DEPARTMENT OF
CIVIL AND ENVIRONMENTAL ENGINEERING

Graduate Program Profiles for:
Master of Science in Civil Engineering
Master of Science in Environmental Engineering
Master of Science in Environmental Engineering Science
Master of Science in Environmental Engineering with
a Specialization in Public Administration
Doctor of Philosophy in Civil Engineering

Syracuse University

Civil and Environmental Engineering
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URL: http://eng-cs.syr.edu/our-departments/civil-and-environmental-engineering/

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PROGRAMS IN CIVIL AND ENVIRONMENTAL ENGINEERING

PROGRAM DESCRIPTION

The Department of Civil and Environmental Engineering (CIE) at Syracuse University (SU) 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 (E&CS). 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, and receive individualized attention from the faculty. The CIE faculty has a wide range of research and teaching interests. The graduate programs are divided into four disciplines: Environmental Engineering, Geotechnical Engineering, Construction Engineering, and Structural Engineering.

Enrollment at Syracuse University is approximately 6,250 graduate students and 15,200 undergraduate students. Currently, about 2,070 Masters and 385 Doctoral degrees are awarded by the University each year. The department awards 25-35 M.S. and 1-5 Ph.D. degrees per year.

FACILITIES

The Civil and Environmental Engineering Department office is located in 151 Link Hall on the main campus of Syracuse University. Link Hall is where all major computer and research laboratory facilities of the CIE Department are housed.

**Laboratory facilities:** The Department of Civil and Environmental Engineering maintains several laboratories for graduate instruction and research. They include an environmental unit operations laboratory, an environmental chemistry and a microbiology laboratory, a geosynthetics laboratory, a geofoam research laboratory, a soil mechanics laboratory, an image analysis laboratory, and a structures/materials laboratory. These facilities are open to all graduate students enrolled in our programs. The environmental engineering laboratories are part of the Center for Environmental Systems and Engineering (CESE) at Syracuse University. The Center (http://eng-cs.syr.edu/about-the-college/facilities/center-for-environmental-systems-engineering-cese) is the focal point for research and teaching of the scientific and engineering aspects of environmentally related subjects. These laboratories are equipped with state-of-the-art experimental, analytical and field equipment. The geotechnical engineering laboratories include a soil-mechanics laboratory, a geosynthetics laboratory, a geofoam laboratory (geofoam.syr.edu) and a computer-based image analysis laboratory. These laboratories have extensive in-situ and in-house equipment for testing of both natural and man-made geomaterials. The structures/materials laboratory is equipped with three universal testing machines including a 1.5MN capacity INSTRON 5595-300HVL machine with a computer data acquisition system, and a 3-D reaction frame with an assortment of hydraulic rams and actuators for testing of large-scale structural systems and components.

**Computer facilities:** Graduate students enrolled in the Department of Civil and Environmental Engineering have access to a wide variety of computer facilities. The College of Engineering and Computer Science maintains several high performance desktop computer clusters in Link Hall. These computer clusters are equipped with advanced desktops that support a variety of general purpose utility programs for word processing, computer graphics, spreadsheet calculations and data analyses as well as a number of discipline-specific software packages for engineering and scientific computations. Additional desktop and workstation clusters are located in Schine, Goldstein, Brockway, Kimmel Halls, and the Center for Science and Technology. These computer clusters are open to all students of Syracuse University.

In addition, the College of Engineering and Computer Science, in partnership with the University’s Information Technology Services (ITS), has research computing resources available on campus. This includes the Academic Virtual Hosting Environment (AVHE), Crush and Orange Grid. The virtual machine (VM) or multiple VMs can be used to perform research and moderately intensive computations. AVHE is a cost effective solution because it utilizes hardware that is already in place on campus. VMs can be configured for up to 24 cores. They are typically used for small to moderate computationally intensive research tasks including small to medium sized clusters. Crush is a high bandwidth, low latency solution for larger jobs when more than 24 cores are needed for a specific amount of time. Within this specified time limit, Crush guarantees the users the number of cores and bandwidth. Orange Grid is a distributed, high throughput computing system utilizing idle desktop computers around campus with approximately 10,000 available cores. It is optimized to perform a large number of smaller parallel jobs (typically less than 24 hours), providing high processing capacity over long periods of time.
The University also maintains and operates several time-sharing UNIX-based computers for advanced scientific and engineering computations. All these computers are connected to a campus-wide network and can be accessed from any public terminal. The computers support a variety of word processing, graphics and mathematics software as well as a number of programming languages. In addition, all computers have internet and electronic mail access that allow users to communicate both inside and outside of the Syracuse University campus. The university maintains the AirOrange wireless network, which provides wireless internet access campus-wide to students, faculty and staff.

