Civil & Environmental Engineering
Graduate Program Profile
2021-22 Academic Year

Last Updated: August 20, 2021

Table of Contents

1.0 Introduction ....................................................................................................... 3
2.0 Program Description ............................................................................................. 3
3.0 Academic Integrity ............................................................................................... 3
4.0 Academic Performance .......................................................................................... 4
   4.1 Maintaining Status as a Registered Student ............................................................... 4
5.0 Departmental Policy & Personnel .............................................................................. 5
   5.1 Conference/Event Space Reservations ..................................................................... 5
   5.2 Retaking double-numbered coursework ................................................................... 5
   5.1 Graduate Seminar Series ..................................................................................... 5
   5.1 Summer Taxes ................................................................................................. 6
   5.2 Curricular Practical Training (CPT) ......................................................................... 6
   5.3 Optional Practical Training (OPT) .......................................................................... 6
   5.4 Health History and Health Insurance ....................................................................... 7
6.0 Civil Engineering PhD ............................................................................................ 8
   6.1 Advising ......................................................................................................... 8
   6.2 Exit Requirements ............................................................................................. 8
   6.3 Exceeding Time to Degree Requirements ............................................................... 9
   6.4 Qualifying Examination ...................................................................................... 10
   6.5 Candidacy Examination ...................................................................................... 11
   6.6 Dissertation ................................................................................................... 13
7.0 Master of Science Programs .................................................................................... 14
   7.1 Master of Science in Civil Engineering .................................................................... 14
   7.2 Master of Science in Environmental Engineering ........................................................ 14
   7.3 Master of Science in Environmental Engineering Science .............................................. 14
   7.4 Exit Requirements ............................................................................................ 14
   7.5 Thesis .......................................................................................................... 14
   7.6 Exit Paper ..................................................................................................... 15
8.0 Civil Engineering MS - Programs of Study .................................................................... 16
   8.1 Construction Engineering and Management - Program of Study ................................... 17
   8.2 Geomechanics and Geotechnical Engineering - Program of Study .................................. 19
   8.3 Structural and Materials Engineering - Program of Study .............................................. 21
9.0 Environmental Engineering MS Programs ........................................................... 23
   9.1 Environmental Engineering MS - Program of Study .................................................. 23
   9.2 Environmental Engineering Science MS - Program of Study ........................................ 24
10.0 Electives .......................................................................................................... 26
   10.1 Approved by Prefix and Level .............................................................................. 26
   10.2 Approved by Course, Syracuse University .................................................................. 27
   10.3 Approved by Course, SUNY ESF ............................................................................ 28
11.0 Certificates of Advanced Study............................................................................... 29
   11.1 Sustainable Enterprise ....................................................................................... 29
   11.2 Public Infrastructure Management and Leadership ................................................ 30
   11.3 Public Administration ......................................................................................... 31
12.0 Recent Theses and Dissertations ................................................................. 32
12.1 Ph.D Dissertations ....................................................................................... 32
12.2 MS Theses .................................................................................................. 32
13.0 Faculty ....................................................................................................... 33
13.1 Full Time Faculty ....................................................................................... 33
13.2 Other Faculty .............................................................................................. 49
1.0 Introduction

This handbook is intended to serve as a supplemental guide to assist graduate students in the Department of Civil and Environmental Engineering as they work towards their degree.

Please note that this is not all-inclusive of Syracuse University policy. Students should refer to the most recent Online Course Catalog for the full listing of Academic Rules & Regulations.

2.0 Program Description

The Department of Civil and Environmental Engineering at Syracuse University was established by the Board of Trustees in 1876. Graduate degrees have been awarded since the 1920's. Civil and Environmental Engineering is one of four departments within the College of Engineering and Computer Science. The department has a long tradition of excellence in graduate teaching and research. Graduate students work closely with their faculty advisors on a variety of research projects. The CEE faculty has a wide range of research and teaching interests. The graduate programs are divided into two disciplines: Civil Engineering and Environmental Engineering. Degrees in Civil Engineering are chosen to include an emphasis in Construction Engineering and Management, Geomechanics and Geotechnical Engineering, or Structural and Materials Engineering. Degrees in Environmental Engineering can encompass a broad range of topics or can be more focused on water quality, hydrology, air quality, sustainable infrastructure, or other topics.

3.0 Academic Integrity

Syracuse University aspires to the highest standards of integrity and honesty in all endeavors. The Academic Integrity Policy is designed to make integrity and honesty central to the Syracuse University experience by:

- setting forth clear ethical expectations for students in their academic endeavors;
- promoting consistency of standards and practices across colleges, schools and programs;
- encouraging reporting of suspected violations; and
- facilitating the resolution of cases as promptly as possible while providing thorough and fair consideration for students and instructors.

Education is a central goal of the policy, including affording students an opportunity to discuss and learn from academic integrity violations.

Students must fully inform themselves of their responsibilities in the conduct of their academic work and should familiarize themselves with Syracuse University’s policy on Academic Integrity.
The full, updated academic integrity policy may be found on the website for the Center for Learning & Student Success. The Center offers academic integrity education and training upon request.

4.0 Academic Performance

All graduate students are required to maintain a satisfactory level of academic performance, which includes but is not limited to:

- maintaining status as a registered student;
- maintaining the minimum required grade point averages (GPA); and
- maintaining continuous progress toward the completion of degree.

The department will provide the student with written notice should a student’s performance become unsatisfactory.

The department may cancel matriculation if these requirements are not met.

4.1 Maintaining Status as a Registered Student

A graduate student is considered to be full-time under any one of the following conditions:

- registered for a semester, full-time study (9 credits for fall, spring, or summer in a program approved by the student’s advisor)
- holding an appointment as a graduate assistant or fellow and registered for the semester (fall and spring only)
- registered for fewer than 9 credits but for at least 0 (zero) credits of thesis, dissertation, or degree in progress for the semester and engaged, at a level equivalent to full-time study in one or more of the following activities as certified by your program.
- a proposed plan of study for the semester should be agreed upon between the student and the instructor (signed by both and filed with the school or college)
  - studying for preliminary, qualifying, or comprehensive exams
  - studying for a language or tool requirement
  - actively working on a thesis or dissertation
  - an internship

If the student is not registered for any coursework, including registration for master’s thesis credits, then the student must be registered for GRD 998 Degree in Progress.
5.0 Departmental Policy & Personnel

Regular office hours during the academic year are 8:30am until 5:00pm, Monday through Friday. The departmental suite is located at 151 Link Hall.

Please do not hesitate to contact departmental staff if you have any questions or concerns:

<table>
<thead>
<tr>
<th>Title</th>
<th>Name</th>
<th>Office</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department Chair &amp; Civil Program Director</td>
<td>Andria Costello Staniec</td>
<td>151G</td>
<td>x2311</td>
<td><a href="mailto:costello@syr.edu">costello@syr.edu</a></td>
</tr>
<tr>
<td>Environmental Program Director</td>
<td>Cliff Ian Davidson</td>
<td>462J</td>
<td>x4287</td>
<td><a href="mailto:davidson@syr.edu">davidson@syr.edu</a></td>
</tr>
<tr>
<td>Administrative Assistant</td>
<td>Nicholas Clarke</td>
<td>151R</td>
<td>x2588</td>
<td><a href="mailto:niclarke@syr.edu">niclarke@syr.edu</a></td>
</tr>
<tr>
<td>Budget Manager</td>
<td>Weisi Liu</td>
<td>151B</td>
<td>x2493</td>
<td><a href="mailto:wliu27@syr.edu">wliu27@syr.edu</a></td>
</tr>
<tr>
<td>Office Coordinator</td>
<td>Morgan Narkiewicz</td>
<td>151</td>
<td>x2311</td>
<td><a href="mailto:mnarkiew@syr.edu">mnarkiew@syr.edu</a></td>
</tr>
</tbody>
</table>

5.1 Conference/Event Space Reservations

Students who would like to reserve the CEE conference room (Link 151A), or any other space within the College of Engineering, should contact the department’s office coordinator.

