Transportation Engineering Data Collection and Analysis
  - CE 509 - Highway Safety
- Special Topics (on a case-by-case basis)
  - CE 590 - Special Topics in Civil Engineering
  - CE 591 - Special Topics in Civil Engineering Computing
  - CE 592 - Special Topics in Construction Engineering
  - CE 593 - Special Topics in Geotechnical Engineering
  - CE 594 - Special Topics in Structures and Mechanics
  - CE 595 - Special Topics in Transportation Engineering
  - CE 596 - Special Topics in Water Resource and Environmental Engineering

## **VII. Requirements for Participation and Graduation**

- Students must complete the BS degree prior to entering the Master's program. Students in the ABM may not elect to bypass the BS degree.
- Students must receive a grade of B or better in the double counted graduate-level courses. Courses with a grade of B- or below cannot be counted toward the graduate degree.
- No more than nine (9) graduate course credit hours may be counted towards the requirements of both degrees.
- Students must complete the Master's degree within 18 months from the completion of the BS degree for a non-thesis Master's degree and within 24 months for Master's

programs requiring a thesis. If the Master's degree is not completed within these time limits, none of the graduate credit obtained before receiving the BS degree can be counted toward the Master's degree.

### **VIII. Continuing Eligibility**

- It is the responsibility of the student to recognize his/her eligibility status.
- If a student completes the BS degree requirements with an accumulated major GPA of less than 3.25/4.00 or an overall GPA of less than 3.50/4.00, then he/she needs to receive program approval to continue in the CCEE ABM program.
- If a student becomes ineligible to participate in the CCEE ABM degree program, the DGP must inform the DUP and the student in writing of his/her ineligibility. A copy of this letter to the student must be sent to the Graduate School.
- A student who is ineligible to participate in (or withdraws from) the ABM program cannot double count any courses for both the bachelor's and master's degrees.

### **IX. Withdrawal**

A student may withdraw at any time from an approved ABM program, by informing the DUP and DGP in writing. A copy of this request must be sent to the Graduate School.

### **X. Semester-by-Semester Plan for ABM students**

As examples, the following pages contain semester-by-semester plan for ABM curricula:

- Bachelor of Science in Civil Engineering (BSCE) to Master of Civil Engineering (MCE)
- Bachelor of Science in Civil Engineering (BSCE) to Master of Science in Civil Engineering with thesis (MSCE)
- Bachelor of Science in Environmental Engineering (BSENE) to Master of Science in Environmental Engineering (MENE)
- Bachelor of Science in Environmental Engineering (BSENE) to Master of Science in Environmental Engineering with thesis (MSENE)

**ACCELERATED BACHELOR'S TO MASTER OF CIVIL ENGINEERING (MCE) CURRICULUM**  
(SEMESTER-BY-SEMESTER DISPLAY)

**FRESHMAN YEAR**

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CH 101 Chemistry, A Molecular Science	3	EC 205 Economics (GEP Req) <sup>1</sup>	3
CH 102 General Chemistry Laboratory	1	MA 241 Calculus II	4
E 101 Introduction to Engr & Prob. Solving	1	PY 205 Physics for Engineers & Scientists I	3
E 115 Intro to Computing Environments	1	PY 206 Physics for Engineers & Scientists I Lab	1
ENG 101 Academic Writing and Research	4	E 102 Engineering in the 21 <sup>st</sup> Century (GEP Req) <sup>1</sup>	2
MA 141 Calculus I	4	GEP Requirement <sup>1</sup>	3
HESF 1XX Fitness & Wellness Course	1		
<i>Total:</i>	15	<i>Total:</i>	16

**SOPHOMORE YEAR**

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 214 Engineering Mechanics – Statics	3 (CP)	CE 225 Mechanics of Solids	3 (CP)
CE 250 Introduction to Sustainable Infrastructure	3 (CP)	CE 282 Hydraulics	3 (CP)
CSC 111 Introduction to Computing: Python	3	PY 208 Physics for Engineers & Scientists II	3
TDE 220 Civil Engineering Graphics	3	MA 341 Applied Differential Eq <b>OR</b>	
MA 242 Calculus III	4	MA 305 Elem Linear Algebra	3
		MSE 200 Mech Prop of Struct Mat	3
		HES *** Phys. Ed/Healthy Living Course	1
<i>Total:</i>	16	<i>Total:</i>	16

**JUNIOR YEAR**

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE Core Course – Lab Intensive Elective I <sup>2</sup>	3/4	CE Core Course – Lab Intensive Elective II <sup>2</sup>	4/3
CE Core Course – Elective I <sup>3</sup>	3	CE Core Course – Elective II <sup>3</sup>	3
CE Junior Elective I <sup>4</sup>	3	CE Junior Elective II <sup>4</sup>	3
ST 370 Prob & Stat for Engineers	3	Basic Science Elective <sup>7</sup>	3
COM 110 Public Speaking <b>OR</b>		Engineering Science Elective <sup>8</sup>	3
ENG 331 Communication for Engr. & Tech.	3		
<i>Total:</i>	15/16	<i>Total:</i>	16/15

