



University Council

February 9, 2024

UNIVERSITY CURRICULUM COMMITTEE – 2023-2024

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Dear Colleagues:

The attached proposal from the College of Engineering to offer the existing major in Civil and Environmental Engineering (M.S.) with an Area of Emphasis in Civil Engineering online will be an agenda item for the February 16, 2024, Full University Curriculum Committee meeting.

Sincerely,

Susan Sanchez, Chair

cc: Provost S. Jack Hu

Dr. Marisa Pagnattaro

PROPOSAL FOR AN ONLINE PROGRAM

Date: October 10, 2023

College/School: College of Engineering

Department/Division: School of Environmental, Civil, Agricultural and Mechanical Engineering (ECAM)

Program (Major and Degree): Civil and Environmental Engineering (M.S. Non-Thesis) with an Area of Emphasis in Civil Engineering

Will any approved areas of emphasis be offered under this major? Civil Engineering

Proposed Effective Date: Fall 2024

This document presents a proposal for a fully online version of the extant non-thesis-based Master of Science in Civil and Environmental Engineering with an Area of Emphasis in Civil Engineering, which is an existing emphasis in the on-campus program.

1. Assessment

A needs assessment demonstrating a sufficient pool of qualified applicants.

The major in Civil and Environmental Engineering (M.S.) with an Area of Emphasis in Civil Engineering is viable for online launch. Student demand is stable nationally and increasing in Georgia, the labor market is strong and increasing faster than average, and only one Georgia institution, Kennesaw State University, offers an online Civil Engineering program. Civil engineering professionals most commonly hold a bachelor's degree, while around 25 to 30 percent hold a master's degree. In this environment, a master's degree is valuable for career advancement and promotion.

Student Demand Assessment

Student demand for civil engineering master's degrees has increased at the state and national levels.

Civil engineering master's completions grew at an annualized rate of 1.5 percent nationally and 7.5 percent in Georgia. By contrast, regional completions declined at a rate of -3.3 percent during the same period. Overall, civil engineering grew about as fast as average nationally, slower than average regionally, and faster than average in the state. These trends suggest student demand for civil engineering is stable nationally and stronger in Georgia.

IT Career Finder ranks civil engineers fourth on its "Best Engineering Careers for the Future" list. Similarly, US News (2023) evaluates civil engineering as the fourth-best engineering career and notes that master's degrees typically improve career opportunities and wages (<https://money.usnews.com/careers/best-jobs/rankings/best-engineering-jobs>).

Labor Market Assessment

The market for civil engineering programs is established, but there is room for an additional program, especially online.

Employment projections combined with educational attainment in relevant occupations indicate a moderately positive outlook for individuals holding a master's degree in civil engineering (refer to Figures 1 and 2 below; data sourced from Projections Central).

In aggregate, relevant occupations are expected to grow about as fast or faster than average at each geographic level (see Table 1) in the near term.

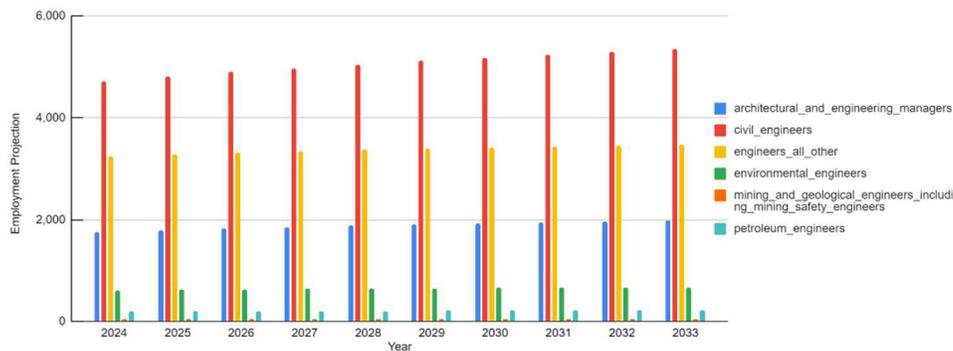
Table 1 - Aggregate civil engineering-related job availability by geographic level.

