

B.S. IN ENVIRONMENTAL ENGINEERING/M.S. IN CHEMICAL, ENVIRONMENTAL, AND MATERIALS ENGINEERING

Overview

The College of Engineering offers a dual-degree program that culminates with students receiving a Bachelor of Science in Environmental Engineering and a Master of Science in Chemical, Environmental, and Materials Engineering concurrently. This program is available only to qualified students enrolled in the undergraduate program in Environmental Engineering at the University of Miami. This program is intended to give qualified Environmental Engineering students the opportunity to acquire both a baccalaureate degree and a Master of Science degree in five years rather than the 4 plus 2 years (approximately) that is traditionally expected. The two degrees are awarded simultaneously when the combined requirements have been met for both degrees.

Juniors enrolled in environmental engineering who have maintained at least a 3.0 CGPA have the option to apply for admission to the dual degree program.

Those who are accepted into this accelerated program must maintain at least a 3.0 CGPA and a minimum of a 3.0 GPA for the final 30 credit hours to meet the requirements of the Graduate School.

If space permits, up to 12 credit hours of graduate coursework can be taken during the fourth year can be counted toward the 30 credit hours required for the M.S. degree. Students must be registered for a minimum of 12 undergraduate credit hours per semester in their fourth year to take these additional graduate courses. Students can register for a maximum of 6 graduate credit hours in each semester of their fourth year.

If a student needs to withdraw from the dual degree program, then all the requirements for the B.S. degree must be completed for graduation with the B.S. in environmental engineering degree.

Admission Requirements

The dual B.S. in environmental engineering/M.S. in chemical, environmental, and materials engineering degree is available only to qualified undergraduate students enrolled in the B.S. in environmental engineering within the Department of Chemical, Environmental, and Materials Engineering. Students must have undergraduate student status and a cumulative G.P.A. of at least 3.0 at the time of application. Qualified students are strongly advised to apply to the dual degree program as early as possible in their junior year to facilitate academic advising and course selection in the second semester of their junior year.

Curriculum Requirements - Thesis Option

Code	Title	Credit Hours
B.S. in Environmental Engineering Requirements (122 credit hours)		
Engineering Courses		
EGN 114	Global Challenges Addressed by Engineering and Technology	3
CET 300	Computational Methods for Engineers (Computational Methods for Engineers (NEW COURSE))	3
CET 330	Fluid Mechanics	3
CET 340	Introduction to Environmental Engineering	3
CET 345	Environmental Laboratory and Analysis ¹	3
CET 403	Senior Design Project I - Engineering Design	3
CET 404	Senior Design Project II – Integrated Engineering Documents ¹	3
CET 430	Water-Resources Engineering I	3
CET 440	Water Quality Control Systems	3
CET 530	Water Resources Engineering II	3
CET 533	Water-Quality Control in Natural Systems	3
CET 540	Environmental Chemistry	3
CET 541	Environmental Engineering Microbiology	3
CET 543	Air Pollution Control Engineering	3
CAE 115	Introduction to Engineering II: Geospatial Data (Surveying and GIS)	2
CAE 210	Mechanics of Solids I	3
CAE 402	Professional Engineering Practice ¹	3
ECE 205	Principles of Electrical Engineering–I	3
ISE 311	Applied Probability and Statistics	3
MAE 303	Thermodynamics	3
Technical Elective		3
Marine Science Courses		

