

**Institutional Effectiveness  
2022-2023**

**Program:** Civil Engineering MS

**College and Department:** College of Engineering, Department of Civil and Environmental Engineering MS

**Contact:** Dr. Ben Mohr

**Mission:**

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.

**Attach Curriculum Map (Educational Programs Only): \*See Appendix 1.**

**SLO1: UNDERSTANDING OF SUB-DISCIPLINE**

**Define Outcome:**

MS graduates will demonstrate clear understanding of the chosen sub-discipline of civil engineering covered in course material in the graduate program.

**Assessment Methods:**

Summary of Grades and Five-Year Average of Course Enrollment (when offered) in Core MS CEE Courses

- Water Resources and Environmental Engineering
  - CEE 6520 - Open Channel Hydraulics
  - CEE 6610 - Applied Environmental Chemistry
- Structural Engineering and Structural Mechanics
  - CEE 6350 - Finite Element Analysis
  - CEE 6930 - Theory of Elasticity
- Transportation Engineering
  - CEE 6410 - Traffic Control Systems
  - CEE 6470 - Transportation Demand Analysis
- Civil Engineering Materials
  - CEE 5190 - Advanced Mechanics of Materials
  - CEE 6300 - Multiscale Analysis of Concrete
- Geotechnical Engineering
  - CEE 5810/6900 - Foundation Engineering
  - CEE 6800 - Advanced Soil Mechanics
  - CEE 6820 - Seepage and Slope Stability

**Criteria for Success (Thresholds for Assessment Methods):**

Program Objective #1 (technical competence) is evaluated through course grades in core courses, the number of degrees completed, and alumni survey results. The average is computed based on a four-point scale in which A<sup>o</sup> 4, B<sup>o</sup> 3, C<sup>o</sup> 2, D<sup>o</sup> 1, and F<sup>o</sup> 0. The lowest average value is 3.00. In most cases, the average value well exceeds 3.00, demonstrating that students achieve technical competence on course content.

**Results and Analysis:**

Table 9. Summary of Average Grade and Average Enrollment in Core CEE MS Courses:

Course	Average Grades (by academic year)					Average number of students
	2017-18	2018-19	2019-20	2020-21	2021-22	
CEE 6300 – Multiscale Analysis of Concrete	4.00	4.00	4.00	4.00	-	4.75
CEE 6410 – Traffic Control Systems	-	-	-	-	4.00	3.00
CEE 6470 – Transportation Demand Analysis	4.00	3.33	4.00	3.00	3.50	2.80
CEE 6520 – Open-Channel Hydraulics	4.00	4.00	4.00		4.00	4.00
CEE 6610 – Applied Environmental Chemistry	-	3.57	-	4.00	3.75	6.00
CEE 6800 – Advanced Soil Mechanics	3.40			3.67		5.50
CEE 6820 – Seepage and Slope Stability		3.50				6.00
CEE 6930 – Theory of Elasticity	3.33	3.00	3.00	3.50	3.75	5.80
CEE 6350 – Finite Element Analysis	3.33	3.14	3.50	3.33	3.57	5.00

**Use of Results to Improve Outcomes:**

Based on the assessment metrics for AY2022-23 in conjunction with previously defined thresholds, no actions are required.

**SLO2: APPLY ADVANCED METHODS****Define Outcome:**

MS graduates will apply advanced methods in the development of solutions in the chosen sub-discipline of civil engineering.

**Assessment Methods:**

Grades for Core Courses: CEE MS students are required to complete sub-discipline courses and electives that provide both an in-depth and broad understanding of civil engineering to students.

**Criteria for Success (Thresholds for Assessment Methods):**

The threshold of acceptability is 3.0 for average scores on the following:

- MS Proposal Presentations
  - Content
  - Response to Questions and Comments
- MS Thesis Defense Presentations
  - Content
  - Response to Questions and Comments

**Results and Analysis:**

Table 10. Assessments of MS Proposal Presentations

Assessed by	Academic Year	Number of Evaluations	Average Score <sup>1</sup>				Response to Questions and Comments
			Content	Visual Aids	Presenter Preparation	Presentation Mechanics	
Committee Members	2017-2018	16	3.420	3.360	3.360	3.390	3.170
	2018-2019	16	3.027	3.000	3.112	3.140	2.945
	2019-2020	5	3.000	3.667	3.333	3.667	3.500
	2020-2021	9	3.220	3.330	3.440	3.330	3.440
	2021-2022	1	3.000	4.000	3.000	3.000	3.000
Other Faculty in Attendance	2017-2018	0					
	2018-2019	0					
	2019-2020	2	3.500	3.500	3.000	3.000	3.000
	2020-2021	0					
	2021-2022	0					

