UNIVERSITY OF GEORGIA

University of Georgia
Athens, Georgia 30602
univcouncil@uga.edu
www.uga.edu

University Council

March 15, 2019

UNIVERSITY CURRICULUM COMMITTEE – 2018-2019
John Maerz, Chair
Agricultural and Environmental Sciences – Elizabeth Little
Arts and Sciences – Jonathan Evans (Arts)
Trenton Schirmer (Sciences)
Business – Richard Gooner
Ecology – Jasmine Crumsey Forde
Education – Morgan Faison
Engineering – E.W. Tollner
Environment and Design – Brad Davis
Family and Consumer Sciences – Patricia Hunt-Hurst
Forestry and Natural Resources – Joseph Dahlen
Journalism and Mass Communication – James Hamilton
Law – Randy Beck
Pharmacy – Robin Southwood
Public and International Affairs – Jeffrey Berejikian
Public Health – Anne Marie Zimeri
Social Work – Harold Briggs
Veterinary Medicine – Susan Sanchez
Graduate School – Amy E. Medlock
Ex-Officio – Interim Provost Libby V. Morris
Undergraduate Student Representative – Ali Elyaman
Graduate Student Representative – Chasity Tompkins

Dear Colleagues:

The attached proposal from the College of Engineering to change the name of the major in Environmental Engineering (M.S.) to Civil and Environmental Engineering (M.S.) will be an agenda item for the March 22, 2019, Full University Curriculum Committee meeting.

Sincerely,

John Maerz, Chair
University Curriculum Committee

cc: Interim Provost Libby V. Morris
Dr. Rahul Shrivastav

MAJOR NAME CHANGE FORM

Date: January 17, 2019

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

College: College of Engineering

Effective Date: Fall 2019

Current Major Name: Environmental Engineering (M.S.)

Proposed Major Name: Civil and Environmental Engineering (M.S.)

Justification: The renaming of our current major in Environmental Engineering (M.S) to Civil and Environmental Engineering (M.S.) reflects the natural evolution of our Environmental Engineering and Civil Engineering programs as well as the national and international trends in these areas. Increasingly, there is an expectation on the part of students and employers that these areas of engineering are treated together and that the degree names and offering reflect this. Work in civil and environmental engineering is strongly coupled as both areas are critically needed for sustainable engineering system design at the human-natural interface. In order to meet this need, we are proposing to change the name of our major in Environmental Engineering (M.S.) to Civil and Environmental Engineering (M.S.) with both thesis and non-thesis degree options.

Major objectives of this name change will be to increase our program visibility, make it more consistent with programs nationally, and support our efforts to increase recruitment both inside and outside of UGA. Since first becoming available to students in 2008, the M.S. in Environmental Engineering has received on average 11 applications per year, with an average acceptance yield of 32%. Enrollment in the program has averaged 7 students, with an average of 3 degrees conferred per year. With the formation of the College of Engineering in 2012 and the growth of the Civil Engineering faculty, an Area of Emphasis in Civil Engineering was established for the major in Engineering (M.S.) in the fall of 2017. In Fall 2018, enrollment in that emphasis topped 8, making it comparable to the Environmental Engineering (M.S.) enrollment. Adding the Civil name and component to the Environmental Engineering (M.S.) will significantly broaden the appeal of the program to both traditional students as well as those in the workplace seeking a master's credential.

Both the M.S. in Environmental Engineering (thesis and proposed non-thesis) and the M.S. in Engineering with an Area of Emphasis in Civil Engineering (thesis and proposed non-thesis) will have exactly the same program structure, with each requiring students to pick courses from either two or three course areas with the one largest course offering area—Environment and Water—shared by both programs. The newly named M.S. in Civil and Environmental Engineering will include two areas of emphasis:

1. Area of Emphasis in Civil Engineering

2. Area of Emphasis in Environmental Engineering

These will allow students to reflect their own program's character based on their own career objectives. These two areas of emphasis are described in the area of emphasis proposals below.

