


Civil Engineering, M.S.C.E., or Engineering, M.S.E.





05. Program Revision [2017-2018 Catalog]

Instructions

****Read before you begin****

Please turn on the help text before starting this proposal by clicking on the information icon  at the top of the form.

For any proposals revising courses or programs, there are five (5) major steps

1. Import	Bring in the current information from the catalog. To import, use the arrow icon  at the top of the form.
2. Complete	Complete all the required fields. All fields with an * are required. You will not be able to launch the proposal without completing required fields. Attachments may be added to the proposal at any time by using the files icon  at the top of the form.
3. Launch	Before you make any edits, LAUNCH the proposal. To launch, use the triangle icon  at the top of the form.
4. Edit	Make all proposed changes.
5. Approve	As the originator, you have to approve the proposal to send it onto the next step. To approve, use the decisions icon  at the top of the form.

The Program Revision: Graduate/Undergraduate Form is used for revisions to an existing major, minor, concentration, or undergraduate certificate.

Submission of this form indicates review and assessment of the proposed curriculum changes at the department and collegiate level either separately or as part of ongoing assessment efforts.

Resources, materials, and templates for course & curriculum proposals are available on the [Faculty Governance website](#).

Program Content

Department/
School/Program*

College of Engineering	
Department of Civil and Environmental Engineering	
Choose the appropriate level and Program Type*	<input checked="" type="radio"/> Graduate Major <input type="radio"/> Graduate Minor <input type="radio"/> Graduate Concentration <input type="radio"/> Undergraduate Major <input type="radio"/> Undergraduate Minor <input type="radio"/> Undergraduate Concentration <input type="radio"/> Undergraduate Certificate
Brief description of the change being proposed.*	<p>The Department of Civil & Environmental Engineering (CEE) proposes to waive GRE test score requirement for MS in Civil Engineering applicants who meet any one of the following criterion.</p> <p>1) Current UNC Charlotte CEE undergraduate students who have earned a 3.2 cumulative GPA and completed at least 75 earned credit hours.</p> <p>2) Applicants who have earned a 3.2 cumulative GPA and graduated with a BS in Civil Engineering from UNC Charlotte.</p> <p>The GRE test score requirement would be waived uniformly and without discrimination to all applicants that meet the above criteria.</p>
Does this revision change more than 50% of the existing program?*	<input type="radio"/> Graduate - Yes <input checked="" type="radio"/> Graduate - No <input type="radio"/> Undergraduate - Yes <input type="radio"/> Undergraduate - No
Program Type*	<input checked="" type="radio"/> Program <input type="radio"/> Shared Core

How to import the existing program information:

User Tracking (Reviewing edits)

To run an import, click the Import Arrow on the top left corner of the heading, select the appropriate catalog, you may use filter and search available curriculum to find the program or core, select the program to preview, then import the item. All appropriate fields from the catalog will then fill in. Do NOT make any changes to this information at this point. You will then fill in all remaining fields as needed. Then "launch" the proposal to begin tracking the changes. All changes made before the "launch" will not be tracked. After the proposal is "launched" you will make all changes you are proposing before "approving" the proposal. After you have "launched" the proposal and made any changes, User Tracking is available to see the original, current with markup, or current versions of the proposal. The decisions (blue circle with a check mark) tab will be used to send the proposal to the next step. You

may enter comments at this time and approve your proposal to move to the next step in the process.

Title* Civil Engineering, M.S.C.E., or Engineering, M.S.E.

Description

The M.S.C.E. program requires a baccalaureate degree in Civil and Environmental Engineering. The M.S.E. degree offers a more discipline-specific program of study to students who may not possess a baccalaureate degree in Civil and Environmental Engineering.

Prospective Curriculum*

Programs of Study

The [Department of Civil and Environmental Engineering \(CEE\)](#) provides opportunities for discipline-specific and multidisciplinary graduate-level education in Civil and Environmental Engineering and closely related areas. Advanced coursework and research are used to enhance professional development, improve technical competency, and initiate a life-long learning experience. The Department has ongoing collaborative research and student exchange programs with several international institutions.

