

Civil and Environmental Engineering MS: 2019-2020

Definition of Unit:

Progress:

Ongoing

Providing Department:

Civil and Environmental Engineering MS

Department/Unit Contact:

Ben Mohr

Mission/Vision Statement:

The mission of the civil engineering program is to offer the strong academic content necessary to produce well-educated graduates who become innovative and productive members of society. Graduates will possess both the problem solving skills and the fundamentals of critical thinking and analysis that are crucial for success within the framework of the civil and environmental engineering profession.

Program Goal 1 and Student Learning Outcomes

Define Goal:

Program Goals

Program Goal 1: Graduates of the M.S. program will have the technical competence to be successful in the chosen area of study in civil engineering professional practice or research.

Intended Outcomes / Objectives:

Student Learning Outcomes

Students of the MS program in Civil Engineering will be able to:

1. Demonstrate clear understanding of the chosen area of emphasis in civil engineering covered in course material in the graduate program.
2. Apply advanced methods in the development of solutions in the chosen area of emphasis in civil engineering.
3. Give professional presentations or write scholarly manuscripts worthy of publication in peer reviewed journals.

Program Goal 2 and Student Learning Outcomes

Define Goal:

Program Goals

Program Goal 2: Graduates of the M.S. program will have the skills to undertake technically sound analysis independently and present their work at professional meetings or publish their work in scholarly journals.

Intended Outcomes / Objectives:

Student Learning Outcomes

Students of the MS program in Civil Engineering will be able to:

1. Demonstrate clear understanding of the chosen area of emphasis in civil engineering covered in course material in the graduate program.
2. Apply advanced methods in the development of solutions in the chosen area of emphasis in civil engineering.
3. Give professional presentations or write scholarly manuscripts worthy of publication in peer reviewed journals.

Program Goal 3 and Student Learning Outcomes

Define Goal:

Program Goals

Program Goal 3: Graduates of the M.S. program will have the technical competence to successfully undertake further advanced study at the doctoral level in civil engineering or a related area, and pursue lifelong learning through professional education.

Intended Outcomes / Objectives:

Student Learning Outcomes

Students of the MS program in Civil Engineering will be able to:

1. Demonstrate clear understanding of the chosen area of emphasis in civil engineering covered in course material in the graduate program.
2. Apply advanced methods in the development of solutions in the chosen area of emphasis in civil engineering.
3. Give professional presentations or write scholarly manuscripts worthy of publication in peer reviewed journals.

Assessment Tool 1: Alumni Surveys

Goal/ Outcome/ Objective:

All

Type of Tool:

Survey

Frequency of Assessment:

Every 5 years

Rationale:

- **Alumni Survey:** One year after graduation and every five years thereafter, alumni are given a set of questionnaires to examine (1) the appropriateness and relevance of the curriculum structure to their activities after graduation, (2) the extent to which they acquire needed skills for job performance and the degree of engagement in professionally-related learning experience, and (3) whether the curriculum objectives and outcomes are met. The metric that has been established is that at least eighty percent of alumni respondents “agree” or “strongly agree” that the program provided them with adequate preparation. A lesser percentage and response on individual questions that constitute less than fifty percent combined “agree or strongly agree” would generate a concern, which would require a review and actions by department ABET advisory committee.
1. The CEE MS degree has provided me with skills to be successful in civil engineering professional practice.
 2. The CEE MS degree has made me aware of the present day professional practice in my area of study in civil engineering.
 3. The CEE MS degree has provided me with the necessary skills to present work at professional meetings or publish work in scholarly journals.
 4. The CEE MS degree has provided me with skills to independently undertake technically sound analysis.
 5. The CEE MS degree has provided me with the technical competence needed to successfully undertake further advanced study at the doctoral level in civil engineering or a related area.
 6. The CEE MS degree has provided me with the technical competence to pursue lifelong learning through professional education.
 7. Would you recommend the TTU CEE MS degree program to other potential candidates in future?

The first six questions were framed as multiple choice (no opinion, strongly disagree, disagree, agree and strongly).

Assessment Tool 2: Completion of thesis and oral defense

Goal/ Outcome/ Objective:

All

Type of Tool:

Tracking Spreadsheet

Frequency of Assessment:

Annual

Rationale:

- **Completion of thesis and oral defense:** Students are monitored each semester for appropriate progress in their program of study based on their own individualized program. The student's program of study (also referred to as "plan of study" previously) is developed by the student as soon as an advisory committee is selected. In this plan of study, the student outlines a thoughtful plan on which courses to take, the order in which these courses should be taken, and the amount of effort to be devoted to research/project each semester.

Either formally or informally, the student has to identify a research problem of interest, and then present a plan for self-inquiry that demonstrates an ability to independently address the research objectives to the satisfaction of the advisory committee. During this stage, a student receives constructive input from the Advisory Committee on improving the plan to make a successful study more likely.