Assessment Scale: 1 = Not Acceptable, 2 = Below Expectations, 3 = Meets Expectations, 4 = Above Expectations

Table 11. Assessments of MS Thesis Defense Presentations

Assessed by	Academic Year	Number of Evaluations	Average Score <sup>1</sup>				Response to Questions and Comments
			Content	Visual Aids	Presenter Preparation	Presentation Mechanics	
Committee Members	2017-2018	8	3.500	3.500	3.750	3.250	3.630
	2018-2019	15	3.263	3.549	3.881	3.596	3.333
	2019-2020	15	3.566	3.400	3.534	3.300	3.200
	2020-2021	15	3.550	3.600	3.670	3.600	3.640
	2021-2022	2	2.500	3.000	3.000	2.500	2.500
Other Faculty in Attendance	2017-2018	2	4.000	3.500	4.000	4.000	4.000
	2018-2019	2	4.000	4.000	4.000	3.500	3.500
	2019-2020	3	4.000	2.667	3.667	4.000	4.000
	2020-2021	1	4.000	4.000	4.000	3.000	4.000
	2021-2022	0					

Assessment Scale: 1 = Not Acceptable, 2 = Below Expectations, 3 = Meets Expectations, 4 = Above Expectations

**Use of Results to Improve Outcomes:**

Based on the assessment metrics for AY2022-23 in conjunction with previously defined thresholds, no actions are required.

**SLO3: CONDUCT PROFESSIONAL PRESENTATIONS AND WRITE SCHOLARLY MANUSCRIPTS**

**Define Outcome:**

MS graduates will demonstrate the ability to conduct professional presentations or write scholarly manuscripts worthy of publication in peer reviewed journals.

**Assessment Methods:**

Thesis and Oral Defense Rubric: CEE MS students are required to undertake thesis research or a project independently under the direction of a CEE faculty advisor and the student's graduate advisory committee. Students through this experience learn to manage a significant research or project effort, acquire the technical knowledge and skills required for its successful completion, learn to pose the appropriate questions whose answers lead to the advancement of their research or project, and also learn to have meaningful periodic interaction with their advisory committee.

**Criteria for Success (Thresholds for Assessment Methods):**

The threshold of acceptability is 3.0 for average scores on the following:

- MS Proposal Presentations
  - Visual Aids
  - Presenter Preparation
  - Presentation Mechanics
- MS Thesis Defense Presentations
  - Visual Aids
  - Presenter Preparation
  - Presentation Mechanics

**Results and Analysis:**

Student Co-Authored Publications, Presentations, and Awards/Accolades:

Academic Year	Student Co-Authored Publications			Oral Presentations		Regional / National Awards
	Journals	Conference Proceedings	Thesis Documents	MS Defense	Conference	
2017-18	10	9	10	10	11	3
2018-19	9	12	12	12	12	1
2019-20	6	3	7	7	2	2
2020-21	6	7	8	8	6	1
2021-22	9	22	7	7	22	1

**Use of Results to Improve Outcomes:**

Based on the assessment metrics for AY2022-23 in conjunction with previously defined thresholds, no actions are required.

**Summative Evaluation:**

Based on the assessment metrics for AY2022-23 in conjunction with previously defined thresholds, no actions are required.

**Assessment Plan Changes:**

No changes are anticipated for the next academic year.

**Appendix 1: Curriculum Maps**

**Civil Engineering, MS (Thesis): Mapping of the Graduate Curriculum and Student Learning Objectives**

Course	Title	Student Outcomes		
		SLO 1: Sub-discipline course knowledge	SLO 2: Advanced methods in sub-discipline	SLO3: Communication Skills
Core Sub-Discipline Courses	6-9 credits minimum in subdiscipline	X	X	
Program of Study Courses	15-18 credits of elective courses approved by student's advisory committee	X	X	
CEE 6910	Graduate Seminar (1 credit)			X
CEE 6990	Research and Thesis (6 credits total)		X	X

**Civil Engineering, MS (Non-Thesis): Mapping of the Graduate Curriculum and Student Learning Objectives**

Course	Title	Student Outcomes		
		SLO 1: Sub-discipline course knowledge	SLO 2: Advanced methods in sub-discipline	SLO3: Communication Skills
Core Sub-Discipline Courses	6-9 credits minimum in subdiscipline	X	X	
Program of Study Courses	21-24 credits of elective courses approved by student's advisory committee	X	X	
CEE 6910	Graduate Seminar (1 credit)			X
CEE 6980	Directed Studies Project Work (3 credits)		X	X