The Department offers graduate studies leading to a master's degree (MSCE or MSE) in five areas of concentration:

- Environmental and water resources engineering
- Geo-environmental engineering
- Geotechnical engineering
- Structural engineering
- Transportation engineering

Doctoral studies leading to the Ph.D. in Infrastructure and Environmental Systems (INES) are available in an interdisciplinary, inter-college program. See the [Ph.D. in Infrastructure and Environmental Systems](#) for details.

Admission Requirements

In addition to the general requirements for admission to the Graduate School, the Department of Civil and Environmental Engineering seeks the following from applicants to the Master's programs in Civil Engineering:

An earned undergraduate degree in Civil Engineering for the MSCE master's program or a closely related field for the MSE master's program

An undergraduate GPA of 3.0 or better

A satisfactory score from the Aptitude Portion of the GRE

Three letters of recommendation

An acceptable TOEFL score as required by UNC Charlotte for international students

And any other appropriate credentials as required by the Graduate School

Additional Admission Requirements

Admission to the MSE program requires remediation of certain deficiencies as specified by the department for each area of concentration

Admission to the Early Entry Program requires a minimum GPA of 3.2, completion of at least 75 hours toward the BSCE degree, and acceptance by the Graduate School to the MSCE program at UNC Charlotte.

Early Entry Program

Undergraduate students at UNC Charlotte with outstanding academic performance, and satisfying the requirements described above, may be admitted to the Early Entry Program to pursue graduate study while completing the undergraduate degree requirements. Early Entry students are dually enrolled with both undergraduate and graduate status, may request two graduate Civil Engineering (CEGR)

courses to be applied to both their graduate and undergraduate programs (double-counting), and may complete up to 15 credits toward their MS degree prior to graduating with their BSCE degree.

Application Deadline

Applications for admission must be submitted online directly to the Graduate School. They may be submitted any time prior April 1 for Fall admission, and October 1 for Spring admission. To be considered for [assistantships](#) and [tuition grants](#) for the following academic year, students should apply by February 15 because the Department makes the first round of award decisions by March 15.

Assistantships

Research and teaching assistantships are available from the Department on a competitive basis to highly qualified applicants/students. Interested students are encouraged to directly contact faculty in their area of interest for research assistantships.

Tuition Grants

Tuition grants including Non-Resident Tuition Differentials and Resident Tuition Aids are available on a competitive basis for both out-of-state and in-state students, respectively.

Degree Requirements

A minimum of 30 approved graduate credit hours is required for graduation. At least half of the approved graduate credit hours must be in courses numbered 6000 or above. A student may fulfill the 30-hour requirement by pursuing one of the three study options: (a) 24 hours of coursework plus 6 hours of thesis, (b) 27 hours of coursework plus 3 hours of a directed project, or (c) 30 hours of coursework and a comprehensive examination.

Each student is limited to one individual study class within the 30 credit hour requirement.

Concentration Courses

Required core courses for the five concentrations are listed below.

Environmental and Water Resources Engineering Concentration

CEGR 6243 Physical Processes in Environmental Systems

CEGR 6245 Chemical and Biological Processes in Environmental Systems

Geo-Environmental Engineering Concentration

CEGR 5145 Groundwater Resources Engineering

CEGR 5264 Landfill Design and Site Remediation

Geotechnical Engineering Concentration

CEGR 5270 Earth Pressures and Retaining Structures

CEGR 6251 Foundation Engineering

CEGR 6254 Experimental Soil Mechanics

CEGR 6255 Slope Stability and Earth Structures

CEGR 6268 Advanced Soil Mechanics

Structural Engineering Concentration

CEGR 5108 Finite Element Analysis and Applications
CEGR 5222 Structural Steel Design II
CEGR 5224 Advanced Structural Analysis
CEGR 5226 Reinforced Concrete Design II
CEGR 6129 Structural Dynamics

Transportation Engineering Concentration

CEGR 5161 Advanced Traffic Engineering
CEGR 5162 Transportation Planning
CEGR 5185 Geometric Design of Highways
CEGR 6161 Traffic Control and Operation

Additional Recommended Courses

Additional recommended courses (excluding [CEGR 6891](#), [CEGR 6892](#), and [CEGR 6991](#)) for each concentration are listed below.