5.2 Retaking double-numbered coursework

Some courses are double-numbered and have both undergraduate and graduate level sections available (typically as 400-/600-level courses). This allows both undergraduate and graduate students to take the same course, with additional coursework required of graduate students.

Students are prohibited from taking both levels of a double-numbered course. A student that completes the undergraduate-level section may not later complete the graduate-level section.

5.1 Graduate Seminar Series

The department will host graduate research seminars throughout the fall and spring semesters. Departmental seminars are generally held on Fridays. Dates and times will be announced through email. All Full-Time MS and PhD students are required to enroll in CEE 660 the Graduate Seminar each semester, although PhD students in absencia may be excused from this requirement.
5.1 Summer Taxes

Any graduate student receiving income from an assistantship, fellowship, hourly lab work, or other on-campus source during the summer should register for 0 credits of GRD 998 (Degree in Progress).

Students who are not registered for at least 0 credits of coursework during the summer may have FICA taxes withheld from their paycheck during that period.

Please contact the department’s budget manager if you believe FICA taxes are being withheld from your paycheck in error.

5.2 Curricular Practical Training (CPT)

International students that want to gain work experience while in the U.S. may apply for Curriculum Practical Training. To be eligible for CPT, a student must:

- Be in good academic standing with the department;
- Have a minimum overall grade point average (GPA) of 2.800; and
- Have completed no fewer than 15 credits of coursework toward their degree;
- Have completed two on-campus semesters.

The department’s administrative assistant will provide a departmental recommendation letter upon request. Students need to have an official offer letter from an employer. Students are required to enroll in 1 Credit of CEE 670 Experience Credit during the Semester they are engaged in CPT. CEE 670 cannot be counted towards a student’s Program of Study. Any student interested in CPT should speak with an advisor at the Slutzker Center for International Services.

5.3 Optional Practical Training (OPT)

International students with an F-1 visa may be eligible for a 12-month temporary employment authorization.

The department’s administrative assistant will provide a recommendation letter upon request. For details, please contact the Slutzker Center for International Services.
5.4 Health History and Health Insurance

Health History and Immunization Forms
Syracuse University is obligated to enforce student immunization requirements, as defined by New York State Public Health Law, which requires all students to provide proof of immunity to Measles, Mumps and Rubella. This information may be obtained by contacting your High School or Primary Care Provider. In addition, a completed response form related to Meningococcal Meningitis vaccine is required. Health Services provides a patient portal for students to securely upload required immunizations and complete needed health screenings. Use your NetID and password to access the portal at suhsportal.syr.edu. Records are due prior to your arrival on campus.

Health Insurance
All full-time, matriculated students are required to show proof of health insurance that meets the University’s requirements. For information about the University’s health insurance requirement or the plan, review healthinsurance.syr.edu.
6.0 Civil Engineering PhD

The Doctor of Philosophy (PhD) is a research-based degree program involving a high level of advanced training in the chosen field. A dissertation consisting of original research in a specialty area within the field is required.

A minimum of 48 credit hours of coursework are required. No dissertation credits are required.

A student entering the program with a prior MS degree may petition to transfer in a maximum of 30 graduate-level credits as approved by the program director.

A minimum of three years of graduate study is required. Students typically complete their degree within five years.

6.1 Advising

The candidate, with advice from the department chair and/or the program director, selects a dissertation advisor, whose consent must be obtained. The candidate and the advisor together, with consent from the department chair, select the members of the examination and dissertation committees. The candidate, in consultation with the advisor and dissertation committee, selects a program of coursework appropriate to the research and scholarly interests of the student.

6.2 Exit Requirements

- No fewer than 48 total credits of graduate-level coursework;
- minimum 3.333 GPA for all coursework used toward the completion of degree;
- minimum 2.800 GPA cumulative for all coursework taken at SU;
- for students with an M.S. degree, at least two-thirds of the Ph.D. coursework must be at or above the 600 level, and no more than one-third of the coursework can be independent study;
- satisfactory academic performance;
- successful completion of a qualifying examination;
- successful completion of a candidacy examination; and
- successful defense of a dissertation in an oral examination.
6.3 Exceeding Time to Degree Requirements

*Exceeding Time to ABD Status (7 Years)*

If the student has exceeded the seven-year limit for achieving ABD status, the student must register for GRD 991, which requires a minimum of one credit hour per semester, each fall and spring semester until ABD status is achieved. Students will be charged the tuition rate of one credit each semester for GRD 991. This cost will not be covered by the college or department. If the student fails to register for GRD 991, for a given term, the student will be withdrawn from the program.

*Exceeding Time to Graduate Status (5 Years after ABD)*

If the student has exceeded the degree completion limit of five years after achieving ABD status, the student must register for GRD 991, which requires a minimum of one credit hour per semester, each fall and spring semester until the completion of the doctoral degree. Students will be charged the tuition rate of one credit each semester for GRD 991. This cost will not be covered by the college or department. If the student fails to register for GRD 991, for a given term, the student will be withdrawn from the program.
6.4 Qualifying Examination

The examination is composed of two parts: a written exam followed by an oral examination covering materials from at least three graduate level classes that the student has taken at Syracuse University, as well as relevant materials from undergraduate coursework. The purpose of this examination is to assess the student’s background knowledge in his/her primary subject area(s) and his/her preparedness for Ph.D. level research. The result of this examination is a decision by the exam committee as to whether or not the student should continue in the Ph.D. program.

Timing
Students are expected to complete their Qualifying Exam after their first year of study.

Exam Committee

The exam committee shall consist of at least three faculty members. The majority of the committee membership shall be faculty members from the Department of Civil and Environmental Engineering at Syracuse University.

Scheduling

The student must work with their advisor to select the members of their exam committee, and to determine the date and time of the written and oral parts of the examination. The length of time spent on the written portion of the exam will be determined by the advisor in coordination with the committee.

Students must notify the department’s administrative assistant at least two weeks prior to the oral examination date with the Date, Time and Location of the oral exam and the selected Committee Members.

Qualifying oral examinations can be held in the CEE Conference Room (151A Link Hall) or in the Link-Plus Conference Room (462K Link Hall) if available, or other space upon request.

At least 2.5 hours should be scheduled for the oral exam to allow sufficient time for questions.

Exam Process

If the student does not pass this examination, they can request to retake the examination one more time in the following semester. In the event that the student fails the examination for the second time, their Ph.D. program of study will be terminated.
6.5 Candidacy Examination

Timing
Students are expected to present their research proposal to a faculty examination committee after completion of the student’s required Ph.D. coursework, but no later than the fifth semester after admission into the Ph.D. program.

Organization of the Proposal
Prior to this examination, the student shall prepare a detailed research proposal that includes but is not limited to a review of relevant literature leading to a statement of objectives (including major questions or hypotheses to be addressed in the dissertation), a description of methods and approaches to be used, and a brief description of the significance of the proposed work. The proposal will often include preliminary results from the student’s work to date.

Exam Committee
The examination committee will consist of five members: the dissertation advisor and at least four other faculty members.

The majority of the committee membership shall be faculty members from the Department of Civil and Environmental Engineering at Syracuse University.

A copy of the research proposal must be delivered to all members of the exam committee at least two full weeks prior to the oral defense date. Any committee member who receives their copy fewer than 14 calendar days prior to the defense may ask for a postponement of the defense. The student should not distribute the final draft of the research proposal until the advisor is satisfied with it.

