MS IN CHEMICAL, ENVIRONMENTAL AND MATERIALS ENGINEERING

Overview

The Department of Chemical, Environmental, and Materials Engineering (CEM) offers a Master of Science (MS) degree in Chemical, Environmental, and Materials Engineering with the following areas of emphasis:

- Chemical Engineering
- Environmental Engineering
- Materials Science and Engineering

Admission Requirements

Students will apply directly to the College of Engineering for the Graduate Program. Students must have a related bachelor's degree in Engineering, Physics, Chemistry, Biology, Mathematics, or other technical fields, with a minimum GPA of 3.0 on a 4.0 scale. There is flexibility based on a holistic review of the application. For non-native English speakers, the minimum TOEFL score is 80 and the minimum IELTS score is 6.5.

Curriculum Requirements

Thesis Option

Code	Title	Credit Hours	
Graduate Coursework		21	
	rom CET 6XX/7XX courses and at least one course from each of the core er 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 730	Advanced Fluid Mechanics		
CET 735	Water and Wastewater Engineering: Treatment and Reuse		
CET 743	Risk Analysis		
Chemical Engineering			
CET 651	(Aerosol Instrumentation)		
CET 652	(Aerosol Science & Technology)		
CET 653	(Aerosol Mechanics)		
CET 670	Soft Matter Colloids (Soft Matter and Colloids)		
CET 671	Chemical Product Design (Chemical Product Design)		
Materials Engineering			
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		
ECE 643	BioNanotechnology		
Master's Thesis			
CET 810	Master's Thesis (Master's Thesis)	6	

CET 703

Total Credit Hours

Curriculum Requirements Non-Thesis Option

Tom approve courses including at least 12 credits from CET 6XX/TXX courses and at least one course from each of the core reas below. Equivalent courses may be taken at other schools/college with the approval of the program director. CET 630 Water Resources Engineering II CET 630 Water Quality Control in Natural Systems CET 640 Environmental Chemistry CET 641 Environmental Chemistry CET 642 Solid and Hazardous Waste Engineering CET 643 Air Pollution Control Engineering CET 643 Air Vandu Machanics CET 730 Advanced Fluid Mechanics CET 743 Risk Analysis CET 790 Advanced Topics (Softmatter & Colloids) CET 790 Advanced Topics (Softmatter & Colloids) CET 790 Advanced Topics (Aerosol Mechanics) CET 790 Advanced Topics (Aerosol Mechanics) CET 790 Advanced Topics (Aerosol Mechanics) CET 790 Advanced Mechanics of Solids MAE 607 Introduction to Composite Materials MAE 616 Introduction to Composite Materials MAE 631 Scientific and Engineering Foundations of Additive Manufacturing MAE 632 Additive Manufacturing Lab	Code	Title	Credit Hours	
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BME 635Advanced BiomaterialsECE 643BioNanotechnologyCET 703Graduate Research Seminar (Taken three times for 1 credit each)Capstone3Cature Research Seminar (Taken three times for 1 credit each)CET 605Master's Project (Master's Project)CET 695Special Problems (A three-month summer industry 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.)	CAE 729	Molecular Simulation of Materials	Molecular Simulation of Materials	
ECE 643BioNanotechnologyCET 703Graduate Research Seminar (Taken three times for 1 credit each)Capstone3Cet 605Master's Project or Industry Project.CET 605Master's Project (Master's Project)CET 695Special Problems (A three-month summer industry 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.)	BME 622	Scanning Electron Microscopy for Engineers	Scanning Electron Microscopy for Engineers	
CET 703 Graduate Research Seminar (Taken three times for 1 credit each) 3 Capstone 3 Students choose to complete a Master's Project or Industry Project. 3 CET 605 Master's Project (Master's Project) CET 695 Special Problems (A three-month summer industry 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.)	BME 635	Advanced Biomaterials		
Capstone 3 Students choose to complete a Master's Project or Industry Project. 5 CET 605 Master's Project (Master's Project) CET 695 Special Problems (A three-month summer industry 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.)	ECE 643	BioNanotechnology		
CET 605 Master's Project or Industry Project. CET 605 Master's Project (Master's Project) CET 695 Special Problems (A three-month summer industry 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.)	CET 703	Graduate Research Seminar (Taken three times for 1 credit each)	3	
CET 605 Master's Project (Master's Project) CET 695 Special Problems (A three-month summer industry 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.)	Capstone		3	
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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.)	CET 605	Master's Project (Master's Project)		
	CET 695	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		
	Total Credit Hours		30	