The student must complete a comprehensive examination, a part of which is open to the public, conducted by the Advisory Committee at least three weeks prior to graduation. During this stage, the quality of the student's work and development as an independent thinker is assessed by the advisory committee to determine if he/she is indeed ready to be classified as a "Master of Science" in Civil Engineering. Prior to and after the comprehensive oral examination, the thesis document goes through rounds of editing and revision in close consultation with the major advisor and the advisory committee until it is of acceptable quality and meets graduate school requirements.

The student has to submit the final version of his/her thesis (for thesis option) or project report (for non-thesis option) to the Graduate School at least two weeks prior to graduation.

Assessment Tool 3: Publications and presentations

Goal/ Outcome/ Objective:

All

Type of Tool:

Tracking Spreadsheet

Frequency of Assessment:

Annual

Rationale:

- **Publications (peer-reviewed and conference) and presentations**

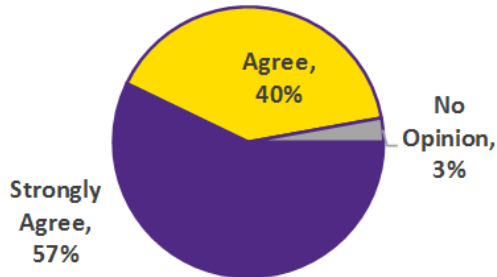
A critical element of the process for facilitating a students' development in independent thinking is the requirement that each student work on a research project of real-world significance to the Civil Engineering discipline and to present their work at a peer-reviewed conference and/or publish it in a peer-reviewed journal.

Results 1: Alumni Surveys

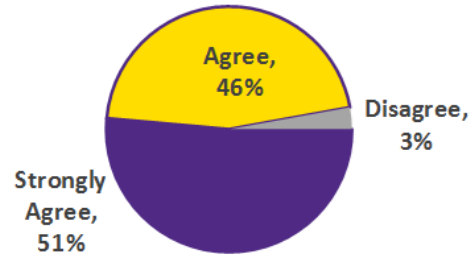
Results:

See attached file.

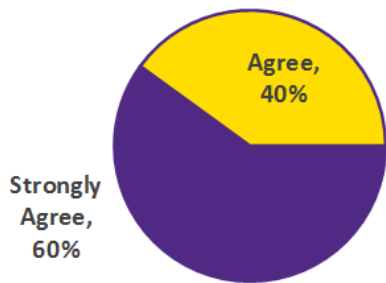
Did the CEE MS degree program provide you with the technical knowledge to be successful in civil engineering professional practice?



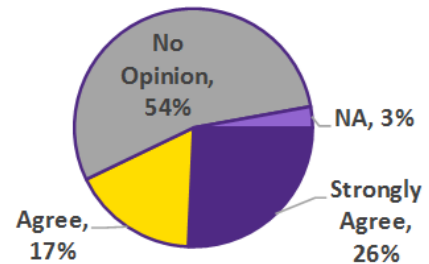
Did the CEE MS degree program provide you with the necessary communication skills to present work at professional meetings and/or publish work in scholarly journals?



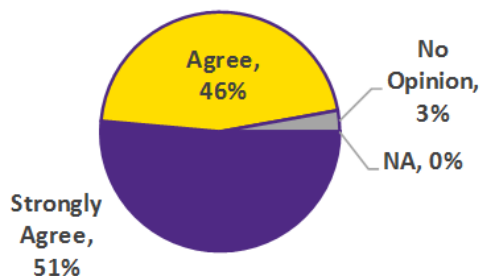
Did the CEE MS degree program provide you with the ability to undertake technical work independently?



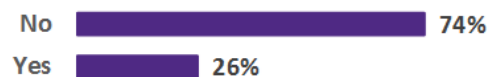
Did the CEE MS degree program provide you with the technical competence needed for advanced study at the doctoral level in civil engineering or a related area?



Did the CEE MS degree program provide you with the technical competence to pursue lifelong learning through continuing professional education?



Have you received any award from a professional civil engineering or related organization?



Would you recommend the TTU CEE MS degree program to other potential candidates in the future?



Attachments:

1.png

Results 2: MS and PhD Graduates**Results:**

See attached file.

Masters:

First Name	Last Name	Degree	Year	Thesis/Project Title	Advisor
Godson	Adjovu	MS	2020	Evaluating the Performance of a GIS-Based Tool for Delineating Swales Along Two Highways in Tennessee	Dr. Alfred
Nicholas	Davis	MS	2020	Earthquake Ground Motion Suites for Nuclear Safety-Related Structures in Oak Ridge, TN	Dr. Tim Hu
Austin	Mathews	MS	2020	Going Beyond ACI 332: Commerical/Residential Enhanced Durability Concrete	Dr. L. K. Cr
Setul	Shah	MS	2019	Telecommuting and Its Impact On the Trips Made Daily by Telecommuters	Dr. Daniel
Armstrong	Aboah	MS	2019	An Investigation Into The Factors That Influence The Use of Transportation Network Company Services Using National Household Travel Survey Data	Dr. Daniel
Lydia	Johnson	MS	2019	Modeling Trip Generation with Metropolitan and National Household Travel Survey Data	Dr. Daniel
Alisa	Kirkpatrick	MS	2019	Nutrients in Highway Stormwater Runoff in Tennessee: Their Characterization and Correlation with Land Use and Meteorological Factors	Dr. Tania I
Philip	Griggs	MS	2019	(non-thesis) MOM Lab Manual	Dr. Jane L
Alex	Davis	MS	2019	Developing an Early Warning System for Floods for Window Cliffs State Natural Area, Putnam County, TN	Dr. Alfred
Alex	Kelley	MS	2019	The Effect of Supplementary Cementitious Material Substitution Rates on Tennessee Bridge Deck Portland Cement Concrete Permeability	Dr. L. K. Cr
Ryan	Wigner	MS	2019	Potential Contributions of Atmospheric Deposition to Nitrates and Ammonia in Tennessee's Highway Stormwater Runoff	Dr. Tania I
Brandon	Anderson	MS	2019	Post-Yield Stiffness of Bridge Piers for Nonlinear Analysis	Dr. Tim Hu

