

Zachry Department of Civil Engineering
Master of Science (M.S.) Degree Requirements
Area of Study: Environmental Engineering

Last revision: September 2014*

The Master of Science (M.S.) degree requires submission of an acceptable thesis based on the student's original research. This degree is intended for those students who are interested in a research component of their degree, particularly those who may wish to continue toward a PhD degree. The M.S. degree requires 32 credit hours, of which 8 hours may be research (CVEN 691). The university and the department place limitations on courses that can be used to meet these requirements. In addition, there are specific requirements for environmental engineering M.S. students. University requirements are described in the Texas A&M University Graduate Catalog (<http://www.tamu.edu/admissions/catalogs/>). Departmental requirements as well as requirements for the environmental engineering M.S. curriculum are described below. All environmental engineering M.S. degree candidates have the obligation of knowing and adhering to all relevant university, departmental and environmental engineering curriculum requirements. Schedules, forms, and procedures for graduate students are provided by the Office of Graduate Studies (<http://ogs.tamu.edu/>).

The following department requirements apply to students pursuing a M.S. degree in the Zachry Department of Civil Engineering.

- All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office at least one day prior to the deadline set by the Office of Graduate Studies.
- All coursework should be discussed with advisory committee chair before enrolling in course. All coursework must be consistent with the student's chosen field of study and commensurate with graduate study.
- A maximum of 6 hours of course work offered through the Business Certificate program can be used toward the M.S. degree requirements (<http://maysbschool.tamu.edu/masters/businessCert.htm>).

The environmental engineering curriculum includes three core courses that cover the fundamental topics in environmental engineering. The remaining hours of non-research course work may be chosen from elective environmental engineering courses, water resources engineering courses or other relevant courses. Students are expected to take elective environmental engineering courses. A list of the courses is included in the Appendix. Choices of these courses should result in a coherent set of courses that supports the career plans of the student. In addition to fulfilling the University and departmental requirements for the M.S. degree, a student enrolled in the Civil Engineering graduate program in the area of Environmental Engineering must satisfy the following:

- All students are required to take all the core courses listed in the Appendix of this document. These core courses should be part of all degree plans for students pursuing a M.S. degree with an interest in environmental engineering, unless the student can demonstrate that he or she has obtained an equivalent knowledge of this material by other coursework or experience.
- All students are required to take CVEN 681. This should be part of the degree plans for all students pursuing a M.S. degree in environmental engineering.
- A minimum of 18 credits of graduate level coursework taken at Texas A&M University (excluding CVEN 684 and CVEN 685).

* This document is applicable to students enrolled in the Environmental Engineering M.S. program from Fall 2014 and onwards.

- A minimum of 24 credits[†] must be taken from course offerings of the following colleges: Engineering[‡], Geosciences, and Science.
- A maximum of 9 credits of advanced undergraduate coursework (must be 400-level CVEN/OCEN/BAEN courses).
- A maximum of 7 hours of CVEN 691 or combination of CVEN 691 and CVEN 685.
- The combination of CVEN 691, CVEN 685, transfer credit, and permissible undergraduate coursework may not exceed the greater of 12 credits or one-third (1/3) of the total credits on the degree plan.

[†] 3 of these 24 credits may be outside of colleges of Engineering, Geosciences, and Science if selected from a list of courses approved by the student's specialty area as outlined by the specialty area's documented course work requirements

[‡] Certain courses within the College of Engineering are prohibited from use on the degree plan unless written justification is made by the student's advisor and approved by the Departmental Graduate Advisor prior to enrolling in the course. Please see Departmental Graduate Advisor for listing of prohibited courses.

Appendix: List of core, elective and other relevant courses[§]

Course	Freq.(yr⁻¹)
<i>A) Core Courses (Mandatory)</i>	
CVEN 601 Environmental Engineering Processes III (Bella Chu)	1
CVEN 619 Environmental Engineering Processes I (Qi Ying)	1
CVEN 620 Environmental Engineering Processes II (Bill Batchelor)	1
<i>B) Other Mandatory Courses</i>	
CVEN 681 Environmental Seminar	1
CVEN 685 Directed Studies MS/ME	Fall/Spring [^]
<i>C) Elective Courses*</i>	
CVEN 603 Environmental Engineering Management	Variable
CVEN 604 Engineering Analysis of Treatment Processes (Bill Batchelor)	1
CVEN 605 Environmental Measurements (Bella Chu)	Variable
CVEN 606 Environmental Engineering Design I (Bill Batchelor)	Variable
CVEN 607 Engineering Aspects of Air Quality (Qi Ying)	1
CVEN 609 Environmental Control of Oil and Hazardous Materials	Variable
CVEN 610 Environmental Risk Assessment (Robin Autenrieth)	Variable
CVEN 682 Environmental Remediation of Contaminated Sites (Bill Batchelor)	Variable
CVEN 684 Professional Internships	Variable
CVEN 685 Directed Studies MS/ME	Fall/Spring
CVEN 689 Special Topics	Variable
- Advanced Biological Treatment and Technology in Environmental Engineering (Bella Chu)	
- Air Quality Modeling (Qi Ying)	
CVEN 691 Research	Variable