In summary, the justification for the name change from Environmental Engineering (M.S.) to Civil and Environmental Engineering (M.S.) are as follows:

- The new name more clearly conveys the broader emphasis of the program.
- The proposed change allows for inclusion of the current Area of Emphasis in Civil Engineering now in our Engineering (M.S.) degree, within the Environmental Engineering (M.S.) which, based on national norms, is the more appropriate home and more recognizable externally.
- The new program name will enable us to recruit students more effectively to the broad range of areas now captured by this new title.
- The addition of the non-thesis option in parallel with the thesis option will further broaden the appeal of the program to both traditional students as well as those in the workplace seeking a master's credential.

Faculty Vote

Consistent with our College's Faculty Governance, the School of Environmental, Civil, Agricultural and Mechanical Engineering's Curriculum Committee voted 17 yes, 2 no for the proposed name change from Environmental Engineering (M.S.) to Civil and Environmental Engineering (M.S.). The College Curriculum Committee approved the proposal unanimously.

Program of Study:

Thesis Option:

The Civil and Environmental Engineering (M.S.) with a thesis option requires a minimum of 33 semester hours in the program of study, which consists of:

- A minimum of 24 semester hours of coursework, which must include:
  - 23 hours of graduate-level coursework, including
    - 9 hours selected from one of the Civil Engineering or Environmental Engineering Emphasis course lists.
    - 12 hours from UGA courses open only to graduate students and exclusive of thesis (ENGR 7300, Master's Thesis) and research (ENGR 7000, Master's Research, and ENGR 7010, Project-Focused Masters Research).
  - 1 hour of ENGR 8950, Graduate Seminar*

- A minimum of 6 hours of master's research (ENGR 7000, Master's Research) or project-based research (ENGR 7010, Project-Focused Masters Research). A typical student's research hours will exceed this minimum; however, at most 6 hours of ENGR 7000 or ENGR 7010 may be listed on the program of study.

- 3 hours of thesis preparation and writing (ENGR 7300, Master's Thesis)

** Only 1 hour of Graduate Seminar may apply on the program of study. Students are strongly encouraged to continue regular attendance at speaker series presentations even if not formally registered in the seminar.*

As a requirement of the M.S. Civil and Environmental Engineering degree, students must complete a minimum of 9 credit hours selected from one of the emphasis areas listed below. Students will work with their graduate advisor to select the most appropriate specialty area and coursework to ensure breadth of understanding as well as mastery of knowledge in a specific subject area. Emphasis courses will be reviewed each academic year and updated as needed to reflect new areas in the field. In addition to completing 9 credit hours selected from the list below, students may work with their graduate advisor to develop an interdisciplinary plan of coursework drawing from the extensive graduate course offerings available at UGA.

Non-Thesis Option:

The M.S. in Civil and Environmental Engineering with a non-thesis option requires a minimum of 33 semester hours in the Program of Study, which consists of:

- A minimum of 30 hours of coursework which must include:

  a) Environmental Engineering:

  Core Coursework (10 hours):

  a) Nine hours from one of the three Environmental Engineering emphasis areas (Energy Systems, Environmental & Water or Sustainable Coastal Engineering

  b) ENGR 8950, Graduate Seminar (1 hour) *

** Only 1 hour of Graduate Seminar may apply on the Program of Study. Students are strongly encouraged to continue regular attendance at speaker series presentations even if not formally registered in the seminar.*

Elective Coursework (20 hours)

For the non-thesis option, students will work with a graduate advisor to select the most appropriate specialty area and coursework to ensure breadth of understanding as well as mastery of knowledge in a specific subject area. Emphasis courses will be reviewed each academic year and updated as needed to reflect new areas in the field.

Project Report (3 hours):

ENGR 7010, Project-Focused Masters Research

This same advisor will work with the student to help select an appropriate project report.