Zachery

Grigg

MS

2019

Constant Ductility Inelastic Seismic Design Spectra – Variability in Design Suites

Dr. Tim Hu

Ph.D.

First Name	Last Name	Degree	Year	Dissertation Title
Juliet	Ohemeng-Ntiamoah	PhD	2020	Anaerobic Co-Digestion of Waste Activation Sludge With Food Waste and Fats and Grease: Effects on Digester Performance, Microbial Community Structure and Activity
Grace	McClellan-Tinker	PhD	2020	Microbial Community Structural and Functional Response to Optimization of a Water Resource Recovery Facility for Nutrient Remova
Md Nowfel	Bhuyian	PhD	2019	Development of Morphologically Consistent Digital Elevation Model for Improved Riverine Flood Impact Assessment In Data-Poor Areas

Attachments:

SACS MS-PhD 2020.xlsx

Modifications and Continuing Improvement

Goal/Objective/Outcome Number:

All

Program Changes and Actions due to Results:

The indicators of program health show the CEE MS program to have remained healthy and to have advanced itself modestly notwithstanding significant reductions in non-recurring budgetary allocations that occurred over the last two years of the review period. Census of the MS program showed it consistently had more than 20 students each academic year. The graduation rate went up by 25 percent, rising from 7.4 MS graduates per year in the previous review period to 9.4 MS graduates per year in the current review period. The BS/MS fast-track program continued to enable the Department attract exceptional students from the CEE undergraduate program at TTU into the MS program. The quality of graduate applications received by the program also improved, contributing in part to the increased number of applicants that were admitted with full standing.

In terms of the program curriculum, Geotechnical Engineering was added as a new CEE sub-discipline, adding to the course offerings at the graduate level, creating more research opportunities for the Department, and providing prospective MS students with an additional sub-discipline in which to specialize. CEE faculty worked at keeping the curriculum abreast of significant developments in their respective fields as well as to address the changing needs of the profession. In line with this, new courses were developed over the five-year period as well as incremental updates made to the content of existing courses.

Graduates of the MS Program whose desire was to enter into professional practice secured employment with major public or private sector agencies either before graduation or shortly thereafter. Several of these agencies are repeat employers of the MS programs' graduates, which serves as evidence of their pleasure with the program's products. Graduates of the MS program that continued on to pursue a doctoral degree have done so at reputable universities that include the University of Texas, Austin, Texas A & M University, College Station, Texas, and Southampton University, UK.

CEE faculty continue to be productive in research and scholarly work. Additionally, their MS students have been co-authors of several of the papers either published in journals or presented at conferences. Several of these papers have been based on the thesis research undertaken by these MS students. CEE faculty continue to have MS students participate in conferences, workshops, and other professional development activities.

Vision

With a long term goal of becoming a nationally recognized university and having a regionally competitive CEE graduate program that is able to attract well qualified applicants, provide funding support to admitted students, and provide a high quality graduate school experience, the program cannot rest on its current achievements. Thus, going forward, the CEE Research and Graduate Affairs Committee and the CEE Department, with inputs from the program's constituencies, will continue to use its improvement process to enhance the quality of the graduate experience offered at TTU. Specific short and long term goals to be pursued by the Department include:

- Recruitment of faculty with research expertise in niche areas to be identified by the CEE Department as targets for attaining regional recognition;
- Recruitment of faculty that are both excellent teachers as well as researchers to strengthen products of the program academically, prepare them well for advanced study, and prepare them well for professional practice;
- Have a graduate course offering in civil and environmental engineering that is complemented by non-civil engineering courses that keep our students at the cutting edge of research and professional practice;
- Increase the number of proposals authored by CEE faculty to funding agencies such as Department of Transportation, National Science Foundation, and Federal Highway Administration with the goal of increasing the dollar amount of funded research done by the Department; and finally,
- Develop a set of actions for the progressive increase in graduate program student enrollment.

Link to 'Tech Tomorrow' Strategic Plan:

Technology Infused Programs, Research, Scholar, Intellect, and Creativity, Programs, Certificates, and Training, Economic Development