	Georgia	Southeast	National
2016	13,610	103,360	483,600
2026	15,870	118,870	525,700
Growth Rate	16.6%	15.0%	8.7%
Total Annual Openings	1,260	9,360	39,500

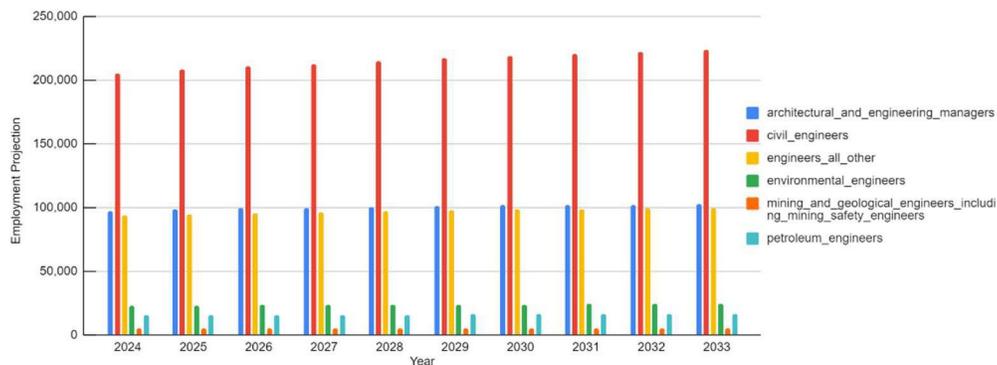
Source: [Projections Central](#)

Note: Total employment is projected to grow by 7.4 percent nationally, 11.1 percent regionally, and 11.7 percent in Georgia between 2016 and 2026.

In the long term, civil engineers will see more rapid growth than architectural and engineering managers (see Figures 1 and 2). Master’s degrees will be fairly common in related occupations; bachelor’s degrees appear to be the standard credential. This breakdown suggests that a master’s degree could help civil engineering professionals advance their careers.

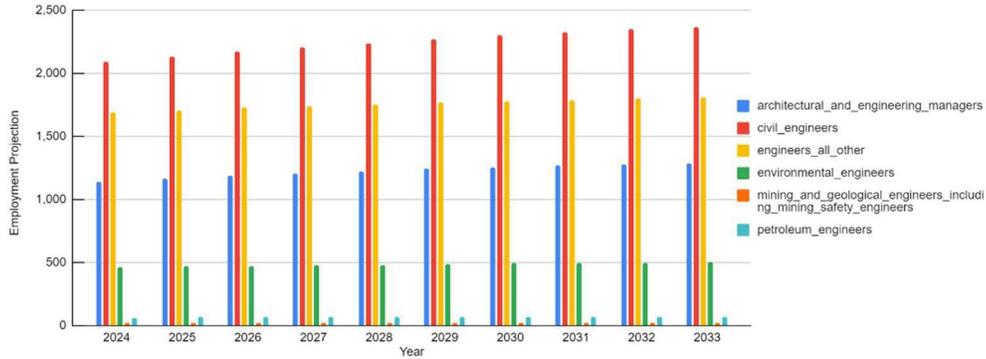


(a) Employment Projection (Count) for Workers with a Bachelor's Degree in Georgia.

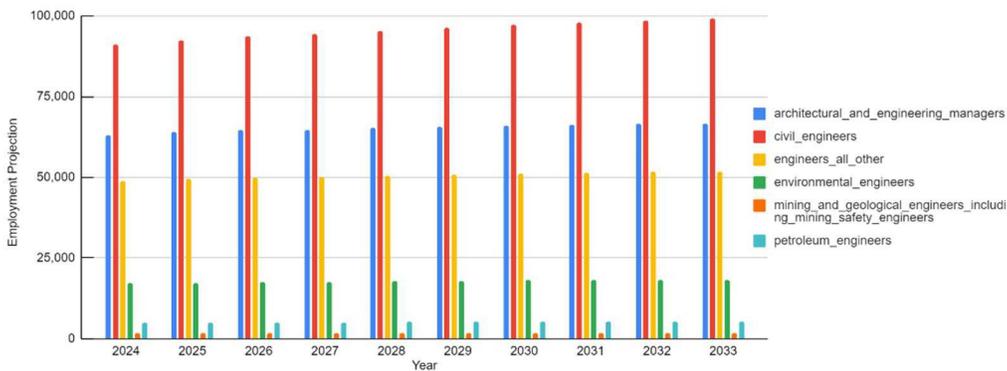


(b) Employment Projection (Count) for Workers with a Bachelor's Degree in the U.S.

Figure 1 - Employment Projection for Workers with a Bachelor's degree.



(a) Employment Projection (Count) for Workers with a Master's Degree in Georgia.



(b) Employment Projection (Count) for Workers with a Master's Degree in the U.S.