A minimum of 15 hours of coursework must be in ECAM Environmental Engineering courses

b) Civil Engineering

Core Coursework (10 to 16 hours):

a) Nine to 15 hours from one of the two Civil Engineering emphasis areas (Structural & Geotechnical Engineering and Environment & Water)

b) ENGR 8950 Graduate Seminar (1 hour) *

** Only 1 hour of Graduate Seminar may apply on the program of study. Students are strongly encouraged to continue regular attendance at speaker series presentations even if not formally registered in the seminar.*

Elective Coursework (14 to 20 hours)

For the non-thesis option, students will work with a graduate advisor to select the most appropriate specialty area and coursework to ensure breadth of understanding as well as mastery of knowledge in a specific subject area. Emphasis courses will be reviewed each academic year and updated as needed to reflect new areas in the field.

Project Report (3 hours)

ENGR 7010, Project-Focused Masters Research

A minimum of 15 hours of coursework must be in ECAM Environmental Engineering courses

Current M.S. with Thesis	Proposed M.S. Non-Thesis with an Area of Emphasis in Environmental Engineering	Proposed M.S. Non-Thesis with an Area of Emphasis in Civil Engineering
A minimum of 24 semester hours of coursework which must include:	A minimum of 30 hours of coursework which must include: Core Coursework (10 hours):	A minimum of 30 hours of coursework which must include: Core Coursework (10 to 16 hours):

23 hours of graduate-level coursework, including: • 9 hours selected from one of the Civil Engineering or Environmental Engineering Emphasis course lists. • 12 hours from UGA courses open only to graduate students and exclusive of thesis (ENGR 7300, Master's Thesis) and research (ENGR 7000, Master's Research, and ENGR 7010, Project-Focused Masters Research). • ENGR 8950, Graduate Seminar (1 hour)*	• 9 hours from one of the three Environmental Engineering emphasis areas (Energy Systems, Environmental and Water or Sustainable Coastal Engineering • ENGR 8950, Graduate Seminar (1 hour)* Elective Coursework (20 hours): • For the non-thesis option, students will work with a graduate advisor to select the most appropriate specialty area and coursework to ensure breadth of understanding as well as mastery of knowledge in a specific subject area.	• 9 to 15 hours from one of the two Civil Engineering emphasis areas (Structural and Geotechnical Engineering and Environment and Water) • ENGR 8950 Graduate Seminar (1 hour)* Elective Coursework (14 to 20 hours.): • For the non-thesis option, students will work with a graduate advisor to select the most appropriate specialty area and coursework to ensure breadth of understanding as well as mastery of knowledge in a specific subject area.
A minimum of 6 hours of master's research (ENGR 7000, Master's Research) or project-based research (ENGR 7010, Project-Focused Masters Research). A typical student's research hours will exceed this minimum; however, at most 6 hours of ENGR 7000 or ENGR 7010 may be listed on the program of study		
3 hours of thesis preparation and writing (ENGR 7300, Master's Thesis)	Project Report (3 hours): ENGR 7010, Project-Focused Masters Research	Project Report (3 hours): ENGR 7010, Project-Focused Masters Research *A minimum of 15 hours of coursework must be in*

	This same advisor will work with the student to help select an appropriate project report. *A minimum of 15 hours of coursework must be in ECAM Environmental Engineering courses*	*ECAM Environmental Engineering courses*
**Only 1 hour of Graduate Seminar may apply on the program of study. Students are strongly encouraged to continue regular attendance at speaker series presentations even if not formally registered in the seminar.*	**Only 1 hour of Graduate Seminar may apply on the program of study. Students are strongly encouraged to continue regular attendance of at speaker series presentations even if not formally registered in the seminar.*	*Only 1 hour of Graduate Seminar may apply on the program of study. Students are strongly encouraged to continue regular attendance at speaker series presentations even if not formally registered in the seminar.*
Total Credit Hours: 33	Total Credit Hours: 33	Total Credit Hours: 33

Proposal to Add a Non-Thesis Option to the
M.S. in Environmental Engineering
(Proposed name change to Civil and Environmental Engineering (M.S.))

Submitted to: Dr. Suzanne Barbour
Dean, Graduate School

Submitted and Prepared by: Sidney Thompson, Ph.D.
Chair, School of Environmental, Civil, Agricultural and Mechanical Engineering

Basic Information:

Proposed Change: Establishing a non-thesis option for the major in Environmental Engineering (M.S.) for students pursuing a non-research, professionally-oriented career path.