**PROGRAM REQUIREMENTS**

**Master of Science Programs**

All candidates for the Master of Science (M.S.) programs must have a Bachelor of Science (B.S.) degree in Civil or Environmental Engineering, or a closely-related field from an accredited institution. Candidates with undergraduate degrees in other fields will have their backgrounds evaluated to determine whether additional undergraduate courses are required in their program of study, as a condition for admission to the appropriate M.S. program. These additional courses will not carry credit toward the M.S. degree.

Programs are planned by the students in consultation with their advisors. A series of fundamental courses specified by area (Environmental, Geotechnical, Structural or Construction) must be satisfactorily completed by each candidate (see Appendix A). 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 both 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 graduate credits from other institutions. Most students complete their degrees in one and a half to two years. All students are expected to complete their program of study within five calendar years. A candidate must maintain a B or better average (3.0 grade point average) in all graduate coursework. Thesis and non-thesis options are available. Students receiving financial aid and/or anticipating further graduate study at the doctoral level are strongly advised to pursue the thesis option. We welcome students who wish to pursue their master’s degrees through part-time study while working full-time.

**Master of Science in Civil Engineering**

The M.S in civil engineering program has three specialties. Students may focus their studies in geotechnical, structures, or construction engineering and management. 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.

(1) **Requirements with Thesis** - 30 credit hours. The candidate must complete a set of core courses in the student’s chosen area of specialization. In addition, the student must complete a cohesive program of elective coursework approved by the student’s advisor, as outlined in the attached program study. All M.S. candidates are expected to participate in faculty/student seminar series each year. In addition, six credits of CIE 997-Master’s Thesis must be taken culminating in the defense of the thesis administered by the student’s thesis committee.

(2) **Requirements without Thesis** - 30 credit hours. The candidate must complete a set of core courses in the student’s chosen area of specialization. In addition, the student must complete a cohesive program of elective coursework approved by the student’s advisor. All M.S. candidates are expected to participate in the faculty/student seminar series each year. To complete the degree requirement, the student must take CIE 996-Master’s Project for 3 credits on a civil engineering topic approved by the advisor and at least one additional reader or take CIE 995-Master’s Exit Paper for 0 credits and an additional course. The exit paper must address issues related to their specialty approved by the advisor and have a minimum length of 2000 words.

**Master of Science in Environmental Engineering**

The M.S. in environmental engineering is intended for students with undergraduate engineering degrees.

(1) **Requirements with Thesis** - 30 credit hours. The candidate must complete a set of core courses in the fundamental environmental engineering areas, which includes CIE 671, CIE 672 and CIE 642. If the student has already taken one or more of these courses at the undergraduate level, he/she will be expected to take corresponding higher level courses in these fundamental engineering areas. In
addition, the student must complete a cohesive program of elective coursework approved by the student’s advisor. All M.S. candidates are expected to participate in faculty/student seminar series each year. Furthermore, six credits of CIE 997-Master’s Thesis must be taken culminating in the defense of the thesis administered by the student’s thesis committee.

(2) Requirements without Thesis - 30 credit hours. The candidate must complete a set of core courses in the fundamental environmental engineering areas, which includes CIE 671, CIE 672 and CIE 642. If the student has already taken one or more of these courses at the undergraduate level, he/she will be expected to take corresponding higher level courses in these fundamental engineering areas. In addition, the student must complete a cohesive program of elective coursework approved by the student’s advisor. All M.S. candidates are expected to participate in faculty/student seminar series each year. Furthermore, the student is required to take one of the following courses: CIE 600-Environmental Assessment for 3 credits, CIE 996-Master’s Project for 3 credits or CIE 995-Master’s Exit Paper for 0 credits and an additional course for 3 credits. If the student chooses to take CIE 996, the project must address a topic in environmental engineering or environmental science and be approved by the advisor and at least one additional reader. The exit paper must address issues related to their specialty approved by the advisor and have a minimum length of 2000 words.

Master of Science in Environmental Engineering Science

The M.S. in environmental engineering science is intended for students with other technical/scientific undergraduate degrees.

(1) Requirements with Thesis - 30 credit hours. The candidate must complete a set of core courses offered by the Department of Civil and Environmental Engineering (Appendix A). In addition, the student must complete a cohesive program of elective coursework approved by the student's advisor. All M.S. candidates are expected to participate in faculty/student seminar series each year. Furthermore, six credits of CIE 997-Master’s Thesis must be taken culminating in the defense of the thesis administered by the student’s thesis committee.