**SENIOR YEAR**

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE Senior Elective I	3	CE Senior Elective III / <b>ABM Course</b>	3
CE Senior Elective II / <b>ABM Course</b>	3	CE Senior Elective IV / <b>ABM Course</b>	3
Senior Elective <sup>9</sup>	3	CE Senior Design <sup>6</sup>	3
GEP Requirement <sup>1</sup>	3	GEP Requirement <sup>1</sup>	3
GEP Requirement <sup>1</sup>	3	GEP Requirement <sup>1</sup>	3
<i>Total:</i>	15	<i>Total:</i>	15

Minimum Credit Hours Required for Graduation for BS: 124

**MASTER'S YEAR**

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
Graduate Course 1	3	Graduate Course 4	3
Graduate Course 2	3	Graduate Course 5	3
Graduate Course 3*	3	Graduate Course 6*	3
		Graduate Course 7*	3
<i>Total:</i>	9	<i>Total:</i>	12

Minimum Credit Hours Required for Graduation for MCE: 30 (including double-counted ABM hours)

\*\* In some cases, the 7<sup>th</sup> graduate course may be taken in summer should an appropriate course be offered in summer. Also, exception may be granted for students to take courses in the following full semester, should the situation warrant, e.g. a specific course is not offered frequently enough, or the student needed graduate prerequisites before taking a specific course.



**ACCELERATED BACHELOR'S TO MASTER OF SCIENCE IN CIVIL ENGINEERING (MSCE) CURRICULUM**  
(SEMESTER-BY-SEMESTER DISPLAY)

**FRESHMAN YEAR**

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CH 101 Chemistry, A Molecular Science	3	EC 205 Economics (GEP Req) <sup>1</sup>	3
CH 102 General Chemistry Laboratory	1	MA 241 Calculus II	4
E 101 Introduction to Engr & Prob. Solving	1	PY 205 Physics for Engineers & Scientists I	3
E 115 Intro to Computing Environments	1	PY 206 Physics for Engineers & Scientists I Lab	1
ENG 101 Academic Writing and Research	4	E 102 Engineering in the 21 <sup>st</sup> Century (GEP Req) <sup>1</sup>	2
MA 141 Calculus I	4	GEP Requirement <sup>1</sup>	3
HESF 1XX Fitness & Wellness Course	1		
<i>Total:</i>	15	<i>Total:</i>	16

**SOPHOMORE YEAR**

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 214 Engineering Mechanics – Statics	3 (CP)	CE 225 Mechanics of Solids	3 (CP)
CE 250 Introduction to Sustainable Infrastructure	3 (CP)	CE 282 Hydraulics	3 (CP)
CSC 111 Introduction to Computing: Python	3	PY 208 Physics for Engineers & Scientists II	3
TDE 220 Civil Engineering Graphics	3	MA 341 Applied Differential Eq <b>OR</b>	
MA 242 Calculus III	4	MA 305 Elem Linear Algebra	3
		MSE 200 Mech Prop of Struct Mat	3
		HES *** Phys. Ed/Healthy Living Course	1
<i>Total:</i>	16	<i>Total:</i>	16

**JUNIOR YEAR**

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE Core Course – Lab Intensive Elective I <sup>2</sup>	3/4	CE Core Course – Lab Intensive Elective II <sup>2</sup>	4/3
CE Core Course – Elective I <sup>3</sup>	3	CE Core Course – Elective II <sup>3</sup>	3
CE Junior Elective I <sup>4</sup>	3	CE Junior Elective II <sup>4</sup>	3
ST 370 Prob & Stat for Engineers	3	Basic Science Elective <sup>7</sup>	3
COM 110 Public Speaking <b>OR</b>		Engineering Science Elective <sup>8</sup>	3
ENG 331 Communication for Engr. & Tech.	3		
<i>Total:</i>	15/16	<i>Total:</i>	16/15

**SENIOR YEAR**

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE Senior Elective I	3	CE Senior Elective III / <b>ABM Course</b>	3
CE Senior Elective II / <b>ABM Course</b>	3	CE Senior Elective IV / <b>ABM Course</b>	3
Senior Elective <sup>9</sup>	3	CE Senior Design <sup>6</sup>	3
GEP Requirement <sup>1</sup>	3	GEP Requirement <sup>1</sup>	3
GEP Requirement <sup>1</sup>	3	GEP Requirement <sup>1</sup>	3
<i>Total:</i>	15	<i>Total:</i>	15