Start Date: Fall 2019

Program Description:

The School of Environmental, Civil, Agricultural and Mechanical Engineering requests that a non-thesis option be added as an option for the major in Environmental Engineering (M.S.). While the M.S. with thesis is a key credential for students in the engineering disciplines continuing on to doctoral study, the majority of master's students in engineering, both at UGA and nationally, either complete their M.S. and then begin their professional careers or complete their M.S. part-time while employed. Nationally, the vast majority of the over 200 engineering programs in the United States offer non-thesis programs to serve this student population and employer need.

The Environmental Engineering (M.S.) became available as a degree option to students in 2008 and has received on average 11 applications each fall, with an average acceptance yield of 32%. Enrollment in the program has averaged 7 students, with an average of 3 degrees conferred per year. With the formation of the College in 2012, the growth of Civil Engineering and its close relationship with Environmental Engineering in both research and profession practice, we anticipate that a non-thesis option for the Environmental Engineering (M.S.) will expand opportunities for students who are either currently in or wish to directly enter a professional career. The name change that is in parallel being sought for the Environmental Engineering (M.S.) will add the Civil Engineering component and will further broaden the appeal of the program to both traditional students as well as those in the workplace seeking a master's credential.

Environmental solutions require a rigorous foundation in the life and physical sciences along with the ability to contribute in creative ways to solving interdisciplinary problems. Priority areas of faculty research include: integrated water resource management, waste management and assimilation through biological processes, environmental externalities of energy production, and coastal and urban systems. The program enables students to gain both in-depth

knowledge and opportunities to seek creative interdisciplinary solutions. Students choose coursework in areas of energy systems, environment and water, and sustainable coastal engineering and round out their programs with other elective coursework to focus their master's work to meet their career objectives. The requested non-thesis M.S. contains all the courses already required of thesis . Non-thesis students will be advised in assembling a coherent program of study by a faculty advisor or graduate director in the School. Non-thesis M.S. students will replace the minimum research (6 credits) and thesis hours (3 credits) with 9 hours of elective credits at the 6000–8000 level for a total of 33 credits. Thus, the number of total credit hours for both thesis and non-thesis tracks are identical. The non-thesis option can be obtained by taking only coursework, or it can include no more than 3 credit hours for a project and report (ENGR 7010, Project-Focused Masters Research) under the guidance of a faculty member. Such a non-thesis project and report is generally not research-oriented, but deals with other aspects of an engineering problem.

The following table outlines the program of study that is required for the current thesis option and the proposed non-thesis option for the M.S. in Environmental Engineering. A minimum of 15 hours of coursework must be in ECAM Environmental Engineering courses.

Current M.S With Thesis		**Proposed M.S. Non-Thesis**	
Courses	24	Courses	30
Core Coursework:		Core Coursework: (Must include a minimum of 15 hours of ECAM courses)	
Energy Systems, Environment and Water, Sustainable Coastal Engineering Courses: 9 hours		Energy Systems, Environment and Water, Sustainable Coastal Engineering Courses: 9 hours	
Grad Seminar: 1 hour		Grad Seminar: 1 hour	
Elective Coursework: 14 hours		Elective Coursework: 20 hours	
Research and Thesis 9 hours		ENGR 7010, Project-Focused Masters Research or Additional Elective	3
ENGR 7000, Master's Research	6		
ENGR 7300, Master's Thesis	3		
Minimum Total Credit Hours:	33	Minimum Total Credit Hours:	33

Faculty Vote

Consistent with our College's Faculty Governance, the School of Environmental, Civil, Agricultural and Mechanical Engineering's Curriculum Committee voted 17 yes, 2 no for the proposed non-thesis option for the M.S. in Environmental Engineering. The College Curriculum Committee then approved the proposal unanimously.