*** The environmental engineering area is expecting to have two additional faculty members. Additional courses may become available in Fall 2015.**

D) Other Relevant Courses

Water Resources Courses

CVEN 627 Engineering Surface Water Hydrology
 CVEN 628 Advanced Hydraulic Engineering
 CVEN 658 Civil Engineering Applications of GIS
 CVEN 664 Water Resources Engineering Planning and Management
 CVEN 665 Water Resources Systems Engineering
 CVEN 674 Groundwater Engineering
 CVEN 675 Stochastic Hydrology

[§] All coursework should be discussed with advisory committee chair before enrolling in course. All coursework must be consistent with the student's chosen field of study and commensurate with graduate study.

Other CVEN Courses

CVEN 673 Transport Through Porous Media
CVEN 679 Theory of Fluid Mechanics Models
CVEN 680 Advanced Computation Methods for Fluid Flow
CVEN 688 Computational Fluid Dynamics
Relevant Geotechnical or Ocean Engineering courses w/pre-requisites.

Mathematics and Statistics Courses

MATH 601 Methods of Applied Math
MATH 602 Partial Differential Equations
MATH 609 Numerical Analysis
STAT 601 Statistical Analysis
STAT 602 Statistical Methods of Regression Analysis

Business Certificate Courses

The following four courses are required to earn a Certificate in Business, but at most two of them can be used in a M.E. degree program.

ACCT 640 Accounting Concepts and Procedures
FINC 635 Financial Management for Non-Business
MGMT 655 Survey of Management
MKTG 621 Survey of Marketing

Other Classes

AGEC 604 Natural Resource Economics
AGEC 659 Ecological Economics
AGEC 689 Water Resource Economics
AGRO 605 Pedology
AGRO 611 Introduction to Environmental Biophysics
AGRO 614 Biodegradation and Bioremediation (VAPH 614)
AGRO 615 Reclamation of Drastically Disturbed Lands
AGRO 616 Land Disposal of Waste
AGRO 617 Advanced Soil Physics
AGRO 650 Mode of Action and Environmental Fate of Herbicides
AGRO 670 Basic Environmental Toxicology
ATMO 601 Fundamentals of Atmospheric Dynamics
ATMO 602 Principles of Atmospheric Physics and Chemistry
ATMO 613 Advanced Atmospheric Chemistry
ATMO 629 Climate Change
ATMO 631 Climate Modeling
ATMO635 Atmospheric Thermal Dynamics
ATMO661 Atmospheric Turbulence
BAEN 651 Geographic Information Systems
BAEN 652 Advanced Topics in GIS
BAEN 669 Water Quality Engineering
BAEN 670 Air Pollution Engineering
BAEN 672 Small Watershed Hydrology

BAEN 673 Modeling Small Watersheds
BAEN 674 Vadose Zone Hydrology
BICH 601 Fundamentals of Biochemistry I
BIOL 650 Genomics
BIOT 601 Biotechnology Principles and Techniques I
BIOT 602 Biotechnology Principles and Techniques II
CHEN 624 Chemical Engineering Kinetics and Reactor Design
CHEN 629 Transport Phenomenon
CHEN 651 Biochemical Engineering
GEOG 626 Fluvial Geomorphology
GEOG 651 Remote Sensing for Geographical Analysis
GEOL 610 Field Methods in Hydrogeology
GEOL 620 Geology of Groundwater
GEOL 621 Contaminant Hydrogeology
GEOL 621 Contaminant Hydrology
GEOL 625 Applied Groundwater Modeling
GEOL 628 Geomorphology and Geology of Water Resources
GEOL 631 Engineering Geomorphology
GEOL 635 Engineering Geology
GEOL 641 Environmental Geochemistry
GEOL 642 Chemical and Isotopic Evolution of Groundwater
OCEN 678 Fluid Dynamics for Ocean and Environmental Engineering
OCNG 629 Lower Food Web Dynamics of Aquatic Ecosystems
OCNG 650 Aquatic Ecology
OCNG 676 Marine Environmental Policy: A Survey
POLS 645 Politics, Policy and Administration
RENR 650 Leadership Development and Management of Environmental NGOs
RENR 659 Ecological Economics
RENR 660 Environmental Impact Analysis for Renewable Natural Resources
RENR 662 Environmental Law and Policy
RENR 664 Coastal Zone Management
RLEM 601 Ecology and Land Uses
RLEM 601 Rangeland Resource Management
RLEM 623 Ecohydrology
RLEM 633 Wetland Plant Taxonomy
RLEM 640 Wetland Delineation
WFSC 611 Estuarine Ecology
WFSC 615 Mariculture
WFSC 628 Wetland Ecology
WFSC 629 Aquatic Ecology
WHMS 601 Applications and Problems in Hydrological Science
WHMS 602 Contemporary Issues in Water Resources