Scheduling
The student must work with their advisor to select the members of their exam committee, and to identify which committee member will serve as exam chair, and to determine the date and time of the presentation.

A copy of the research proposal must be delivered to all members of the exam committee at least two full weeks prior to the oral defense date.

Students must contact the department’s administrative assistant at least two weeks prior to the presentation date with the Date, Time and Location of the Exam and the selected Committee Members.

Candidacy examinations can be held in the CEE Conference Room (151A Link Hall) or in the Link-Plus Conference Room (462K Link Hall) if available, or other space upon request.

At least 2 hours should be scheduled to allow sufficient time for questions.

Exam Process
The oral examination is initiated by a 30-40 minute summary of the dissertation research proposal and progress to date by the student.
Following the presentation, the dissertation committee members ask the student questions concerning the research proposal.

Following the examination, the dissertation committee confers to determine if the student is a suitable Ph.D. candidate based on his/her performance on the candidacy examination, as well as to determine if the student should be required to take additional coursework beyond the minimum required for the degree.

If the student successfully completes the candidacy examination by receiving an affirmative vote from the majority of the committee, the advisor notifies the student and the graduate school and the student is considered a Ph.D. candidate.

If the student does not successfully complete the candidacy examination, the committee determines whether the student will be permitted to retake the examination after a minimum period of six months or whether the student’s Ph.D. program should be terminated.
6.6 Dissertation

The Oral Dissertation Defense and submission of the dissertation document to the Syracuse University Graduate School are the final requirements of the PhD program. Defense paperwork must comply with Graduate School’s guidelines, including formatting.

Preparation

It is recommended that the student meet with their defense committee to review dissertation progress at least three to six months in advance of the defense. The student should not distribute the final draft of the dissertation until the advisor is satisfied with it. Readers should be presented with a polished draft that has been proofread, paginated, and contains professional quality tables and figures with captions.

Deadlines

The official Request for Examination form must be signed and submitted to the Graduate School at least three full weeks prior to the oral defense date.

A copy of the dissertation document must be delivered to all members of the defense committee at least two full weeks prior to the oral defense date. Any committee member who receives their copy fewer than 14 calendar days prior to the defense may ask for a postponement of the defense.

Defense Committee

The dissertation defense committee will consist of six members, including

- the research advisor;
- four tenured or tenure-track faculty members from the department; and
- the Chair of the Oral Examination Committee.

The Chair of the Oral Examination Committee must be a Syracuse University tenured or tenure-track faculty member from outside the department and program.

The student may substitute one committee member based on subject-matter expertise who does not satisfy the second bullet above and may be internal or external to Syracuse University. Additional external committee members may be allowed by petition.

Defense Process

The dissertation defense is usually initiated with a 30-40 minute summary of the research. This is followed by open questioning from the audience. When this is completed, the candidate is questioned by the dissertation committee members.

For the candidate to pass the dissertation defense, a majority vote on the quality and originality of the research, the quality of the dissertation, and the performance of the candidate at the examination is required.
7.0 Master of Science Programs

The Master of Science is a flexible and individually-structured program, planned by the student and their advisor to help students develop careers in their chosen field. The MS can be a terminal degree or an introduction to research before pursuing the PhD. All plans are designed to be completed within three to four semesters.

7.1 Master of Science in Civil Engineering

All Civil Engineering MS Students will follow one of three plans. Students completing a Civil Engineering MS must select one the following concentrations: Construction Engineering and Management, Geomechanics and Geotechnical Engineering, or Structural and Materials Engineering. Students who receive a Master’s in Civil Engineering in one focus area cannot apply for and receive a second Master’s in Civil Engineering in a different focus area.

7.2 Master of Science in Environmental Engineering

The MS in Environmental Engineering is intended for students with undergraduate engineering degrees.

7.3 Master of Science in Environmental Engineering Science

The MS in Environmental Engineering Science is intended for students with technical/scientific undergraduate degrees that are not in engineering.

7.4 Exit Requirements

- No fewer than 30 total credits of graduate-level coursework;
- completion of all coursework group requirements in a selected concentration;
- minimum 3.000 GPA for all coursework used toward the completion of degree;
- minimum 2.800 GPA cumulative for all coursework taken at SU;
- no more than 15 credits of 500-level coursework;
- at least 15 credits must be CEE prefixed graduate level courses; and
- satisfactory completion of either a thesis or an exit paper.

7.5 Thesis

The Oral Thesis Defense and submission of the thesis document to the Syracuse University Graduate School are the final requirements for students in a thesis plan. Defense paperwork must comply with the Graduate School’s guidelines, including formatting.

The candidate must complete 24 credit hours of coursework, which include a set of core courses in the student’s chosen area of specialization and a cohesive program of elective coursework approved by the student’s advisor, as outlined in the attached programs of study. All Full-Time M.S. candidates are expected to participate in
faculty/student seminar series (CEE 660) each year. In addition, the student must register for six credits of CEE 997-Master’s Thesis, culminating in the defense of the thesis administered by the student’s thesis committee.

**Deadlines**

The official Request for Examination form must be signed and submitted to the Graduate School at least three full weeks prior to the oral defense date.

A copy of the thesis document must be delivered to all members of the defense committee at least two full weeks prior to the oral defense date.

**Defense Committee**

The thesis defense committee will consist of four members, including

- the thesis advisor;
- two faculty members from the department or other specialists in the subject area; and
- the Chair of the Oral Examination Committee

The Chair of the Oral Examination Committee must be a Syracuse University tenured or tenure-track faculty member.

Two of the four-committee members must be CEE faculty members.

A committee member from outside Syracuse University may be allowed by petition.

**7.6 Exit Paper**

Students not completing a Master’s Thesis must instead complete a Master’s Exit Paper. To complete the degree requirement, a student must also take CEE 995-Master’s Exit Paper for zero credit. The exit paper must be an original work that address issues related to their specialty approved by the advisor and have a minimum length of 2,000 words. The academic advisor determines the formatting and requirements for the exit paper.
8.0 Civil Engineering MS - Programs of Study

Programs are planned by the students in consultation with their advisors. At least half of the coursework must be at or above the 600 level. Students who have taken the lower level of a double-numbered course (e.g., a course offered at the 400 and 600 levels) may not take the higher level of the same course for credit.

M.S. candidates may transfer a maximum of six credits from other institutions and are expected to complete their entire program within five calendar years of admission.

Thesis and non-thesis options are available. Students anticipating further graduate study at the doctoral level should pursue the thesis option.

Requirements with Thesis (30 credits)

1. Completion of 9 credits of core courses in any one of the following areas: construction engineering and management, geotechnical engineering, or structural engineering.
2. Completion of 15 credits of coursework satisfying the distributional requirements for each concentration.
3. Completion of 6 credits of CEE 997 - Master’s Thesis
4. Defense of thesis
5. Participation in the zero credit faculty/student seminar program (CEE 660)

Requirements without Thesis (30 credits)

1. Completion of 9 credits of core courses in any one of the following areas: construction engineering and management, geotechnical engineering, or structural engineering.
2. Completion of 21 credits of coursework satisfying the distributional requirements for each concentration.
3. Completion of CEE 995 - Master’s Exit Paper (zero credits)
4. Participation in the zero credit faculty/student seminar program (CEE 660)
8.1 Construction Engineering and Management - Program of Study

Construction Engineering and Management - 30 Total Credit Hours

**Group 1 - Core Courses**
All courses in Group 1 are required for a total of 9 Credit Hours. Courses include:

- CEE 601 Construction Engineering and Project Management;
- CEE 639/ECS 636 Sustainable Development and Infrastructure Management;
- CEE 605 Construction Estimating and Scheduling.