Justification for the Proposed Non-Thesis M.S. Option

The requested non-thesis option completes our Environmental Engineering (M.S.) offerings and makes us competitive with our peers in recruitment of professionally-oriented students into our program. Among UGA's peer comparator group, nearly 90 percent offer master's students a non-thesis option. This reflects the fact that there exist significant opportunities for students with the additional training possible with an M.S. degree that do not require completing research and a thesis.

The establishment of a non-thesis option for the Environmental Engineering (M.S.) and its areas of emphasis will:

- Enable the School of Environmental, Civil, Agricultural and Mechanical Engineering to recruit students to a terminal professional masters who are interested in employment in the environmental and civil engineering sectors,
- Encourage our own Engineering (B.S.) students to stay for an additional year to complete a 5-year Double Dawgs B.S.-M.S. program, and
- Better serve local industry in the environmental and civil sectors in their recruitment, retention and training of professional talent through providing a master's opportunity locally for their engineering employees.

Admission Procedure for Domestic Applicants

As with the thesis M.S., students will apply using the established Graduate School Application process for admission. Those applications will be reviewed by the Graduate Admissions and Advisory Committee of the College which has faculty representatives from each of our three Schools and is chaired by the College's Graduate Coordinator. The admissions standards for the Environmental Engineering (M.S.) will be the same for students applying for either the thesis or non-thesis options.

Admission Procedure for International Applicants

Other than the graduate school international admissions and test score requirements, the basic admission procedure will be the same for international as well as domestic applicants.

Impact on Current Students

We do not anticipate any adverse impact on current M.S. students. The positive impact will be to give our existing students another option for a program they need for their desired careers. In addition, this program will contribute to our planned growth of our graduate enrollment enabling us to offer a more robust set of courses on a more regular basis for our students. Students currently enrolled in the M.S. or Ph.D. program will have the option of changing to a non-thesis M.S. in Environmental Engineering (and completing those requirements) or continuing with the current degree objective. We do not anticipate that many of our current students will switch to a non-thesis option.

Financial Impacts

There is adequate capacity in existing courses. The growth in graduate student enrollment expected will result in more regular and expanded offering of courses which

currently have FTE committed to them but often may not make minimum enrollment. No new faculty, facilities, or services will be required to implement a non-thesis option for the M.S. degree. Thus, no new funds are required.

Assessment

The Department currently has a strong assessment plan for our graduate program. We will make necessary adjustments for the non-thesis M.S. option so that this program can be properly assessed.

M.S. in Engineering - Civil Engineering Emphasis

Structural and Geotechnical Engineering

- CVLE 6330, Advanced Structural Analysis (3 hours)
- CVLE 6340, Design of Bridges (3 hours)
- CVLE 6470, Pavement Design (3 hours)
- CVLE(MCHE)(LAND) 6660, Sustainable Building Design (3 hours)
- CVLE(MCHE) 8350, Nonlinear Finite Element Analysis (3 hours)
- CVLE 8410, Inelastic Behavior of Asphalt (3 hours)
- CVLE 8420, Geomechanics (3 hours)
- CVLE 8460, Soil Improvement (3 hours)
- CVLE 8550, Design of Prestressed Concrete Structures (3 hours)
- CVLE(MCHE) 8640, Advanced Strength of Materials (3 hours)
- ENGR 6350, Introduction to Finite Element Analysis (3 hours)
- ENGR 8103, Computational Engineering: Fundamentals, Elliptic, and Parabolic Differential Equations (3 hours)
- MCHE 6650, HVAC Systems for Buildings and Industry (3 hours)
- MCHE 8380, Continuum Mechanics (3 hours)
- STAT 6315, Statistical Methods for Researchers (4 hours)

Environment and Water

- BCHE(ENVE) 6490, Environmental Engineering Remediation Design (3 hours)
- CRSS(GEOL) 8710, Watershed-Scale Modeling (3 hours)
- CVLE 8110, Environmental River Mechanics (3 hours)
- CVLE 8130, Mechanics of Jets and Plumes (3 hours)
- CVLE 8140, Transport and Mixing in Natural Flows (3 hours)
- CVLE(MCHE) 8160, Advanced Fluid Mechanics (3 hours)
- ENGR 8103, Computational Engineering: Fundamentals, Elliptic, and Parabolic Differential Equations (1 hour)
- ENGR 8220, Microfluidic Transport Phenomena (3 hours)
- ENVE 6430, Advanced Open Channel Design (3 hours)