Minimum Credit Hours Required for Graduation for BS: 124

**MASTER'S YEAR 1**

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
Graduate Course 1	3	Graduate Course 4	3
Graduate Course 2	3	Graduate Course 5	3
Graduate Course 3*	3	CE 695 MS Thesis	3
<i>Total:</i>	9	<i>Total:</i>	9

**MASTER'S YEAR 2**

FALL SEMESTER*	CREDITS		
MS Thesis	3		
Graduate Seminar**	1		
<i>Total:</i>	4		

Minimum Credit Hours Required for Graduation for MSCE: 31 (including double-counted ABM hours)

\* MS students typically take 4 full semesters to graduate and ABM would facilitate graduation in three full semesters. In some cases, it is possible that an MS student can finish the requirements of thesis during the summer after the second semester and graduate within a year after BS.

\*\* For some sub-disciplines

**ACCELERATED BACHELOR'S TO MASTER OF ENVIRONMENTAL ENGINEERING (MENE) CURRICULUM**  
(SEMESTER-BY-SEMESTER DISPLAY)

FRESHMAN YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CH 101 Chemistry - A Molecular Science <sup>1</sup>	3	CH 201 Chemistry – A Quantitative Science	3
CH 102 General Chemistry Laboratory <sup>1</sup>	1	EC 205 Fundamentals of Economics (GEP Req) *	3
E 101 Introduction to Engr & Prob. Solving <sup>1,2</sup>	1	MA 241 Calculus II <sup>1</sup>	4
E 115 Intro to Computing Environments <sup>1,2</sup>	1	PY 205 Physics for Engineers & Scientists I <sup>1</sup>	3
ENG 101 Academic Writing and Research <sup>1,2</sup>	4	PY 206 Physics for Engineers & Scientists I Lab <sup>1</sup>	1
MA 141 Calculus I <sup>1,2</sup>	4	E 102 Engineering in the 21 <sup>st</sup> Century (GEP Req)*	2
HESF 1XX Fitness & Wellness Course*	1		
<i>Total:</i>	15	<i>Total:</i>	16

SOPHOMORE YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 214 Engineering Mechanics – Statics	3 (CP)	BIO 183 Intro. Biology: Cellular and Molecular Bio.	4
CE 250 Introduction to Sustainable Infrastructure	3 (CP)	CE 373 Fundamentals of Environmental Eng	3 (CP)
CHE 205 Chemical Proc Principles	4	Earth Systems Chemistry Elective <sup>3</sup>	3
MA 242 Calculus III	4	MA 341 Applied Differential Equations I	3
CSC 111 Intro to Computing: PYTHON	3	CE 282 Hydraulics	3 (CP)
<i>Total:</i>	17	<i>Total:</i>	16

JUNIOR YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 378 Environmental Chemistry & Microbiology	4	CE 381 Hydraulics Sys Meas Lab	1
TDE 220 Civil Engineering Graphics <b>OR</b> GIS 280 Intro to Geographic Info Systems	3	CE 383 Hydrology & Urban Water Sys	3
PY 208 Physics for Engineers & Scientists II	3	CE 339 Civil Engineering Systems	3
ST 370 Probability & Statistics for Engr	3	MAE 201 Engr Thermodynamics I	3
COM 110 Public Speaking (GEP Req)*	3	PS 320 US Environ Law and Politics <b>OR</b> PS 336 Global Envir Pol (GEP Req)*	3
HES XXX Phys Ed/Healthy Living Course	1	GEP Requirement*	3
<i>Total:</i>	17	<i>Total:</i>	16

SENIOR YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 488/ <b>588</b> <sup>5</sup> Water Resource Engineering	3	CE 477/ <b>577</b> <sup>5</sup> Solid Waste Engineering	3
CE 476/ <b>576</b> <sup>5</sup> Air Pollution Control <b>OR</b> CE 479/ <b>579</b> <sup>5</sup> Air Quality	3	CE 481 Environmental Engineering Project	3
ENE Elective I <sup>4</sup> / <b>ABM Course</b> <sup>5</sup>	3	ENE Elective II <sup>4</sup> / <b>ABM Course</b> <sup>5</sup>	3
CE 484 Water Supply & Waste Water Sys	3	ENE Elective III <sup>4</sup> / <b>ABM Course</b> <sup>5</sup>	3
GEP Requirement*	3	GEP Requirement*	3
<i>Total:</i>	15	<i>Total:</i>	15

Minimum Credit Hours Required for Graduation\*: 127

MASTER'S YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
Graduate Course 1	3	Graduate Course 5	3
Graduate Course 2	3	Graduate Course 6	3
Graduate Course 3	3	Graduate Course 7	3
Graduate Course 4	3	Graduate Seminar	1
<i>Total:</i>	12	<i>Total:</i>	10

Minimum Credit Hours Required for Graduation for MENE: 31 (including double-counted ABM hours)

<sup>5</sup>Only 5XX courses will count as ABM credit. Select up to three to take during the senior year.