MSC 301	Introduction to Physical Oceanography	3
Marine/Atmospheric Science Elective		3
Math and Science Courses		
MTH 151	Calculus I for Engineers ²	5
MTH 162	Calculus II	4
MTH 211	Calculus III	3
MTH 311	Introduction to Ordinary Differential Equations	3
PHY 221	University Physics I	3
PHY 222	University Physics II	3
PHY 106	Physics Laboratory 1	1
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
Biology Elective		3
General Education Requirements		
Written Communication Skills:		
WRS 105	First-Year Writing I	3
WRS 107	First-Year Writing II: STEM	3
Quantitative Skills:		
MTH 151	Calculus I for Engineers (fulfilled through the major)	
Areas of Knowledge:		
Arts and Humanities Cognate		9
People and Society Cognate		9
STEM Cognate (9 credits) (fulfilled through the major)		
MS Requirements (30 credits)		
Graduate Coursework		21
At least 12 credits from CET 6XX/7XX courses and at least one course from each of the core areas below. Equivalent courses may be taken at other schools/college with the approval of the program director.		
Environmental Engineering		
CET 630	Water Resources Engineering II	
CET 633	Water-Quality Control in Natural Systems	
CET 640	Environmental Chemistry	
CET 641	Environmental Engineering Microbiology	
CET 642	Solid and Hazardous Waste Engineering	
CET 643	Air Pollution Control Engineering	
CET 644	Introduction to Atmospheric Chemistry	
CET 735	Water and Wastewater Engineering: Treatment and Reuse	
CET 743	Risk Analysis	
Chemical Engineering		
CET 660	Aerosol Science and Technology	
CET 670	Soft Matter Colloids	
CET 671	Chemical Product Design	
CET 730	Advanced Fluid Mechanics	
CET 750	Advanced Engineering Reaction Kinetics	
CET 760	Aerosol Instrumentation	
Materials Engineering		
CET 680	Affordable and Sustainable Batteries	
MAE 607	Advanced Mechanics of Solids	
MAE 616	Introduction to Composite Materials	
MAE 631	Scientific and Engineering Foundations of Additive Manufacturing	
MAE 632	Additive Manufacturing of Engineering Materials	
MAE 733	Additive Manufacturing Lab	
CAE 720	Concrete Materials Science	

CAE 729	Molecular Simulation of Materials	
BME 622	Scanning Electron Microscopy for Engineers	
BME 635	Advanced Biomaterials	
BME 675	Tissue Mechanics	
ECE 642	MEMS: Sensors and Electronics	
ECE 643	BioNanotechnology	
CET 810	Master's Thesis	6
CET 703	Graduate Research Seminar ³	3
Total Credit Hours		152

¹ Counts toward the Advanced Writing and Communication Skills Requirement

² Fulfills the University General Education Quantitative Skills Proficiency Requirement

³ Taken 3 times at 1 credit each

Internships, Practical Training, or other types of practicums are neither required nor optional credit-earning components in the established undergraduate curriculum. Credit earned through these experiences via UMI 305 will not count towards the degree requirements.

Curriculum Requirements - Non-Thesis Option

Code	Title	Credit Hours
B.S. in Environmental Engineering (122 credit hours)		
Engineering Courses		
EGN 114	Global Challenges Addressed by Engineering and Technology	3
CET 300	Computational Methods for Engineers (Computational Methods for Engineers (NEW COURSE))	3
CET 330	Fluid Mechanics	3
CET 340	Introduction to Environmental Engineering	3
CET 345	Environmental Laboratory and Analysis ¹	3
CET 403	Senior Design Project I - Engineering Design	3
CET 404	Senior Design Project II – Integrated Engineering Documents ¹	3
CET 430	Water-Resources Engineering I	3
CET 440	Water Quality Control Systems	3
CET 530	Water Resources Engineering II	3
CET 533	Water-Quality Control in Natural Systems	3
CET 540	Environmental Chemistry	3
CET 541	Environmental Engineering Microbiology	3
CET 543	Air Pollution Control Engineering	3
CAE 115	Introduction to Engineering II: Geospatial Data (Surveying and GIS)	2
CAE 210	Mechanics of Solids I	3
CAE 402	Professional Engineering Practice ¹	3
ECE 205	Principles of Electrical Engineering–I	3
ISE 311	Applied Probability and Statistics	3
MAE 303	Thermodynamics	3
Technical Elective		3
Marine Science Courses		
MSC 301	Introduction to Physical Oceanography	3
Marine/Atmospheric Science Elective		3
Math and Science Courses		
MTH 151	Calculus I for Engineers ²	5
MTH 162	Calculus II	4
MTH 211	Calculus III	3
MTH 311	Introduction to Ordinary Differential Equations	3
PHY 221	University Physics I	3
PHY 222	University Physics II	3