Graduate Research Seminar (Taken three times for 1 credit each)

Graduation Requirements

The average grade in curricular coursework should be B or better, and no grade below C will be counted. 50% of the non-thesis credits should be from CET courses. Other requirements are identical to the College of Engineering requirements.

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Supervisory Committee Requirements

Students who decide to pursue the thesis option must select a supervisory committee. The supervisory committee must have at least two members, with at least one member being a Graduate Faculty member in CEME. The chair must be a full-time faculty and a member of the Graduate Faculty, and may or may not be from CEME. If the chair is from CEME and a member of the Graduate Faculty, then only one other member of the committee must be from CEME and a member of the Graduate Faculty

Sample Plan of Study Thesis Ontion

Year One		
Fall		Credit Hours
Graduate Course		3
Graduate Course		3
Graduate Course		3
CET 703	Graduate Research Seminar	1
	Credit Hours	10
Spring		
Graduate Course		3
Graduate Course		3
CET 703	Graduate Research Seminar	1
CET ### MS Thesis		3
	Credit Hours	10
Year Two		
Fall		
Graduate Course		3
Graduate Course		3
CET ### MS Thesis		3
CET 703	Graduate Research Seminar	1
	Credit Hours	10
	Total Credit Hours	30

Sample Plan of Study Non-Thesis Option

Year One		
Fall		Credit Hours
Graduate Course		з
Graduate Course		3
Graduate Course		3
CET 703	Graduate Research Seminar	1
	Credit Hours	10
Spring		
Graduate Course		3
Graduate Course		3
Graduate Course		3
CET 703	Graduate Research Seminar	1
	Credit Hours	10
Summer		
CET 605 or 695	Master's Project	3
	or Special Problems	
	Credit Hours	3
Year Two		
Fall		
Graduate Course		3

Graduate Course		3
CET 703	Graduate Research Seminar	1
	Credit Hours	7
	Total Credit Hours	30

Mission

The mission of the Department of Chemical, Environmental, and Materials Engineering is to:

- Provide high-quality undergraduate and graduate education in chemical, environmental, and materials engineering that will prepare graduates for professional careers and a lifetime of learning.
- Conduct high-quality research that will advance the current body of knowledge and engage in new discoveries to improve the quality of human life; and
- · Serve the engineering profession and society through active involvement in professional organizations and contribution of professional expertise.

The departmental mission will be accomplished by providing an integrated and multidisciplinary scientific education. Graduates will be involved in the transfer of scientific discoveries to modern technologies and novel products that benefit society and minimize the impact on the environment. They will be trained to address multi-scale aspects of generating clean energy, producing novel and superior materials, and utilizing the biological revolution to manufacture new products. They will be involved in the development and manufacture of consumer products, as well as in design, operation, and control of processes in a variety of industries (e.g., petroleum, petrochemical, chemical, consumer products, semiconductor, environmental technologies, advanced materials, food, feed and pharmaceuticals).

Educational Objectives

The educational objectives of the MS program are to produce graduates whom:

- · Have advanced technical knowledge in at least one specialty area of chemical, environmental, or materials engineering;
- Have advanced capability to apply advanced knowledge to engineering problems; and
- · Have made significant contributions in at least one specialty area of chemical, environmental, or materials engineering.

Student Learning Outcomes

- Students will demonstrate an advanced knowledge of the discipline (mathematics, science, and engineering), including methodology relevant to a specialty area.
- Students will demonstrate an advanced ability to identify, formulate, and solve engineering problems to carry out supervised research.
- · Students will demonstrate an advanced ability to generate technical contributions and effectively communicate them to the scientific community.