Environmental and Water Resources Engineering Concentration

CEGR 5090 Special Topics in Civil Engineering
(environmental and water resources engineering topic)
CEGR 5141 Process Engineering
CEGR 5142 Water Treatment Engineering
CEGR 5143 Solid Waste Management
CEGR 5144 Engineering Hydrology
CEGR 5145 Groundwater Resources Engineering
CEGR 5146 Advanced Engineering Hydraulics
CEGR 5147 Stormwater Management
CEGR 5234 Hazardous Waste Management
CEGR 5235 Industrial Pollution Control
CEGR 5237 Environmental Risk Management
CEGR 5241 Chemical Processes in Water and Wastewater Treatment
CEGR 5242 Wastewater Treatment Plant Design

CEGR 5243 Topics in Environmental Health
CEGR 5247 Sustainability
CEGR 6090 Special Topics in Civil Engineering
(*environmental and water resources
engineering topic*)
CEGR 6141 Water Quality Modeling
CEGR 6142 Bioenvironmental Engineering
CEGR 6144 Environmental Biotechnology
CEGR 6145 Waste Incineration
CEGR 6146 Advanced Groundwater Analysis
CEGR 6147 Watershed Modeling
CEGR 6148 Water Conservation
CEGR 6149 Watershed Analysis
CEGR 6171 Air Quality Control
CEGR 6172 Air Dispersion Modeling
CEGR 6173 Environmental Aquatic Chemistry
CEGR 6244 Chemical Fate and Transport

Geo-Environmental Engineering Concentration

CEGR 5090 Special Topics in Civil Engineering
(*geo-environmental engineering topic*)
CEGR 5270 Earth Pressures and Retaining
Structures
CEGR 5271 Pavement Design
CEGR 5272 Design with Geosynthetics
CEGR 5273 Engineering Ground Improvement
CEGR 5274 Site Characterization
CEGR 5278 Geotechnical Engineering II
CEGR 6146 Advanced Groundwater Analysis
CEGR 6243 Physical Processes in
Environmental Systems
CEGR 6244 Chemical Fate and Transport
CEGR 6245 Chemical and Biological Processes
in Environmental Systems
CEGR 6251 Foundation Engineering
CEGR 6252 Soil Dynamics and Earthquake
Engineering
CEGR 6254 Experimental Soil Mechanics
CEGR 6255 Slope Stability and Earth
Structures
CEGR 6268 Advanced Soil Mechanics

Geotechnical Engineering Concentration

CEGR 5090 Special Topics in Civil Engineering
(*geotechnical engineering topic*)
 CEGR 5145 Groundwater Resources
 Engineering
 CEGR 5264 Landfill Design and Site
 Remediation
 CEGR 5271 Pavement Design
 CEGR 5272 Design with Geosynthetics
 CEGR 5273 Engineering Ground Improvement
 CEGR 5274 Site Characterization
 CEGR 5278 Geotechnical Engineering II
 CEGR 6252 Soil Dynamics and Earthquake
 Engineering

Structural Engineering Concentration

CEGR 5090 Special Topics in Civil Engineering
(*structural engineering topic*)
 CEGR 5121 Prestressed Concrete Design
 CEGR 5123 Bridge Design
 CEGR 5125 Forensic Engineering
 CEGR 5126 Codes, Loads, and Nodes
 CEGR 5127 Green Building and Integrative
 Design
 CEGR 5128 Matrix Methods of Structural
 Analysis
 CEGR 5223 Timber Design
 CEGR 6090 Special Topics in Civil Engineering
(*structural engineering topic*)
 CEGR 6122 Advanced Topics in Structural Steel
 CEGR 6124 Masonry Design
 CEGR 6125 Structural Strengthening
 CEGR 6126 Analysis of Plates and Shells
 CEGR 6127 Fracture Mechanics and Fatigue
 CEGR 6128 Structural Optimization
 CEGR 6222 Experimental Structural Mechanics
 and Nondestructive Evaluation
 MEGR 6141 Theory of Elasticity I