- ENVE 6435, Natural Resources Engineering (3 hours)
- ENVE 6440, Computer Modeling in Water Resources (3 hours)
- ENVE 6450, Engineering Hydrology and Hydraulics (3 hours)
- ENVE 6460, Groundwater Hydrology for Engineers (3 hours)
- ENVE 6470, Environmental Engineering Unit Operations (3 hours)
- GEOL(WASR) 8740, Hydrologic Flow and Transport Modeling (3 hours)
- MCHE 6590, Fluid Mechanics II (3 hours)
- STAT 6315, Statistical Methods for Researchers (4 hours)
- WASR 8200, Hillslope Hydrology Seminar (3 hours)

M.S. Environmental Engineering

Energy Systems

- ENGR 6490, Renewable Energy Engineering (3 hours)
- ENGR 8103, Computational Engineering (3 hours)
- ENVE 6230, Energy in Nature, Civilization, and Engineering (3 hours)
- ENVE 6250, Energy Systems and the Environment (3 hours)
- ENVE 6530, Energy and Environmental Policy Analysis (3 hours)
- ENVE 8110, Ecological Energetics (3 hours)
- MIST 6550, Energy Informatics (3 hours)

Environment and Water

- BCHE(ENVE) 6490, Environmental Engineering Remediation Design (3 hours)
- CRSS(GEOL) 8710, Watershed-Scale Modeling (3 hours)
- CVLE(MCHE)(LAND) 6660, Sustainable Building Design (3 hours)
- CVLE 8110, Environmental River Mechanics (3 hours)
- CVLE 8130, Mechanics of Jets and Plumes (3 hours)
- CVLE 8140, Transport and Mixing in Natural Flows (3 hours)
- CVLE(MCHE) 8160, Advanced Fluid Mechanics (3 hours)
- ENGR 8103, Computational Engineering: Fundamentals, Elliptic, and Parabolic Differential Equations (1 hour)
- ENGR 8220, Microfluidic Transport Phenomena (3 hours)
- ENVE 6430, Advanced Open Channel Design (3 hours)
- ENVE 6435, Natural Resources Engineering (3 hours)
- ENVE 6440, Computer Modeling in Water Resources (3 hours)
- ENVE 6450, Engineering Hydrology and Hydraulics (3 hours)
- ENVE 6460, Groundwater Hydrology for Engineers (3 hours)
- ENVE 6470, Environmental Engineering Unit Operations (3 hours)
- ENVE 6550, Environmental Life Cycle Analysis (3 hours)
- GEOL(WASR) 8740, Hydrologic Flow and Transport Modeling (3 hours)
- MCHE 6590, Fluid Mechanics II (3 hours)

- STAT 6315, Statistical Methods for Researchers (4 hours)
- WASR 8200, Hillslope Hydrology Seminar (3 hours)

Sustainable Coastal Engineering

- CVLE 8130, Mechanics of Jets and Plumes (3 hours)
- CVLE 8140, Transport and Mixing in Natural Flows (3 hours)
- CVLE(MCHE) 8160, Advanced Fluid Mechanics (3 hours)
- ENGR 8103, Computational Engineering: Fundamentals, Elliptic, and Parabolic Differential equations (3 hours)
- ENGR 8220, Microfluidic Transport Phenomena (3 hours)
- ENVE 6435, Natural Resources Engineering (3 hours)
- MARS 8030, General Physical Oceanography (3 hours)
- MARS 8100, Estuarine and Coastal Oceanography (3 hours)
- MARS 7380, Quantitative Methods in Marine Science (3 hours)
- MARS 8150, Ocean Waves (3 hours)
- MARS 8510, Modeling Marine Systems (3 hours)
- MCHE 6590, Fluid Mechanics II (3 hours)