(2) Requirements without Thesis - 30 credit hours. The candidate must complete a set of core courses offered by the Department of Civil and Environmental Engineering (Appendix A). In addition, the student must complete a cohesive program of elective coursework approved by the student's advisor. Furthermore, the student is required to take one of the following courses: CIE 600-Environmental Assessment for 3 credits, CIE 996-Master’s Project for 3 credits or CIE 995-Master’s Exit Paper for 0 credits and an additional course for 3 credits. If the student chooses to take CIE 996, the project must address a topic in environmental engineering or environmental science and be approved by the advisor and at least one additional reader. The exit paper must address issues related to their specialty approved by the advisor and have a minimum length of 2000 words.

Master of Science in Environmental Engineering with a Specialization in Public Administration

(1) Requirements with Thesis - 30 credit hours. The candidate must complete a set of core courses in the fundamental environmental engineering areas, which includes CIE 671, CIE 672 and CIE 642. If the student has already taken one or more of these courses at the undergraduate level, he/she will be expected to take corresponding higher level courses in these fundamental engineering areas. In addition, the student must complete the requirement for the Certificate of Advanced Study in Public Management and Policy* (12 credits) in public administration. Furthermore, six credits of CIE 997-Master’s Thesis must be taken culminating in the defense of the thesis administered by the student’s thesis committee.

(2) Requirements without Thesis - 30 credit hours. The candidate must complete a set of core courses in the fundamental environmental engineering areas, which includes CIE 671, CIE 672 and CIE 642. If the student has already taken one or more of these courses at the undergraduate level, he/she will be expected to take higher level courses in these fundamental engineering areas. In addition, the student must complete the requirement for the Certificate of Advance Study in Public Administration* (12 credits) in public administration. Furthermore, the student is required to take one of the following courses: CIE 600-Environmental Assessment for 3 credits, CIE 996-Master’s Project for 3 credits or CIE 995-Master’s Exit Paper for 0 credits and an additional course for 3 credits. If the student chooses to take CIE 996, the project must address a topic in environmental engineering or environmental science and be approved by the advisor and at least one additional reader. The exit paper must address issues related to their specialty approved by the advisor and have a minimum length of 2000 words.

*Students must apply and be admitted to the certificate program. Students may apply after completing one semester in environmental engineering. For additional information see https://www.maxwell.syr.edu/exed/certificates/sa-public_admin/overview/
Doctor of Philosophy in Civil Engineering

The Civil and Environmental Engineering Department offers the Ph.D. degree to students interested in research and teaching. The primary focus is on the development of skills to pursue original research in careers in academia, government, or research institutions. Students may focus their studies in environmental, geotechnical, structures, or construction engineering and management. The degree is usually completed within three to five years.

Admission requirements:
(1) B.S. in civil engineering or other acceptable field from an accredited institution.
(2) M.S. degree from an accredited institution.
(3) B+ average in M.S. program coursework.
(4) Satisfactory scores on all required graduate entrance examinations.
(5) Departmental approval.
(6) Demonstrated potential for excellent research work.

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.

Course requirements:
(1) Ph.D. students are required to take a minimum of 48 credit hours of coursework beyond the B.S. level, or at least 18 credit hours of coursework beyond the M.S. level.
(2) 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 (CIE 690).
(3) Ph.D. students are required to maintain an average GPA of B+ (3.333) in all Ph.D. coursework, and they are required to participate in the faculty/student seminar program (CIE 660).

Examinations:
1. Qualifying Examination: The qualifying examination is to be conducted within the first year of enrollment in the Ph.D. program. The examination is composed of two parts: a written exam followed by an oral examination covering materials from at least 3 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 exam committee shall consist of at least 3 faculty members. The majority of the committee membership shall be faculty members from the Department of Civil and Environmental Engineering at Syracuse University. 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. For the candidate to pass this examination, a majority of the committee must vote favorably. If the student does not pass this examination, he/she 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, he/she will be asked to terminate his/her Ph.D. study.

2. Candidacy Examination: This examination is conducted in the semester after completion of the student’s Ph.D. coursework, but no later than the fifth semester after admission into the Ph.D. program. 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.

The candidacy examination is an oral exam and is presided over by a dissertation committee comprised of at least five members. The majority of the committee membership shall be faculty members from the Department of Civil and Environmental Engineering at Syracuse University. This committee will follow the student’s work through his/her Ph.D. Dissertation Defense. Students are required to deliver their research proposals to all dissertation committee members and notify the Department Graduate Secretary of the examination time and place at least two weeks prior to the exam. Any committee member who receives the dissertation proposal less than 14 calendar days prior to the defense may ask the Department Chair for a postponement of the defense.
The norm for the duration of the examination, which is open to all Department faculty members, is two hours. 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 and Department faculty 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.