**ACCELERATED BACHELOR'S TO MASTER OF SCIENCE IN ENVIRONMENTAL ENGINEERING CURRICULUM (MSENE)**

(SEMESTER-BY-SEMESTER DISPLAY)

## FRESHMAN YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CH 101 Chemistry - A Molecular Science <sup>1</sup>	3	CH 201 Chemistry – A Quantitative Science	3
CH 102 General Chemistry Laboratory <sup>1</sup>	1	EC 205 Fundamentals of Economics (GEP Req) *	3
E 101 Introduction to Engr & Prob. Solving <sup>1,2</sup>	1	MA 241 Calculus II <sup>1</sup>	4
E 115 Intro to Computing Environments <sup>1,2</sup>	1	PY 205 Physics for Engineers & Scientists I <sup>1</sup>	3
ENG 101 Academic Writing and Research <sup>1,2</sup>	4	PY 206 Physics for Engineers & Scientists I Lab <sup>1</sup>	1
MA 141 Calculus I <sup>1,2</sup>	4	E 102 Engineering in the 21 <sup>st</sup> Century (GEP Req)*	2
HESF 1XX Fitness & Wellness Course*	1		
<i>Total:</i>	15	<i>Total:</i>	16

## SOPHOMORE YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 214 Engineering Mechanics – Statics	3 (CP)	BIO 183 Intro. Biology: Cellular and Molecular Bio.	4
CE 250 Introduction to Sustainable Infrastructure	3 (CP)	CE 373 Fundamentals of Environmental Eng	3 (CP)
CHE 205 Chemical Proc Principles	4	Earth Systems Chemistry Elective <sup>3</sup>	3
MA 242 Calculus III	4	MA 341 Applied Differential Equations I	3
CSC 111 Intro to Computing: PYTHON	3	CE 282 Hydraulics	3 (CP)
<i>Total:</i>	17	<i>Total:</i>	16

## JUNIOR YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 378 Environmental Chemistry & Microbiology	4	CE 381 Hydraulics Sys Meas Lab	1
TDE 220 Civil Engineering Graphics <b>OR</b> GIS 280 Intro to Geographic Info Systems	3	CE 383 Hydrology & Urban Water Sys	3
PY 208 Physics for Engineers & Scientists II	3	CE 339 Civil Engineering Systems	3
ST 370 Probability & Statistics for Engr	3	MAE 201 Engr Thermodynamics I	3
COM 110 Public Speaking (GEP Req)*	3	PS 320 US Environ Law and Politics <b>OR</b> PS 336 Global Envir Pol (GEP Req)*	3
HES XXX Phys Ed/Healthy Living Course	1	GEP Requirement*	3
<i>Total:</i>	17	<i>Total:</i>	16

## SENIOR YEAR

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
CE 488/ <b>588</b> <sup>5</sup> Water Resource Engineering	3	CE 477/ <b>577</b> <sup>5</sup> Solid Waste Engineering	3
CE 476/ <b>576</b> <sup>5</sup> Air Pollution Control <b>OR</b> CE 479/ <b>579</b> <sup>5</sup> Air Quality	3	CE 481 Environmental Engineering Project	3
ENE Elective I <sup>4</sup> / <b>ABM Course</b> <sup>5</sup>	3	ENE Elective II <sup>4</sup> / <b>ABM Course</b> <sup>5</sup>	3
CE 484 Water Supply & Waste Water Sys	3	ENE Elective III <sup>4</sup> / <b>ABM Course</b> <sup>5</sup>	3
GEP Requirement*	3	GEP Requirement*	3
<i>Total:</i>	15	<i>Total:</i>	15

Minimum Credit Hours Required for Graduation\*: 127

## MASTER'S YEAR 1

FALL SEMESTER	CREDITS	SPRING SEMESTER	CREDITS
Graduate Course 1	3	Graduate Course 4	3
Graduate Course 2	3	Graduate Course 5	3
Graduate Course 3	3	CE 695 MS Thesis Research <sup>6</sup>	3
<i>Total:</i>	9	<i>Total:</i>	9

## FALL SEMESTER

## CREDITS

## MASTER'S YEAR 2

CE 695 Master's Thesis Research <sup>6</sup>	3		
Graduate Seminar	1		
<i>Total:</i>	4		

Minimum Credit Hours Required for Graduation for MSENE: 31 (including double-counted ABM hours)

<sup>5</sup>Only 5XX courses will count as ABM credit. Select up to three to take during the senior year.<sup>6</sup>Enrollment in CE 695 (6 credits total) can occur during any semester once in the MSENE program. The schedule shown here is a suggestion.