Figure 2 - Employment Projection for Workers with a Master's Degree.

Competitive Assessment

The market for civil engineering master's degree programs can support an additional online degree.

Distance programs accounted for 18.9 percent of selected master's programs in the United States and 30.6 percent in the region, as shown in the graphics below. In Georgia, only two institutions report master's degree programs under *Civil Engineering* – Georgia Institute of Technology and Kennesaw State University. Only Kennesaw State reports an online program in civil engineering. Georgia Tech (<https://ce.gatech.edu/ms-civil>) only offers an on-campus program, which makes pursuing an advanced degree more challenging for working individuals. Kennesaw's program (<https://engineering.kennesaw.edu/civil-environmental/degrees/ms-civil-requirements.php>) provides general training in civil engineering but does not provide training in specialized areas such as “Structural and Geotechnical engineering”—skills demanded by the job market.

Within the United States, Figure 3 shows that competitive conditions support an additional civil engineering program.

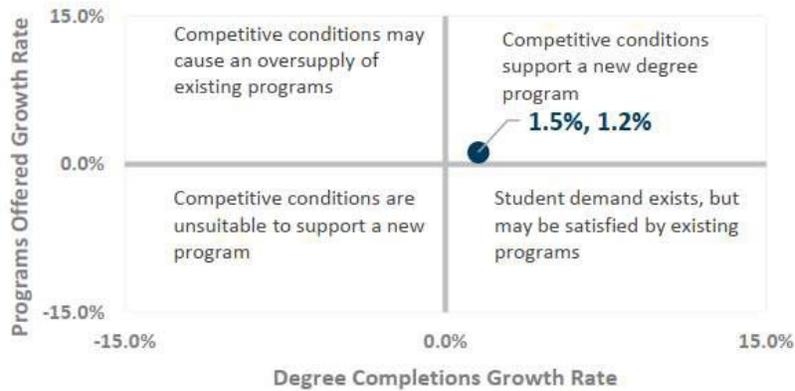


Figure 3 - National Competitive Saturation.

There were at least 45 institutions with online civil engineering master’s degrees in the United States. Table 2 below shows some of the closest institutions geographically.

Table 2 - Regional Online Programs.

Institution	Program	Delivery Format
Auburn University	Master of Civil Engineering	Online
Clemson University	Master of Engineering (Risk Engineering and System Analytics)	Online
Johns Hopkins University	Master of Civil Engineering	Online or Hybrid
Kennesaw State University	M.S. in Civil Engineering	Online
University of Central Florida	M.S. in Civil Engineering	Online
University of Florida	M.E. or M.S. in Civil Engineering	Online
Mississippi State University	M.S. in Civil Engineering	Online
Florida State University	Master of Engineering in Civil Engineering	Online
North Carolina State University	Master of Civil Engineering	Online
University of Tennessee - Knoxville	M.S. in Civil Engineering	Online
University of Louisville	M.S. in Civil Engineering	Online
University of South Carolina	M.S. or M.E. in Civil Engineering	Online

2. Admission Requirements

All requirements for admission to an Online Academic Degree Program will be the same as those for the same degree at an authorized unit.

Students holding a B.S. or an M.S. in engineering from an ABET accredited program or a B.S. or an M.S. in a related field from an accredited institution are invited to apply for admission. Students with degrees in non-engineering disciplines may be asked to take additional selected course work to adequately prepare them for their studies. No GRE will be required, although it is encouraged.

The existing requirements for consideration for admission to the College of Engineering’s graduate programs are listed below:

- Completion of a B.S. and M.S. (for Ph.D. applicants) with minimum GPA of 3.0 (out of 4.0) from an ABET accredited program or program in a related field. The average undergraduate GPA and graduate GPA of recent accepted students is 3.4 and 3.6, respectively.

- UGA will accept satisfactory scores on either the TOEFL or IELTS language proficiency examinations. Scores must be reported to UGA electronically by the testing agency.
 - The minimum TOEFL score requirement: overall score of 80 with at least 20 on speaking and writing
 - The minimum IELTS score requirement: overall band-width of 6.5, with no single band (score) below 6.0

Applicants whose primary language is not English must submit official TOEFL or IELTS scores that are not more than two years old. Applicants who have received degrees from accredited institutions in the U.S. or from institutions in countries where English is the primary language are usually not required to submit scores. If such an applicant received the degree more than two years prior to application to the Graduate School and has been residing/working in a country where the primary language is not English, he or she must submit current scores.