**Group 2 - Advanced Fundamentals**
At least one course from Group 2 (3 credit hours) must be selected.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 600</td>
<td>Geotechnical Earthquake Engineering</td>
</tr>
<tr>
<td>CEE 637</td>
<td>Advanced Soil Mechanics and Foundation Engineering I</td>
</tr>
<tr>
<td>CEE 678</td>
<td>Rehabilitation of Civil Infrastructure</td>
</tr>
<tr>
<td>CEE 663</td>
<td>Introduction to Sustainable Engineering</td>
</tr>
<tr>
<td>MAE 548</td>
<td>Engineering Economics and Technology Valuation</td>
</tr>
<tr>
<td>MFE 634</td>
<td>Productivity and Quality Control</td>
</tr>
</tbody>
</table>

**Group 3 - Design**
At least one course from Group 3 (3 credit hours) must be selected.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 535</td>
<td>Structural Steel Design</td>
</tr>
<tr>
<td>CEE 536</td>
<td>Pre-Stressed Concrete Design</td>
</tr>
<tr>
<td>CEE 549</td>
<td>Designing with Geofoam</td>
</tr>
<tr>
<td>CEE 638</td>
<td>Advanced Soil Mechanics and Foundation Engineering II</td>
</tr>
<tr>
<td>CEE 641</td>
<td>Seepage and Earth Dam Design</td>
</tr>
<tr>
<td>CEE 643</td>
<td>Transportation Engineering</td>
</tr>
<tr>
<td>CEE 739</td>
<td>Soil Stabilization</td>
</tr>
</tbody>
</table>
Group 4 - Management and Advanced Tools

At least one course from Group 4 (3 credit hours) must be selected.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECS 526</td>
<td>Statistics for Engineers</td>
</tr>
<tr>
<td>ECS 650</td>
<td>Managing Sustainability</td>
</tr>
<tr>
<td>GEO 683</td>
<td>Geographic Information Systems</td>
</tr>
<tr>
<td>MBC 616</td>
<td>Operations Management (1.5 credits). Must be taken with MBC 617</td>
</tr>
<tr>
<td>MBC 617</td>
<td>Supply Chain Management (1.5 credits). Must be taken with MBC 616</td>
</tr>
<tr>
<td>PAI 712</td>
<td>Public Organizations and Management</td>
</tr>
<tr>
<td>PAI 731</td>
<td>Financial Management in State and Local Governments. Cannot be taken with PAI 734.</td>
</tr>
<tr>
<td>PAI 734</td>
<td>Public Budgeting. Cannot be taken with PAI 731.</td>
</tr>
<tr>
<td>PAI 895</td>
<td>Mid-Career Training Group</td>
</tr>
<tr>
<td>SCM 656</td>
<td>Project Management</td>
</tr>
<tr>
<td>SCM 701</td>
<td>Introduction to Supply Chain Management</td>
</tr>
<tr>
<td>SCM 702</td>
<td>Principles of Management</td>
</tr>
</tbody>
</table>

Group 5 - Electives

- Advisor approval is required before a student can take courses from this group.
- Some suggested elective courses can be selected from Engineering and Computer Science (ECS) and Public Administration and Management (PAI) courses not listed above, Architecture (ARC), and Construction Management at ESF (CME).
- For the MS with Thesis - Two additional course from Groups II through V, upon advisor’s approval, one of which can be CEE 690 - Independent study, should be taken for a total of 6 credit hours. Students will also enroll in CEE 997 - Master’s Thesis for 6 credit hours.
- For the MS without Thesis - Four additional courses from Groups II through V upon advisor’s approval; one of which can be CEE 690 - Independent study for a total of 12 credit hours. Students will also enroll in CEE 995 - Master’s Exit Paper (0 credit hour). The exit paper must address a topic relevant to construction engineering. The paper can be an original work or it can be a critical review of a published journal article.
- All Full-Time MS candidates must enroll and participate in CEE 660-CEE Seminar.
8.2 Geomechanics and Geotechnical Engineering - Program of Study

Geomechanics and Geotechnical Engineering - 30 Total Credit Hours

**Group 1 - Core Courses**

Three courses in Group 1 are required for a total of 9 Credit Hours. Courses include:

- CEE 637 Soil Mechanics and Foundation Engineering I;
- CEE 638 Soil Mechanics and Foundation Engineering II;
- Either CEE 549 Designing with Geofoam, or CEE 584 Designing with Geosynthetics.

**Group 2 - Advanced Fundamentals**

At least one course from Group 2 (3 credit hours) must be selected.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 538</td>
<td>Dynamics of Structures</td>
</tr>
<tr>
<td>CEE 633</td>
<td>Finite Element Analysis</td>
</tr>
<tr>
<td>CEE 737</td>
<td>Applied Soil Mechanics</td>
</tr>
<tr>
<td>CEE 739</td>
<td>Soil Stabilization</td>
</tr>
<tr>
<td>CEE 740</td>
<td>Soil Dynamics</td>
</tr>
</tbody>
</table>

**Group 3 - Design**

At least two courses from Group 3 (6 credit hours) must be selected.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 545</td>
<td>Pavement Design</td>
</tr>
<tr>
<td>CEE 549</td>
<td>Designing with Geofoam</td>
</tr>
<tr>
<td>CEE 584</td>
<td>Designing with Geosynthetics</td>
</tr>
<tr>
<td>CEE 641</td>
<td>Seepage and Earth Dam Design</td>
</tr>
</tbody>
</table>
Group 4 - Advanced Tools
At least one course from Group 4 (3 credit hours) must be selected.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 629</td>
<td>Reliability of Civil Systems</td>
</tr>
<tr>
<td>CEE 678</td>
<td>Rehabilitation of Civil Infrastructure</td>
</tr>
<tr>
<td>EAR 601</td>
<td>Hydrogeology</td>
</tr>
<tr>
<td>EAR 603</td>
<td>Geomorphology</td>
</tr>
<tr>
<td>ERE 527</td>
<td>Storm Water Management</td>
</tr>
<tr>
<td>ERE 551</td>
<td>GIS for Engineers</td>
</tr>
<tr>
<td>ERE 693</td>
<td>GIS Based Modeling</td>
</tr>
</tbody>
</table>

Group 5 - Electives

- Advisor approval is required before a student can take courses from this group.
- Some suggested elective courses can be selected from Earth Science (EAR), Computer Programming (CIS), Construction Engineering (CME), Information Technology (IST), and Other CEE graduate courses.
- For the MS with Thesis - One additional course from Groups II through V, upon advisor's approval, or CEE 690 - Independent study should be taken for a total of 3 credit hours. Students will also enroll in CEE 997 - Master's Thesis for 6 credit hours.
- For the MS without Thesis - Three additional courses from Groups II through V upon advisor's approval; one of which can be CEE 690 - Independent study for a total of 9 credit hours. Students will also enroll in CEE 995 - Master's Exit Paper (0 credit hour). The exit paper must address a topic relevant to geotechnical engineering. The paper can be an original work or it can be a critical review of a published journal article. The paper has a minimum length requirement of 2000 words and requires approval of the student's advisor.
- All Full-Time MS candidates must enroll and participate in CEE 660-CEE Seminar.
8.3 Structural and Materials Engineering - Program of Study

Structural Engineering - 30 Total Credit Hours

**Group 1 - Core Courses**

All courses in Group 1 are required for a total of 9 Credit Hours. Courses include:

- CEE 633 Finite Element Analysis;
- CEE 678 Rehabilitation of Civil Infrastructure;
- MAE 635 Advanced Mechanics of Materials.