PHY 106	Physics Laboratory 1	1
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
Biology Elective		3
General Education Requirements		
Written Communication Skills:		
WRS 105	First-Year Writing I	3
WRS 107	First-Year Writing II: STEM	3
Quantitative Skills:		
MTH 151	Calculus I for Engineers (fulfilled through the major)	
Areas of Knowledge:		
Arts and Humanities Cognate		9
People and Society Cognate		9
STEM Cognate (9 credits) (fulfilled through the major)		
MS Requirements (30 credits)		
Graduate Coursework		24
At least 12 credits from CET 6XX/7XX courses and at least one course from each of the core areas below. Equivalent courses may be taken at other schools/college with the approval of the program director.		
Environmental Engineering		
CET 630	Water Resources Engineering II	
CET 633	Water-Quality Control in Natural Systems	
CET 640	Environmental Chemistry	
CET 641	Environmental Engineering Microbiology	
CET 642	Solid and Hazardous Waste Engineering	
CET 643	Air Pollution Control Engineering	
CET 644	Introduction to Atmospheric Chemistry	
CET 735	Water and Wastewater Engineering: Treatment and Reuse	
CET 743	Risk Analysis	
Chemical Engineering		
CET 660	Aerosol Science and Technology	
CET 670	Soft Matter Colloids	
CET 671	Chemical Product Design	
CET 730	Advanced Fluid Mechanics	
CET 750	Advanced Engineering Reaction Kinetics	
CET 760	Aerosol Instrumentation	
Materials Engineering		
CET 680	Affordable and Sustainable Batteries	
MAE 607	Advanced Mechanics of Solids	
MAE 616	Introduction to Composite Materials	
MAE 631	Scientific and Engineering Foundations of Additive Manufacturing	
MAE 632	Additive Manufacturing of Engineering Materials	
MAE 733	Additive Manufacturing Lab	
CAE 720	Concrete Materials Science	
CAE 729	Molecular Simulation of Materials	
BME 622	Scanning Electron Microscopy for Engineers	
BME 635	Advanced Biomaterials	
BME 675	Tissue Mechanics	
ECE 642	MEMS: Sensors and Electronics	
ECE 643	BioNanotechnology	
Capstone (Choose one)		3
CET 605	Master's Project ³	
CET 695	Special Problems ³	

CET 703	Graduate Research Seminar ⁴	3
Total Credit Hours		152

¹ Counts toward the Advanced Writing and Communication Skills Requirement

² Fulfills the University General Education Quantitative Skills Proficiency Requirement

³ Students choose to complete a Master's Project or Industry Project. The Industry Project is a three-month summer project, culminating with an internship report detailing the work done and knowledge gained. Project will be supervised by a faculty member in an appropriate academic unit culminating in a report that's approved by the supervisor.

⁴ Taken 3 times at 1 credit each

Plan of Study

Thesis Option

Freshman Year		Credit Hours
Fall		
EGN 114	Global Challenges Addressed by Engineering and Technology	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
WRS 105	First-Year Writing I	3
Credit Hours		14
Spring		
CAE 115	Introduction to Engineering II: Geospatial Data (Surveying and GIS) ¹	2
MTH 162	Calculus II	4
PHY 222	University Physics II	3
PHY 106	Physics Laboratory 1	1
WRS 107	First-Year Writing II: STEM	3
PS Cognate ²		3
Credit Hours		16
Sophomore Year		
Fall		
CET 300	Computational Methods for Engineers ¹	3
CAE 210	Mechanics of Solids I	3
MTH 211	Calculus III	3
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
PS Cognate ²		3
Credit Hours		17
Spring		
CET 340	Introduction to Environmental Engineering ¹	3
ECE 205	Principles of Electrical Engineering-I	3
MTH 311	Introduction to Ordinary Differential Equations	3
Biology Elective ⁶		3
AH Cognate ²		3
Credit Hours		15
Junior Year		
Fall		
CET 330	Fluid Mechanics	3
CET 345	Environmental Laboratory and Analysis ¹	3
MAE 303	Thermodynamics	3
ISE 311	Applied Probability and Statistics	3
MSC 301	Introduction to Physical Oceanography (MSC 111 not required)	3
Credit Hours		15

Spring		
CET 430	Water-Resources Engineering I ¹	3
CET 440	Water Quality Control Systems ¹	3
Environmental Engineering Course ³		3
Marine/Atmospheric Science Elective ⁴		3
Technical Elective ⁵		3
Credit Hours		15
Senior Year		
Fall		
CET 403	Senior Design Project I - Engineering Design ¹	3
CET 530	Water Resources Engineering II ¹	3
Environmental Engineering Course ³		3
Environmental Engineering Course ³		3
AH Cognate ²		3
Graduate Elective		3
CET 703		1
Credit Hours		19
Spring		
CET 404	Senior Design Project II – Integrated Engineering Documents ¹	3
CAE 402	Professional Engineering Practice	3
Environmental Engineering Course ³		3
AH Cognate ²		3
PS Cognate ²		3
Graduate Elective		3
CET 703		1
Credit Hours		19
Year Five		
Fall		
CET 703	Graduate Research Seminar	1
CET 810	Master's Thesis	3
Graduate Elective		3
Graduate Elective		3
Credit Hours		10
Spring		
CET 810		3
Graduate Elective		3
Graduate Elective		3
Graduate Elective		3
Credit Hours		12
Total Credit Hours		152

¹ Only offered once a year in the semester indicated in the curriculum.