3. Program Content

The academic standards for the proposed online M.S. in Civil and Environmental Engineering are the same as those for the existing M.S. in Civil and Environmental Engineering.

The program requirements for the online Area of Emphasis in Civil Engineering under the major in Civil and Environmental Engineering (M.S.) mirror those of the on-campus program (<https://engineering.uga.edu/ms-civil-environmental-engineering>), with the following course substitutions shown below:

On-Campus M.S. Requirements	Online M.S. Requirements
ENGR 7010, Project-Focused Masters Research (3 hours)	ENGR 7030E, Project-Focused Masters Learning (3 hours) - NEW
ENGR 8950, Graduate Seminar (1 hour)	CVLE 6930E, Structural Engineering Studio (3 hours) - NEW
Core Coursework (9 hours): see below	Core Coursework (9 hours): see below
Elective Coursework (20 hours): see below	Elective Coursework (18 hours**): see below

Note: ** reduced to 18 credit hours due to the graduate seminar substitution.

1. Core [C] Coursework Options:

a. Structural and Geotechnical Engineering

Course Options
CVLE 6910E, Computational Modeling (3 hours) - NEW
CVLE 6870E Solid Mechanics (3 hours) - NEW
CVLE 6940E Bridge Engineering Studio (3 hours) - NEW

b. Transportation and Pavement Engineering

Course Options
CVLE 6210E, Transportation Engineering Studio (3 hours) – NEW
CVLE 6220E, Highway Design & Traffic Safety (3 hours) – NEW
CVLE 6470E, Pavement Engineering Studio (3 hours) - NEW

2. Elective [E] Coursework Options:

The following elective courses are identified based on the latest in-demand job skills' analysis and will be created:

Courses
CVLE 6820E, Construction Management and Technologies (3 hours) - NEW

CVLE 6810E, Project Management Principles (3 hours) - NEW
CVLE 6860E, A.I. and Informatics in Civil Engineering (3 hours) - NEW
CVLE 6960E, Foundation Engineering Studio (3 hours) - NEW
CVLE 6880E, Forensics of Civil Engineering Materials (3 hours) - NEW
CVLE 6840E, GIS in Civil Engineering Applications (3 hours) - NEW
Other courses approved by faculty advisor

The program of study requires **33 credit hours**. The online curriculum will consist of 10 selected ‘E’ classes offered in 8-week blocks over two years and one Project-Focused Research course. The 1-credit hour graduate seminar course (ENGR 8950) will be substituted with a 3-credit hour Engineering Studio course. As a result, 18 credit hours of elective coursework will be required. The course name, “Studio,” is proposed to create opportunities for group work and bring senior civil engineers’ work experience and case studies to the studios so that remote learners can network with them, as well as learn from them and their peers.

Table 3 shows a sample curriculum. The proposed online program will initially start with the Structural and Geotechnical Engineering track and will be able to offer an increased number of elective courses when the Transportation and Pavement track becomes available.

Table 3 - Sample Curriculum (Structural and Geotechnical Engineering Track)

Year 1	Block #1 (Fall)	[E] CVLE 6820E (3 hrs) Construction Management and Technologies
	Block #2 (Fall)	[E] CVLE 6840E (3 hrs) GIS in Civil Engineering Applications
	Block #3 (Spring)	[C] CVLE 6940E (3 hrs) Bridge Engineering Studio
	Block #4 (Spring)	[C] CVLE 6870E (3 hrs) Solid Mechanics
	Block #5 (Summer)	[C] CVLE 6910E (3 hrs) Computational Modeling Studio
Year 2	Block #6 (Fall)	[E] CVLE 6810E (3 hrs) Project Management Principles
	Block #7 (Fall)	[E] CVLE 6860E (3 hrs) A.I. and Informatics in Civil Engineering
	Block #8 (Spring)	[E] CVLE 6960E (3 hrs) Foundation Engineering Studio
	Block #9 (Spring)	[E] CVLE 6880E (3 hrs) Forensics of Civil Engineering Materials
	Block #10 (Summer)	[O] CVLE 6930E (3 hrs) Structural Engineering Design Studio [O] ENGR7030E (3 hrs) Project-Focused Masters Learning

Note: C – Core coursework; E – Elective coursework; O – Other required coursework.

Technological resources such as Zoom, Slack, and eLC will be leveraged. A combination of live classes and self-paced learning will be used. Students will be admitted in a pilot cohort of 35 students in fall 2024. The overall target number of online cohorts will be determined over time based on ongoing evaluation related to capacity, resources, and continuous curricular assessment.