Transportation Engineering Concentration

CEGR 5090 Special Topics in Civil Engineering
(*transportation engineering topic*)
 CEGR 5171 Urban Public Transportation

CEGR 5181 Human Factors in Traffic Engineering
CEGR 5182 Transportation Environmental Assessment
CEGR 5183 Traffic Engineering Studies
CEGR 5262 Traffic Engineering
CEGR 5271 Pavement Design
CEGR 6090 Special Topics in Civil Engineering (*transportation engineering topic*)
CEGR 6162 Computer Applications for Transportation Engineers
CEGR 6163 GIS for Civil Engineers
CEGR 6164 Traffic Safety
CEGR 6165 Urban Systems Engineering
CEGR 6166 Urban Transportation Networks: Operations and Optimization
CEGR 6167 Discrete Choice Modeling
CEGR 6181 Traffic Flow Theory
CEGR 6182 Transportation Systems Analysis
CEGR 6261 Traffic Signal Control Systems

Note:

Undergraduate students who have taken any of the courses listed above, or equivalent material, as part of their undergraduate program need not take the corresponding 5000-level graduate courses. Instead, they may choose other graduate courses as part of their master's degree plan of study. Courses without designated course numbers are currently being offered as Special Topic classes with appropriate course numbers yet to be provided.

Elective Courses

With advisor and Graduate Program Director approval, a maximum of one graduate course (outside or within CEGR) related to the thesis topic, project topic, or student's concentration may be incorporated into the 30 credit hour requirement. A student with a non-CEGR background is encouraged to fulfill the 30 credit hour requirement by taking all CEGR courses.

Transfer Credit

The Department accepts the transfer of related graduate courses (6 credit hours maximum) taken at another institution or from UNC Charlotte prior to admission to the master's program in Civil Engineering.

Capstone Experiences

Students pursuing a master's degree in Civil and Environmental Engineering have three options to complete the 30 credit hour program:

24 credit hours of coursework plus 6 credit hours of thesis ([CEGR 6991](#))

27 credit hours of coursework plus 3 credit hours of a directed project (CEGR 6891)

30 credit hours of coursework plus a written and/or oral comprehensive examination

All three options require the formation of a program committee as described below. The thesis and project options require students to submit a written thesis or project report, and orally defend their work before their program committee.

A student's comprehensive exam may be taken once all core courses are completed, and at least 18 credit hours of graduate coursework are either completed or in progress. Core courses taken at the graduate level may be included in the 18 credit hours. The student's graduate advisor and the examining committee coordinate the examination (typically offered once in the Fall semester and once in the Spring semester), preparing the exam with the assistance of members of the student's Program Committee. The exam measures the student's mastery of theories and applications in core courses and/or in the selected area of specialization within the discipline. Students have only two attempts to pass the examination. All students passing the written examination are assessed further on their oral communication effectiveness.

Application for Degree

Students preparing to graduate must submit an online Application for Degree by the filing date specified in the [University Academic Calendar](#). If a student does not graduate in the semester identified on the Application for Degree, then the student must submit a new Application for Degree for graduation in a subsequent semester.

Advising

Each student is assigned an initial academic advisor. Upon developing a program of study, the student shall be supervised by his/her graduate advisor and a program committee.

Program Committee

The Program Committee shall consist of at least three UNC Charlotte graduate faculty members. At most one graduate faculty member (CEGR or non-CEGR) from outside the student's concentration may serve as a member of the Program Committee. The student's CEE graduate advisor shall chair the committee.

Research Opportunity/Experience

Students in Civil and Environmental Engineering enjoy a curriculum with opportunities for interdisciplinary research, study abroad, and active participation in a growing research program. Programs of study can be tailored to suit individual needs and interests. [The CEE website](#) provides current areas of research conducted by the Civil and Environmental Engineering faculty.