**Group 2 - Structural Analysis**

At least one course from Group 2 (3 credit hours) must be selected.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 629</td>
<td>Reliability of Civil Systems</td>
</tr>
<tr>
<td>CEE 631</td>
<td>Classical and Matrix Structural Analysis</td>
</tr>
<tr>
<td>CEE 634</td>
<td>Stability Analysis of Structural Systems</td>
</tr>
<tr>
<td>CEE 676</td>
<td>Multiscale Material Modelling and Simulations</td>
</tr>
</tbody>
</table>

**Group 3 - Structural Design**

Two courses from Group 3 (6 credit hours) must be selected. One course must be on Steel Design, and one course must be on either Concrete Design or Bridge Engineering.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 535</td>
<td>Structural Steel Design</td>
</tr>
<tr>
<td>CEE 536</td>
<td>Pre-Stressed Concrete Design</td>
</tr>
<tr>
<td>CEE 635</td>
<td>Advanced Reinforced Concrete Design</td>
</tr>
<tr>
<td>CEE 636</td>
<td>Plastic Design of Steel Structures</td>
</tr>
<tr>
<td>CEE 666</td>
<td>Design of Concrete Bridges</td>
</tr>
</tbody>
</table>
Group 4 - Dynamics and Earthquake Engineering

At least one course from Group 4 (3 credit hours) must be selected.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 538</td>
<td>Dynamics of Structures</td>
</tr>
<tr>
<td>CEE 600</td>
<td>Geotechnical Earthquake Engineering</td>
</tr>
<tr>
<td>CEE 632</td>
<td>Structural Dynamics and Earthquake Engineering</td>
</tr>
<tr>
<td>MAE 626</td>
<td>Vibration of Mechanical Systems</td>
</tr>
</tbody>
</table>

Group 5 - Electives

- Advisor approval is required before a student can take courses from this group.
- Some suggested elective courses can be selected from Architecture (ARC), Construction Management (CME), Political Science, Engineering and Computer Science (ECS), Information Studies Management (IST), Public Communications, and Other CEE graduate courses not listed above.
- Note that CEE 520 - Building Information Modeling and ARC 555 - Introduction to Building Information Modeling can only be counted once towards your program of study.
- For the MS with Thesis - One additional course from Groups II through V, upon advisor's approval, or CEE 690 - Independent study should be taken for a total of 3 credit hours. Students will also enroll in CEE 997 - Master's Thesis for 6 credit hours.
- For the MS without Thesis - Three additional courses from Groups II through V upon advisor's approval; one of which can be CEE 690 - Independent study for a total of 9 credit hours. Students will also enroll in CEE 995 - Master's Exit Paper (0 credit hour). The exit paper must address a topic relevant to structural engineering. The paper can be an original work or it can be a critical review of a published journal article. The paper has a minimum length requirement of 2000 words and requires approval of the student's advisor.
- All Full-Time MS candidates must enroll and participate in CEE 660-CEE Seminar.
9.0 **Environmental Engineering MS Programs**

9.1 **Environmental Engineering MS - Program of Study**

**Group 1 - Core Courses**

Three courses in Group 1 are required for a total of 9 or 10 Credit Hours. Select three from the group. Only one course can come from the Hydrology Group, and only one course can come from the Statistics Group. Courses include:

- CEE 642 Treatment Processes in Environmental Engineering
- CEE 671 Environmental Chemistry and Analysis
- CEE 672 Applied Environmental Microbiology

**Statistics Courses (only one can count as a core course)**

- APM 595 Probability and Statistics for Engineers
- CEE 687 Environmental Geostatistics

**Hydrology Courses (only one can count as a core course)**

- CEE 659 Advanced Hydrology
- EAR 601 Hydrogeology
- ERE 645 Hydrologic Modeling

**Group 2 - Electives**

- Any CEE graduate course, no more than 15 credits of 500-level coursework. Other graduate courses can be used as Group 2 electives if approved by the student's advisor.
- Advisor approval is required before a student can take courses from this group.
- For the MS with Thesis - In addition to the three courses taken in Group 1, five additional elective courses, upon advisor's approval, one of which can be CEE 690 - Independent study should be taken for a total of 15 credit hours. Students will also enroll in CEE 997 - Master's Thesis for 6 credit hours.
- For the MS without Thesis - In addition to the three courses taken in Group 1, seven additional elective courses, upon advisor's approval, one of which can be CEE 690 - Independent Study should be taken for a total of 21 credit hours. Students will also enroll in CEE 995 - Master's Exit Paper (0 credit hour). The exit paper must address a topic relevant to environmental engineering. The paper can be an original work or it can be a critical review of a published journal article. The paper has a minimum length requirement of 2000 words and requires approval of the student's advisor.
- All Full-Time MS candidates must enroll and participate in CEE 660-CEE Seminar.
9.2 Environmental Engineering Science MS - Program of Study

**Group 1 - Core Courses**
Both courses in Group 1 are required for a total of 6 Credit Hours. Required Courses include:

- CEE 671 Environmental Chemistry and Analysis
- CEE 672 Applied Environmental Microbiology

**Group 2 - Advanced Fundamentals**
At least two courses from Group 2 (6 credit hours) must be selected.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 577</td>
<td>Urban Stormwater Management</td>
</tr>
<tr>
<td>CEE 613</td>
<td>Physical Hydrology</td>
</tr>
<tr>
<td>CEE 630</td>
<td>Environmental Organic Chemistry</td>
</tr>
<tr>
<td>CEE 642</td>
<td>Treatment Processes in Env Eng</td>
</tr>
<tr>
<td>CEE 650</td>
<td>Environmental Risk Assessment &amp; Toxicology</td>
</tr>
<tr>
<td>CEE 653</td>
<td>Applied Aquatic Chemistry</td>
</tr>
<tr>
<td>CEE 657</td>
<td>Biogeochemistry</td>
</tr>
<tr>
<td>CEE 659</td>
<td>Advanced Hydrology</td>
</tr>
<tr>
<td>CEE 662</td>
<td>Chemistry of Soils and Natural Surfaces</td>
</tr>
<tr>
<td>CEE 663</td>
<td>Introduction to Sustainable Engineering</td>
</tr>
</tbody>
</table>

**Group 3 - Advanced Tools**
One course from Group 3 (3 credit hours) must be selected. Courses in probability and statistics and/or regression analysis may be accepted with advisor approval.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 521</td>
<td>Introduction to Probability</td>
</tr>
<tr>
<td>ECS 525</td>
<td>Probability for Engineers</td>
</tr>
<tr>
<td>ECS 526</td>
<td>Statistics for Engineers</td>
</tr>
<tr>
<td>APM 595</td>
<td>Probability and Statistics for Engineers</td>
</tr>
<tr>
<td>CEE 571</td>
<td>Water Quality Monitoring</td>
</tr>
<tr>
<td>CEE 600</td>
<td>Data Science for Environmental Systems Research</td>
</tr>
<tr>
<td>EAR 602</td>
<td>Numerical Methods in Geosciences</td>
</tr>
<tr>
<td>GEO 683</td>
<td>Geographic Information Systems</td>
</tr>
</tbody>
</table>
Group 4 - Electives (15 Credits)

- Advisor approval is required before a student can take courses from this group.
- Some suggested elective courses can be selected from Law and Public Policy, Management, Computer Programming, and other CEE graduate courses not listed above.
- For the MS with Thesis - Two additional courses from Groups II through IV, upon advisor's approval, or CEE 690 - Independent study should be taken for a total of 6 credit hours. Students will also enroll in CEE 997 - Master's Thesis for 6 credit hours.
- For the MS without Thesis - Four additional courses from Groups II through IV upon advisor's approval, should be taken for a total of 12 credit hours. One of these can be CEE 690 - Independent study for 3 credit hours. Students will also either enroll in (a) CEE 600 Environmental Assessment (3 Credit hours); or (b) CEE 995 - Master's Exit Paper (0 credits) and one additional course from Groups II through IV (3 credit hours). The exit paper must address a topic relevant to environmental engineering. The paper can be an original work or it can be a critical review of published journal articles. The paper has a minimum length requirement of 2000 words and requires approval of the student's advisor.
- All Full-Time MS candidates must enroll and participate in CEE 660-CEE Seminar.
10.0 Electives

Graduate students at Syracuse University are able to take courses at both SUNY ESF and SUNY Upstate Medical University.