² To be selected from approved lists. Students take a minimum of 3 courses (9 credits) in the AH cognate and 3 courses in the PS cognate (9 credits).

³ CET 533, CET 540, CET 541, and CET 543 are offered on a 3-semester rotation. Students must take all four courses.

⁴ Students must select the Marine/Atmospheric Science Elective from the list of (a) 300-level or higher elective courses required for a minor in Marine Science, or (b) MSC 311, MSC 313, MSC 314, MSC 339, MSC 340, MSC 341, MSC 342, MSC 345, MSC 418, MSC 425. To complete the requirements for the minor in Marine Science, additional courses are required. The requirements for the minor in Marine Science can be found in the University Bulletin.

⁵ Technical Elective is any engineering course 200 level or higher. CET 395 Undergraduate Research can also be used as a Technical Elective.

⁶ BIL 150 or BIL 160. Note that BIL 151 need not be taken with BIL 150, and BIL 150 is a prerequisite of BIL 160.

Plan of Study

Non-Thesis Option

Freshman Year		
Fall		Credit Hours
EGN 114	Global Challenges Addressed by Engineering and Technology	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
WRS 105	First-Year Writing I	3
	Credit Hours	14
Spring		
CAE 115	Introduction to Engineering II: Geospatial Data (Surveying and GIS) ¹	2
MTH 162	Calculus II	4
PHY 222	University Physics II	3
PHY 106	Physics Laboratory 1	1
WRS 107	First-Year Writing II: STEM	3
PS Cognate ²		3
	Credit Hours	16
Sophomore Year		
Fall		
CET 300	Computational Methods for Engineers ¹	3
CAE 210	Mechanics of Solids I	3
MTH 211	Calculus III	3
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
PS Cognate ²		3
	Credit Hours	17
Spring		
CET 340	Introduction to Environmental Engineering ¹	3
ECE 205	Principles of Electrical Engineering-I	3
MTH 311	Introduction to Ordinary Differential Equations	3
Biology Elective ⁶		3
AH Cognate ²		3
	Credit Hours	15
Junior Year		
Fall		
CET 330	Fluid Mechanics	3
CET 345	Environmental Laboratory and Analysis ¹	3
MAE 303	Thermodynamics	3
ISE 311	Applied Probability and Statistics	3
MSC 301	Introduction to Physical Oceanography (MSC 111 not required)	3
	Credit Hours	15
Spring		
CET 430	Water-Resources Engineering I ¹	3
CET 440	Water Quality Control Systems ¹	3
Environmental Engineering Course ³		3
Marine/Atmospheric Science Elective ⁴		3
Technical Elective ⁵		3
	Credit Hours	15
Senior Year		
Fall		
CET 403	Senior Design Project I - Engineering Design ¹	3

CET 530	Water Resources Engineering II ¹	3
Environmental Engineering Course ³		3
Environmental Engineering Course ³		3
AH Cognate ²		3
Graduate Elective		3
CET 703		1
Credit Hours		19
Spring		
CET 404	Senior Design Project II – Integrated Engineering Documents ¹	3
CAE 402	Professional Engineering Practice	3
Environmental Engineering Course ³		3
AH Cognate ²		3
PS Cognate ²		3
Graduate Elective		3
CET 703		1
Credit Hours		19
Year Five		
Fall		
CET 703	Graduate Research Seminar	1
CET 605 or 695	Master's Project or Special Problems	3
Graduate Elective		3
Graduate Elective		3
Credit Hours		10
Spring		
Graduate Elective		3
Graduate Elective		3
Graduate Elective		3
Graduate Elective		3
Credit Hours		12
Total Credit Hours		152

¹ Only offered once a year in the semester indicated in the curriculum.

² To be selected from approved lists. Students take a minimum of 3 courses (9 credits) in the AH cognate and 3 courses in the PS cognate (9 credits).

³ CET 533, CET 540, CET 541, and CET 543 are offered on a 3-semester rotation. Students must take all four courses.

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