Program Learning Outcomes

Students completing master's degree will demonstrate abilities to analyze and evaluate advanced topics in engineering, and to communicate technical information effectively. Achievement of these outcomes will prepare students to function professionally in their chosen careers.

Program learning outcomes for doctoral students are described in the "[Infrastructure and Environmental Systems](#)" section.

Requested Effective Term:*

Fall 2017

If "Other", indicate term:

If "Other", explain reason:

Consultations, Resources, and Documentation

Justification and Impact

Changes to courses and curricula often have impacts both within the proposing department as well as campus-wide. What effect will this proposal have on existing courses and curricula, students, and other departments/units? Answer the following questions to address how you have assessed potential impacts and what the impacts of this proposal might be.

Identify the need addressed by this proposal.

The subject proposal will not have an effect on existing courses and curricula. It would help the Department of Civil & Environmental Engineering attract and retain exceptional UNC Charlotte Civil Engineering undergraduate students, who otherwise would delay or reconsider applying to the program (due to the lack of time to take GRE exam).

In general, how will this proposal improve the scope, quality and/or efficiency of programs

and/or instruction?

The subject proposal would help attract and retain exceptional UNC Charlotte Civil Engineering undergraduate students. It would lead to an increase in the enrollment numbers. Having exceptional students being part of the program would improve the quality of program outcomes. Atmosphere in the classrooms and research labs would be more stimulating.

What group(s) of students will be served by this proposal? Describe how you made this determination.

The following groups of students would be served by this proposal.

- 1) Current UNC Charlotte Civil Engineering undergraduate students with a CGPA of 3.2 or better.
- 2) Students with a CGPA of 3.2 or better and graduated with a BS in Civil Engineering from UNC Charlotte.

Exceptional students with a CGPA of 3.2 or better and have 75 earned credit hours are eligible to apply and potentially get admitted to Early-entry MS in Civil Engineering program. The same criterion is being adopted to identify and retain exceptional students toward the MS in Civil Engineering program.

Identify any changes to program that would limit registration (e.g. class-standing, admission to the major, GPA).

The proposal intends to retain and attract exceptional students who have 75 earned credit hours (Early-entry) or have graduated with a BS in Civil Engineering from UNC Charlotte. It does not limit admission, enrollment or other related aspects.

How will the content and/or frequency of other courses be affected?

Not applicable.

Total number of new courses that were created for this program revision.*

Not applicable.

Does the proposed change impact other units, departments or colleges?*

- Yes
 No

If Yes, please list. Attach consultations (using the 'files' icon at the top of the form) or copy/paste here.

Does this impact Honors College (undergraduate only)?*

- Yes
 No

If Yes, include documentation above from the Honors College.

Does this impact General Education (undergraduate only)?*

- Yes
 No

If Yes, then the workflow steps will include University College Faculty Council.

Does this revision require a change in Student Learning Outcomes?*

- Yes
 No

If Yes, please attach updated [Student Learning Outcomes](#) template.

Does this revision require a change to the Academic Plan of Study (undergraduate only)?*

- Yes
 No

If yes, please attach updated [Academic Plan of Study](#) template.

Does this proposal alter an agreement with a North Carolina community college?*

- Yes
- No

Resources required to support proposal.

When added resources are not required, indicate "none". For items which require "none" explain how this determination was made.

Specify requirements for new faculty, part-time faculty, student assistants and/or increased load on current faculty.

None / not applicable.

Specify computer or audio-visual usage (beyond Moodle) required by students and/or faculty, and include an assessment of the adequacy of resources.

None / not applicable.

Specify and estimate cost of other new resources required (e.g., travel, communication, equipment, supplies, printing). Indicate source(s) of funding.

None / not applicable.

It is the policy of the Board of Governors to reduce textbook costs for students whenever possible.

Have electronic textbooks, textbook rentals, or the buyback program been considered?*

- Yes
- No

Briefly explain your decision on textbooks:*

Not applicable