Students may register for SUNY Upstate Medical University coursework using the Inter-Institutional Graduate Course Registration Form, which is available from the department’s administrative assistant. All coursework taken at SUNY Upstate Medical University must be approved by petition.

Students may register for SUNY ESF coursework normally using MySlice.

Please contact the department if you are interested in an elective that is not included on one of the approved lists below.

Additional coursework at Syracuse University or SUNY ESF may be approved by petition. CEE Master’s Degree Programs require at least 15 Credits of Coursework be CEE Prefixed.

10.1 Approved by Prefix and Level

Unless otherwise noted, all courses offered by either Syracuse University or SUNY ESF that are numbered 600:996 with one of the following prefixes are approved as electives for all MS & PhD programs of study.

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>APM</td>
<td>Applied Mathematics</td>
</tr>
<tr>
<td>ARC</td>
<td>Architecture</td>
</tr>
<tr>
<td>BCM</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>BEN</td>
<td>Bioengineering</td>
</tr>
<tr>
<td>BIO</td>
<td>Biology</td>
</tr>
<tr>
<td>BPE</td>
<td>Bioprocess Engineering</td>
</tr>
<tr>
<td>BTC</td>
<td>Biotechnology</td>
</tr>
<tr>
<td>CEN</td>
<td>Chemical Engineering</td>
</tr>
<tr>
<td>CHE</td>
<td>Chemistry</td>
</tr>
<tr>
<td>CME</td>
<td>Construction Management Engineering</td>
</tr>
<tr>
<td>CIS</td>
<td>Computer and Information Science</td>
</tr>
<tr>
<td>CPS</td>
<td>Computational Science</td>
</tr>
<tr>
<td>CSE</td>
<td>Computer Engineering</td>
</tr>
<tr>
<td>EAR</td>
<td>Earth Sciences</td>
</tr>
<tr>
<td>ECS</td>
<td>Engineering and Computer Science</td>
</tr>
<tr>
<td>EGR</td>
<td>Engineering</td>
</tr>
<tr>
<td>FCH</td>
<td>Chemistry</td>
</tr>
<tr>
<td>IST</td>
<td>Information Studies</td>
</tr>
<tr>
<td>MAE</td>
<td>Mechanical and Aerospace Engineering</td>
</tr>
<tr>
<td>MAT</td>
<td>Mathematics</td>
</tr>
<tr>
<td>MEE</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>MFE</td>
<td>Manufacturing Engineering</td>
</tr>
<tr>
<td>MTS</td>
<td>Materials Science</td>
</tr>
</tbody>
</table>
Additionally, the following specific courses offered by Syracuse University are approved as electives for all graduate-level programs of study.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARC 555</td>
<td>Introduction to Building Information Modeling*</td>
</tr>
<tr>
<td>ARC 558</td>
<td>Advanced Building Information Modeling and 3D Design</td>
</tr>
<tr>
<td>COM 600</td>
<td>Multimedia Reporting: Climate Change</td>
</tr>
<tr>
<td>EAR 600</td>
<td>Water Energy Field Course</td>
</tr>
<tr>
<td>EAR 601</td>
<td>Hydrogeology</td>
</tr>
<tr>
<td>EAR 665</td>
<td>Groundwater Modeling</td>
</tr>
<tr>
<td>ECS 526</td>
<td>Statistics for Engineers</td>
</tr>
<tr>
<td>ECS 651</td>
<td>Strategic Management &amp; The Natural Environment</td>
</tr>
<tr>
<td>ECS 759</td>
<td>Sustainability Driven Enterprise</td>
</tr>
<tr>
<td>GEO 683</td>
<td>Geographic Information Systems</td>
</tr>
<tr>
<td>IST 687</td>
<td>Introduction to Data Science</td>
</tr>
<tr>
<td>IST 719</td>
<td>Information Visualization</td>
</tr>
<tr>
<td>MAE 548</td>
<td>Engineering Economics and Technology Valuation</td>
</tr>
<tr>
<td>MAE 573</td>
<td>Application of Finite Element Analysis</td>
</tr>
<tr>
<td>MAE 587</td>
<td>Design of Solar Energy System</td>
</tr>
<tr>
<td>MAE 626</td>
<td>Vibration of Mechanical Systems</td>
</tr>
<tr>
<td>MAE 658</td>
<td>Built in Environmental Modeling</td>
</tr>
<tr>
<td>MBC 616</td>
<td>Operations Management</td>
</tr>
<tr>
<td>MBC 617</td>
<td>Supply Chain Management</td>
</tr>
<tr>
<td>PAI 734</td>
<td>Public Budgeting</td>
</tr>
<tr>
<td>PAI 895</td>
<td>Managerial Leadership</td>
</tr>
<tr>
<td>SCM 656</td>
<td>Project Management</td>
</tr>
<tr>
<td>SCM 701</td>
<td>Supply Chain and Logistics Management</td>
</tr>
<tr>
<td>SCM 702</td>
<td>Principles of Management Science</td>
</tr>
</tbody>
</table>

*Note that CEE 520 - Building Information Modeling and ARC 555 - Introduction to Building Information Modeling can only be counted once towards a program of study. If a student has taken either CEE 520 or ARC 555 and used it towards any program of study, they cannot take the other course for program credit.*
10.3 Approved by Course, SUNY ESF

Additionally, the following specific courses offered by SUNY ESF are approved as electives for all graduate-level programs of study.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APM 595</td>
<td>Probability and Statistics for Engineers</td>
</tr>
<tr>
<td>APM 620</td>
<td>Experimental Design and ANOVA</td>
</tr>
<tr>
<td>CME 531</td>
<td>Construction Safety</td>
</tr>
<tr>
<td>CME 535</td>
<td>Cost Engineering</td>
</tr>
<tr>
<td>CME 543</td>
<td>Construction Estimating</td>
</tr>
<tr>
<td>ERE 527</td>
<td>Stormwater Management</td>
</tr>
<tr>
<td>ERE 551</td>
<td>GIS for Engineers</td>
</tr>
<tr>
<td>ERE 645</td>
<td>Hydrologic Modeling</td>
</tr>
<tr>
<td>ERE 693</td>
<td>GIS-Based Modeling</td>
</tr>
<tr>
<td>ENS 607</td>
<td>Wetland Practicum</td>
</tr>
<tr>
<td>EST 695</td>
<td>Environmental Journalism</td>
</tr>
<tr>
<td>EST 770</td>
<td>Ecological Economics &amp; Policy</td>
</tr>
</tbody>
</table>
11.0 Certificates of Advanced Study

Civil and Environmental Engineering graduate students have the opportunity to earn a Certificate of Advanced Study (CAS) in the multiple programs. If enrolling in a CAS please consult with your advisor and notify the department’s administrative assistant. You will need to complete an Internal Admission Form. Some popular CAS Programs include:

11.1 Sustainable Enterprise

The Certificate of Advanced Study in Sustainable Enterprise (CASSE) integrates business, science, engineering, and environmental science and policy, taking a transdisciplinary approach to sustainable enterprise. The program brings together graduate students in Business, Engineering, and Environmental Sciences. Students must complete 15 credits for the certificate.