4. Student Support Services

Students enrolled in the online program will work with a program advisor. The advisor will be responsible for the following: advising students about the program of study and courses to be taken each semester; responding to students' needs regarding courses, how to register via Athena, and how to work in eLC; and addressing any registration flags.

The College of Engineering will provide resources to assist students with career development. Similar to all students at the university, students will have access to college- wide resources such as

the Office of Financial Aid and the Office of Student Care and Outreach. Students with disabilities can register and be assigned a counselor within the Disability Resource Center. All students will be required to have functioning computers with the latest version of a compatible web browser, a web cam, a microphone, and a high-speed internet connection. These requirements are essential because all of the academic content and a majority of the advising will occur in a virtual format.

5. Resident Requirements

Residence requirements are identical to those established for the authorized degree program.

6. Program Management

A faculty member will serve as the Online M.S. in Civil and Environmental Engineering Program Director to maintain program processes and procedures, with the support of the full-time staff member who will provide administrative support to the faculty director. They will work closely with the School of ECAM graduate program coordinator(s) for graduate matters.

Additionally, Civil Engineering faculty serving as academic faculty mentors to students in the online program will provide support for program maintenance. Civil Engineering faculty who are serving as instructors of online course offerings will maintain curricular and instructional quality. Monthly program meetings will allow faculty to collaborate and continuously evaluate program needs. Annual review of program Student Learning Objectives will allow faculty to further assess student success and program effectiveness.

The deadline for applying to the Online M.S. in Civil and Environment Engineering with an Area of Emphasis in Civil Engineering is April 1st. Students will generally matriculate in the fall semester. The duration of the 33-credit hour program is 2 years (or 6 semesters), and the anticipated start semester is Fall 2024.

7. Library and Laboratory Resources

There are no laboratory requirements for the program. In terms of library access, students will have access to Galileo and GIL. Students will be required to meet the basic technology necessary to use eLC as the program is designed to be online.

8. Budget

The budget below was developed assuming a cohort model with once per year enrollment in the fall. The enrollment target will be 35 students initially. The budget assumes that online learners complete the program in 2 years.

A total of 11 courses will be taught each year. The recurring budget includes the cost of faculty instruction (approximately \$10k per course for 9 courses taught by the Civil Engineering faculty) and part-time instructors' salary at \$10k per course for 2 courses in YR 2 (note 2 cohorts). The CVLE faculty may use the budget to pay an extra compensation or buyout a course per discussion with the school chair. The cost of TAs (i.e., Ph.D. students) for student engagement is budgeted at \$30k per TA.

Table 4 presents the proposed budget. The program will have a net positive revenue by FY2027, assuming steady enrollment at 35. Funds from the Office of Instruction and the College of Engineering will be used to cover initial program deficits in the first three years.

The School of ECAM will use the e-rate return to pay for the operational cost of the proposed online program.

Table 4 – Proposed Budget.