3. Dissertation Defense: The final phase of the Ph.D. program is the dissertation defense. The doctoral dissertation is a summary of all phases of the student’s research endeavor. The final stage in the preparation of this dissertation is its distribution to all members of the dissertation committee. 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. All members of the dissertation committee must be given at least two weeks to review the dissertation before the defense. Any committee member who receives the thesis less than 14 calendar days prior to the defense may ask the Exam Committee Chair for a postponement of the defense.

When the Ph.D. candidate has completed the dissertation that has been approved by his/her advisor, a copy is to be provided to each of the dissertation committee members and a defense date is scheduled. The dissertation defense is an open examination and all members of the University community are invited. This is accomplished by announcements to students and faculty in the Department at least one week in advance of the defense, as well as a notice in the SU Events Calendar.

The dissertation defense is to be conducted in accordance with University Policies and Procedures for Dissertation and Oral Examination. The norm for the duration of the dissertation defense is two hours. The dissertation defense is usually initiated with a 30-40 minute summary of the research conducted. 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.

Recent Doctoral Dissertations:

- **Svetoslava Todorova**, “*Mercury Accumulation and Biological Transfer in Onondaga Lake: Ecosystem Response to Decreases in Mercury Load and Water Quality Improvements*”, 2012.
- **Bradley Blackwell**, “*Deposition and Fate of Atmospheric Mercury in Forested Landscapes of the Adirondack Park, NY*”, 2013.
- **Colin Fuss**, “*Hydrochemical Dynamics Under Differing Winter Climate Regimes at the Hubbard Brook Experimental Forest*”, 2014.
- **Fares Jnaid**, “*Analysis of Corroded Steel Reinforced Concrete Beams*”, 2014.
ACADEMIC INTEGRITY

All students in the Department of Civil and Environmental Engineering are expected to abide by the Codes of Academic Integrity and the Codes of Student Conduct in the Syracuse University Student Handbook (http://www.syr.edu/currentstudents/studenthandbook/). The Handbook is revised each year by the Academic Integrity Office.

The Department of Civil and Environmental Engineering strictly enforces these policies. Students are required to read the policies on their own and follow the policies at all times while enrolled at the University. Ignorance of the policies will not be accepted as an excuse. Students are expected to ask questions if they do not understand. Violations of any policy will be reviewed by a quorum of Civil and Environmental Engineering faculty. Occurrences of cheating, plagiarism, falsifying records, or other behavior in violation of the University policies will result in penalties following the Academic Integrity Office guidelines (http://academicintegrity.syr.edu).

FINANCIAL SUPPORT

Financial aid awards in the form of tuition scholarships, teaching assistantships, research assistantships, departmental and university fellowships are available on a competitive basis for qualified students. Most assistantships and fellowships provide full tuition for 24 credits over a calendar year. They also carry a stipend and require an average of 20 hours a week of instruction and/or research responsibilities during the academic year. Some summer support may be available. M.S. students receiving financial aid awards are expected to take the thesis option in their program of study.

FACULTY

Full-Time Faculty

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

Sample Publications:
Chutarat, N. and Aboutaha, R.S., “Cyclic Response of Exterior Reinforced Concrete Beam-Column Joints Reinforced with Headed Bars,” American Concrete Institute, ACI Structural Journal, 100(2), March-April, 2003, pp. 259-264.

Teaching Interests:
Rehabilitation of Civil Infrastructure, Bridge Engineering, Behavior and Design of Reinforced and Prestressed 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, Composite and Hybrid Systems, FRP Reinforced Concrete Structural Systems, Low-cost Maintenance of Bridges, Preventive Maintenance of Highway Bridges, and Investigation of Structural Failures

Hossein Ataei
Ph.D. (University of Southern California), Assistant Professor of Civil and Environmental Engineering
Specialty: Structural Engineering and Mechanics, Construction Engineering and Management
E-mail: hataei@syr.edu
Sample Publications:
Ataei H., Niazy A.M., (2015), “Structural Buckling Analysis of Arched Structures using Finite Element Analysis”, 7th Congress on Forensic Engineering, American Society of Civil Engineers (ASCE), Miami, FL, USA (in publication)
Ataei H., Mamaghani M.H., Aboutaha R.S., (2015), “Finite Element Analysis of Cable-Stayed Suspension Bridges Failure due to an Anchorage Room Fire”, 7th Congress on Forensic Engineering, American Society of Civil Engineers (ASCE), Miami, FL, USA (in publication)