Students who complete the certificate will be fluent in the economic, environmental, and social dimensions of sustainability and their interdependence; systems science and its relationship to sustainability; and the natural, financial, technical, legal, and social drivers of sustainability strategy in businesses and other organizations. They will be prepared to engage in transdisciplinary collaboration to develop sustainable solutions to complex organizational challenges.

**Group 1 - Required Courses (9 Credits)**

All three courses are required.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUA 650/ECS 650/EST 696</td>
<td>Managing Sustainability: Purpose, Principles, and Practice</td>
</tr>
<tr>
<td>BUA 651/ECS 651</td>
<td>Strategic Management and the Natural Environment</td>
</tr>
<tr>
<td>BUA 759/ECS 759/EST 796</td>
<td>Sustainability Driven Enterprise</td>
</tr>
</tbody>
</table>

**Group 2 - Electives (6 Credits)**

Two courses of CEE Graduate level coursework.
11.2 Public Infrastructure Management and Leadership

The College of Engineering and Computer Science, in collaboration with the Department of Public Administration and the Executive Education Program within The Maxwell School at Syracuse University, has created a joint 15-credit certificate program entitled the Joint Certificate of Advanced Studies in Public Infrastructure Management and Leadership (CAS-PIML). This certificate program is geared towards mid-career professionals that are interested in building on their body of experience and expanding their skills and knowledge in infrastructure planning, engineering, management and administration through course work that is relevant to their knowledge, interests, and needs.

Group 1 - Required Courses

Four courses are required from this group for a total of 12 Credits. Students may take either PAI 734 or PAI 731. PAI 895, MAE 548 and ECS 636 are required.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAI 895</td>
<td>Mid-Career Training Group Executive Education Seminar: Managerial Leadership</td>
</tr>
<tr>
<td>PAI 734</td>
<td>Public Budgeting</td>
</tr>
<tr>
<td>PAI 731</td>
<td>Financial Management in State and Local Governments</td>
</tr>
<tr>
<td>MAE 548</td>
<td>Engineering Economics and Technology Valuation</td>
</tr>
<tr>
<td>ECS 636</td>
<td>Sustainable Development and Infrastructure Management</td>
</tr>
</tbody>
</table>

Group 2 - Elective

One course selected from the group below, or approved by course director for 3 Credits.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 570</td>
<td>Water &amp; Wastewater Treatment</td>
</tr>
<tr>
<td>CEE 601</td>
<td>Construction Engineering and Project Management</td>
</tr>
<tr>
<td>CEE 643</td>
<td>Transportation Engineering</td>
</tr>
<tr>
<td>CEE 678</td>
<td>Rehabilitation of Civil Infrastructure</td>
</tr>
<tr>
<td>PAI 601</td>
<td>Fundamentals of Conflict Studies</td>
</tr>
<tr>
<td>PAI 730</td>
<td>Problems in Public Administration</td>
</tr>
<tr>
<td>PAI 730</td>
<td>Environmental Conflicts and Collaboration</td>
</tr>
<tr>
<td>PAI 757</td>
<td>Economics of Development</td>
</tr>
<tr>
<td>PAI 777</td>
<td>Economics of Environmental Policy</td>
</tr>
</tbody>
</table>
11.3 Public Administration

This certificate is for midcareer professionals who cannot leave work to complete the entire Executive Master of Public Administration program but still desire a rigorous educational experience focusing on significant elements of public administration. Most individuals taking the certificate state an interest in improving their management and leadership skills or an interest in developing concrete knowledge in a specific policy area. This certificate requires 12 graduate credits. To complete the certificate, students take 12 credits of Public Administration coursework (recognized by a PAI prefix), including one required course, PAI 895 Managerial Leadership.
12.0 Recent Theses and Dissertations

12.1 Ph.D Dissertations

- Fang Wang, “Mechanical Properties and Cyclic Behavior of High Strength Steel After Fire Exposure”, 2020
- Nafiseh Shahbazi Majd, “Analysis and Behavior of Segmented Energy Absorbing Steel Plate Shear Walls (SEA-SPSWs)”, 2020
- Shuai Shao, “Effects of acid deposition and changing climate on the hydrochemistry and critical loads of watersheds in the Adirondack region of New York”, 2021

12.2 MS Theses

- Raed Ashour, “The Effects of Shrinkage Reducing Admixtures on Shrinkage and Strength Properties of Cement Mortar Lining Mixes”, 2020
- Courtney Gammon, “HYDRUS-1D Modeling to Represent Performance of the OnCenter Green Roof”, 2021
- Mengyi Zhang, “Integrated Water Quality Monitoring of Skaneateles Lake Tributaries”, 2021
- Yngrid Pereira Marques, “Assessment of Pluvial Flooding in Syracuse, NY, Using High-Resolution Topographic Data”, 2021
13.0 Faculty

13.1 Full Time Faculty

Riyad S. Aboutaha

Ph.D. (University of Texas at Austin), Associate Dean and Associate Professor of Civil and Environmental Engineering
Specialty: Structural Engineering
E-mail: rsabouta@syr.edu

• Teaching Interests: Rehabilitation of Civil Infrastructure, Bridge Engineering, Behavior and Design of Reinforced and Pre-Stressed Concrete Structures, Mechanics of Materials, and Structural Analysis
• Research Interests: Structural Rehabilitation of Civil Infrastructure, Bridge Retrofit with CFRP Composites, Experimental Investigation of Structural Concrete and Steel Systems, FRP Reinforced Concrete Structural Systems, Foundation Strengthening, Cost-Effective Preventive Maintenance and Widening of Highway Bridges, Rehabilitation of Fire Damaged Concrete Structures, and Investigation of Structural Failures

Sample Publications:

Ph.D. (University of British Columbia), Professor of Civil and Environmental Engineering, Laura J. and L. Douglas Meredith Professor for Teaching Excellence

Specialty: Geotechnical Engineering

E-mail: skbhatia@syr.edu

- Teaching Interests: Designing with Geosynthetics, Seepage and Earth Dams, Ground Improvement, Soil Dynamics and Advanced Soil Mechanics

Sample Publications:

Elizabeth K. Carter

Ph.D. (Cornell University), Assistant Professor of Civil and Environmental Engineering
Specialty: Applied Computational Hydroclimatology
E-mail: ekcarter@syr.edu

- Teaching Interests: Hydrometeorology and hydroclimatology, Algorithmic bias in water resources management and engineering ethics.
- Research Interests: Disaster response and mitigation, Detection of water from space, Space/time statistics, Machine learning/artificial intelligence.

Sample Publications:

David G. Chandler

Ph.D. (Cornell University), Associate Professor of Civil and Environmental Engineering
Specialty: Hydrology
E-mail: dgchandl@syr.edu

- Teaching Interests: Hydrology, Water Resources Engineering, Sustainable Water Systems, Environmental Sensing
- Research Interests: Climate and Anthropogenic Impacts on Hydrology, Soil Physics, Alternative Waste Treatment Systems, Green Infrastructure

Sample Publications:

Andria Costello Staniec

Ph.D. (California Institute of Technology), Department Chair, Associate Professor of Civil & Environmental Engineering

Specialty: Environmental Microbiology, Biotechnology, Engineering & STEM Education

E-mail: costello@syr.edu

• Teaching Interests: Environmental Microbiology, Environmental Chemistry, Environmental Engineering, Biotechnology
• Research Interests: Environmental Microbiology, Engineering & STEM Education

Sample Publications:

Cliff I. Davidson

Ph.D. (California Institute Technology), Program Director of Environmental Engineering, Professor of Civil and Environmental Engineering and Center of Excellence in Environmental and Energy Systems, Thomas C. and Colleen L. Wilmot Chair of Engineering; Director, Center for Sustainable Engineering