Expense	FY24 (prep yr)	FY25 (operating yr 1)	FY26 (operating year 2)	FY27 (operating year 3)	FY28 (operating year 4)	FY29 (operating year 5)
Start Up						
Equipment/Technology	\$9,000					
Advertising thru March	\$35,000					
Travel (e.g., conf/expo) for recruitment	\$5,000					
Faculty salary/benefits for course dev. (\$10k/course) x 3 & 6 courses, FY24 & 25	\$30,000	\$60,000				
Part-time faculty salary for course dev. (\$10k/course) x 1 & 1 course, FY24 & 25	\$10,000	\$10,000				
Start Up Subtotal	\$89,000	\$70,000				
Recurring [note: 2% inflation]						
Administration/Faculty Director Salary (\$8.5k/yr)	\$4,000	\$8,500	\$8,670	\$12,381	\$12,628	\$12,881
CVLE Faculty Compensation for Providing Feedback on Online Applications (\$3k/yr)	\$3,000	\$3,060	\$3,121	\$4,457	\$4,546	\$4,637
Program Advisor/Staff (\$41k/yr)	\$20,000	\$41,000	\$41,820	\$63,131	\$64,394	\$65,682
CVLE Faculty Instruction (\$10k/course) x 9 courses		\$40,000	\$91,800	\$131,090	\$133,712	\$136,386
Part-time Faculty Instr. (\$10k/course) x 2 courses		\$10,000	\$20,400	\$20,808	\$21,224	\$25,469
Travel (conf/expo/local visits) for Recruitment		\$5,000	\$5,100	\$5,202	\$5,306	\$2,165
TAs for Student Engagement - 2 cohorts in YR26		\$30,600	\$62,424	\$68,130	\$69,492	\$70,882
Marketing (annual contract)		\$35,700	\$36,414	\$37,142	\$37,885	\$38,643
Student Social/Recruitment Events		\$2,000	\$4,080	\$4,162	\$4,245	\$4,330
Technology (e.g., Eng. software, Slack)		\$9,180	\$9,364	\$9,551	\$9,742	\$9,937
Recurring Subtotal	\$27,000	\$185,040	\$283,193	\$356,054	\$363,175	\$371,012
Grand Total	\$116,000	\$255,040	\$283,193	\$356,054	\$363,175	\$371,012
Revenue						
<i>eRate Return</i>	\$0	\$0	\$204,960	\$461,160	\$563,640	\$563,640
Tuition	\$0	\$0	\$63,000	\$220,500	\$346,500	\$346,500
Total	\$0	\$0	\$267,960	\$681,660	\$910,140	\$910,140
<i>eRate Revenue/Loss</i>	<i>-\$116,000</i>	<i>-\$255,040</i>	<i>-\$78,233</i>	<i>\$105,106</i>	<i>\$200,465</i>	<i>\$192,628</i>
Net Revenue/Loss	-\$116,000	-\$255,040	-\$15,233	\$325,606	\$546,965	\$539,128

9. Program Costs Assessed to Students

Costs for students taking the online M.S. in Civil and Environmental Engineering with an Area of Emphasis in Civil Engineering will be consistent with the established e-rate fee structure at the University of Georgia.

The UGA graduate base rate for the in-person M.S. is \$370/credit. With the \$488 e-rate differential, the total cost per credit hour will be \$858/credit (or the total cost of \$28,314 for 33 credit hours), effective fall 2024.

Table 5 compares the proposed tuition rate with tuition rates at other online programs.

Table 5 – Online Programs and Tuition Rates.

Institution	Online Program	Tuition /Credit	Credit Required	Total Tuition
Proposed	M.S. in Civil and Environmental Engineering (w/ Civil Emphasis)	\$858	33	\$28,314
University of Illinois Urbana-Champaign	Master of Civil Engineering	\$1,137	30	\$34,110
Michigan State University	M.S. in Civil Engineering	\$995	30	\$29,850
University of Missouri-Columbia	M.S. in Civil Engineering	\$1,200	30	\$36,000
Auburn University	Master of Civil Engineering	\$949	30	\$28,470
Clemson University	Master of Engineering	\$1,115	30	\$33,450
Johns Hopkins University	Master of Civil Engineering	\$1,696	30	\$50,880
Kennesaw State University	M.S. in Civil Engineering	\$438	30	\$13,140
University of Central Florida	M.S. in Civil Engineering	\$1,152	30	\$34,560
University of Florida	M.E. or M.S. in Civil Engineering	\$690	30	\$20,700
Mississippi State University	M.S. in Civil Engineering	\$562	30	\$16,860
Florida State University	Master of Engineering in Civil Engineering	\$1,005	30	\$30,150
North Carolina State University	Master of Civil Engineering	\$1,746	30	\$52,380
University of Tennessee -Knoxville	M.S. in Civil Engineering	\$890	30	\$26,700
University of Louisville	M.S. in Civil Engineering	\$791	30	\$23,730
University of South Carolina - Columbia	M.S. or M.E. in Civil Engineering	\$797	30	\$23,910

10. E-Rate

The e-rate for the online M.S. in Civil and Environmental Engineering will be \$488/credit hour.

Documentation of Approval and Notification

Proposal: Offer the existing major in Civil and Environmental Engineering (M.S.) with an Area of Emphasis in Civil Engineering online

College: College of Engineering

Department: School of Environmental, Civil, Agricultural and Mechanical Engineering

Proposed Effective Term: Fall 2024

School/College:

- School of Environmental, Civil, Agricultural and Mechanical Engineering Department Head, Dr. Bjorn Birgisson, 9/18/23
- College of Engineering Dean, Dr. Donald Leo, 10/10/2023
- College of Engineering Senior Associate Dean for Academic Affairs and Assessment, Dr. Ramaraja Ramasamy, 10/10/2023
- Graduate School Associate Dean, Dr. Anne Shaffer, 11/9/2023