Specialty: Environmental Engineering

E-mail: davidson@syr.edu

- Teaching Interests: Environmental Engineering, Sustainable Engineering
- Research Interests: Green Infrastructure, Environmental Flows of Chemicals, Air Quality, Sustainable Urban Development, Engineering Education

Sample Publications:

Charles T. Driscoll

Ph.D. (Cornell University), University and Distinguished Professor of Environmental Systems Engineering, National Academy of Engineering

Specialty: Environmental Engineering, Civil Engineering, Environmental Science

E-mail: ctdrisco@syr.edu

- Teaching Interests: Environmental Engineering, Environmental Chemistry, Biogeochemistry, Environmental Systems Modeling

Sample Publications:

Chris E. Johnson

Ph.D. (University of Pennsylvania), Associate Provost for Academic Affairs and Professor of Civil and Environmental Engineering

Specialty: Environmental Engineering

E-mail: cejohns@syr.edu

- Teaching Interests: Environmental Chemistry, Soil Chemistry, Statistics
- Research Interests: Biogeochemistry, Soil Chemistry, Natural Organic Matter

Sample Publications:

Christa Kelleher

Ph.D. (The Pennsylvania State University), Assistant Professor of Earth Sciences and Civil and Environmental Engineering

Specialty: Hydrology

E-mail: ckellehe@syr.edu

- Teaching Interests: Physical Hydrology, Hydrologic Systems Modeling, Small Unoccupied Aerial Systems
- Research Interests: Watershed Hydrology, Riverine Responses to Climate and Land Use Change, Water Quality, Environmental Model Diagnostics and Uncertainty, Small Unoccupied Aerial Systems, Scientific Visualization

Sample Publications:

Eric M. Lui

Ph.D. (Purdue University), Laura J. and L. Douglas Meredith Professor for Teaching Excellence, Associate Professor of Civil and Environmental Engineering
Specialty: Structural Engineering
E-mail: emlui@syr.edu

- Research Interests: Nonlinear Analysis, Numerical Methods, Steel Structures, Damage Identification and Quantification, Structural Dynamics and Earthquake Engineering

Sample Publications:

Dawit Negussey

Ph.D. (University of British Columbia), Professor of Civil and Environmental Engineering
Specialty: Geotechnical Engineering
E-mail: negussey@syr.edu

- Teaching Interests: Geofoam Geotechnics, Soil Mechanics, Geotechnical Engineering Design, Transportation Engineering
- Research Interests: Properties and Applications of Geofoams, Geotechnical Engineering Design, and Forensic Engineering Investigations

Sample Publications:

Zhao Qin

Ph.D., (Massachusetts Institute of Technology), Assistant Professor of Civil and Environmental Engineering

Specialty: Structural Engineering

E-mail: zqin02@syr.edu

- Research Interests: Development of advanced computational modeling methods for designing new materials of advanced material functions.

Sample Publications:

- X Guo, L Zhao, Z Qin, L Wu, A Shehu, Y Ye (2020), Interpretable Deep Graph Generation with Node-Edge Co-Disentanglement, Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining, 1697-1707
- JL Zitnay, GS Jung, AH Lin, Z Qin, Y Li, SM Yu, MJ Buehler, JA Weiss (2020), Accumulation of collagen molecular unfolding is the mechanism of cyclic fatigue damage and failure in collagenous tissues, Science Advances, 6, eaba2795
Baris Salman

Ph.D. (University of Cincinnati), Assistant Professor Civil and Environmental Engineering

Specialty: Civil Engineering/Construction Engineering and Management

Email: bosalman@syr.edu

- Teaching Interests: Construction Project Management and Scheduling, Construction Equipment, Sustainable Infrastructures and Asset Management, Civil Engineering Materials, Principles of Transportation Engineering
- Research Interests: Infrastructure Asset Management; Deterioration Models and Risk Assessment; Execution of Sustainable Repair, Rehabilitation, and Replacement Practices for Civil Infrastructure Systems

Sample Publications:

Yilei Shi, P.E.

Ph.D. (Florida International University), Associate Teaching Professor, Civil and Environmental Engineering

Specialty: Civil Engineering/Structural Engineering

Email: yshi83@syr.edu

- Research Interests: Transportation Resilience, Sustainable Construction Materials, Structural Behavior Under Extreme Loading Conditions

Sample Publications:

Svetoslava Todorova

Ph.D. (Syracuse University), Professor of Practice Civil and Environmental Engineering
Specialty: Environmental Engineering
E-mail: stodorov@syr.edu

- Teaching Interests: Environmental Engineering, Environmental Chemistry, Sustainable Engineering, Urban Drainage and Stormwater Design
- Research Interests: Aquatic Chemistry, Mercury Cycling and Bioaccumulation, Environmental Policy, Sustainable Infrastructure

Sample Publications:

Teng Zeng

Ph.D. (University of Minnesota), Assistant Professor of Civil and Environmental Engineering

Specialty: Environmental Engineering

Email: tezeng@syr.edu

- Research Interests: Occurrence and Fate of Organic Contaminants, Formation and Control of Disinfection Byproducts, Aquatic Photochemistry

Sample Publications:

13.2 Other Faculty

Ruth Chen
Ph.D. (University of Michigan), Part-Time Professor of Practice Civil and Environmental Engineering

- Teaching Interests: Risk assessment methodology, environmental toxicology, alternative energy, human health impact of exposures to environmental toxins, education in global response to energy and environmental challenges

Samuel P. Clemence
Ph.D. (Georgia Institute of Technology), Emeritus Professor, Laura J. and L. Douglas Meredith Professor for Teaching Excellence

- Teaching Interests: Geotechnical Engineering, Soils and Foundation Design, Construction Management in the Middle East, History of Technology, Leonardo da Vinci Artist and Engineer, Engineering History of the Erie Canal

Kimberly M. Driscoll
M.S.E.E. (Syracuse University), Research Faculty

- Teaching Interests: Environmental Engineering
- Research Interests: Environmental Systems

Dennis P. Joyce, LS
Joyce Land Surveying, Adjunct Faculty
Teaching Interests: Surveying and Mapping
Lance S. Ketcham, P.E.
M.S. (Syracuse University), Adjunct Faculty, Practitioner in Residence
Principal Environmental/Geotechnical Design Engineer and National Expert, ARCADIS


Raymond D. Letterman
Ph.D. (Northwestern University), Emeritus Professor

- Research Interests: Solid-Liquid Separation Processes, Potable Water Supply, Applied Surface Chemistry

James A. Mandel
Ph.D. (Syracuse University), Emeritus/Research Professor

- Teaching Interests: Finite Element Analysis, Plate and Shell Structures
- Research Interests: Composite Materials, Fiber Reinforcement Concrete, Curved Bridge Design, Finite Element Analysis

Sinead Mac Namara
Ph.D. (Princeton University), Associate Professor, Associate Dean for Student Affairs

- Teaching Interests: Structural Analysis and Design
- Research Interests: Thin-shell concrete in nuclear containment structures

Peter W. Plumley
Ph.D. (UC-Santa Cruz), Research Associate Professor

- Teaching Interests: Geology/Tectonics, Renewable Energy, Climate Change, Freshman Engineering
- Research Interests: Science Education, K-12 Outreach

Robert Tanchak
M.S. Manufacturing Engineering (Syracuse University) Adjunct Faculty

- Teaching Interests: Statics, Dynamics, Engineering Computations, Production/MFG processes, Materials
**Eric Wing**  
B. Tech. (SU NY-Delhi), Adjunct Faculty  
C&S Companies  
- Teaching Interests: BIM, Advanced BIM

**Abdallah H. Yabroudi**  
M.S. (Syracuse University), Adjunct Faculty  
CEO and Managing Director, Dubai Contracting Company  
- Teaching Interests: Construction Engineering and Project Management