Teaching Interests:
Structural Engineering & Mechanics of Deformable Bodies, Finite Element Analysis, Construction Project Management and Control Systems, Civil Engineering Senior Design Project, Construction Regulations and Organizational Management, Infrastructure Budgeting and Cost Control, Strategic Planning and Business Administration of Engineering Enterprise, Civil Infrastructure Construction Equipment and Methods

Research Interests:

Shobha K. Bhatia
Ph.D. (University of British Columbia), Professor of Civil and Environmental Engineering, Laura J. and L. Douglas Meredith Professor for Teaching Excellence
E-mail: skbhatia@syr.edu

Sample Publications:


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

Research Interests:
Dredged Sediment Dewatering and Containment, Green Polymers and Textiles, Application of Natural Fibers in Engineering, Soil Erosion, Women in Science and Engineering (WISE)
Sample Publications:


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

Joan V. Dannenhoffer
M.S.C.E (University of Connecticut), MBA (Rensselaer Polytechnic Institute), P.E., Associate Professor of Civil and Environmental Engineering
E-mail: jvdannen@syr.edu

Sample Publications:


Teaching Interests:
Engineering Mechanics, Engineering Materials

Research Interests:
Engineering Education Assessment and Teaching Methods

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

Sample Publications:

Teaching Interests:
Environmental Engineering, Sustainable Engineering

Research Interests:
Environmental Flows of Chemicals, Air Quality, Sustainable Urban Development, Engineering Education

Charles T. Driscoll
Ph.D. (Cornell University), University Professor of Environmental Systems Engineering, NAE (National Academy of Engineering)
Specialty: Environmental Engineering
E-mail: ctdrisc@syr.edu

Sample Publications:

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

Research Interests:

Chris E. Johnson
Ph.D. (University of Pennsylvania), Professor of Civil and Environmental Engineering
Specialty: Environmental Engineering
E-mail: cejohns@syr.edu

Sample Publications:


**Teaching Interests:**
Environmental Chemistry, Soil Chemistry, Statistics

**Research Interests:**
Biogeochemistry, Soil Chemistry, Natural Organic Matter

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

**Specialty:** Hydrology

**E-mail:** TBD

**Sample Publications:**


**Teaching Interests:**
Physical Hydrology, Water Quality and Quantity Modeling, Environmental Model Evaluation, Multivariate Statistics for Environmental Datasets

**Research Interests:**
Watershed Hydrology, System Responses to Climate and Land Use Change, Water Quality and Quantity, Environmental Model Diagnostics and Uncertainty, Scientific Visualization

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**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

**Sample Publications:**


**Teaching Interests:**
Structural Analysis and Design, Computer-Aided Engineering, Structural Stability, Structural Dynamics, Structural Reliability, Earthquake Engineering, Green Technology and Sustainability

**Research Interests:**
Nonlinear Theories, Numerical Modeling and Methods of Analysis, Steel Structures, Damage Identification and Quantification, Structural Dynamics and Earthquake Engineering

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**Dawit Negussey**
Ph.D. (University of British Columbia), Professor of Civil and Environmental Engineering.

**Specialty:** Geotechnical Engineering.

**E-mail:** negussey@syr.edu

**Sample Publications:**

The Geo-Institute of the American Society of Civil Engineers.

**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

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**Ossama M. Salem**
Ph.D. (University of Alberta, Canada), Department Chair, Professor of Civil and Environmental Engineering, Yabroudi Chair of Sustainable Civil Infrastructures.
**Specialty:** Civil Engineering/Construction
**E-mail:** om.salem@syr.edu

**Sample Publications:**

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**Salem, O., Salman, B. and Najafi, M., “Developing a Deterioration Model for Metal Culverts.” *Transportation Research Board*, (91) 12-0692 (2012).**

**Teaching and Research Interests:**
Construction Engineering and Management, Infrastructure Engineering and Asset Management, Green Buildings and Sustainable Infrastructures

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**Baris Salman**
Ph.D. (University of Cincinnati), Professor of Practice Civil and Environmental Engineering
**Specialty:** Civil Engineering/Construction
**Engineering and Management**
**E-mail:** bsalman@syr.edu

**Sample Publications:**

**Teaching Interests:**
Construction Project Management and Scheduling, Construction Equipment, Sustainable Infrastructures and Asset Management, Civil Engineering Materials, Principles of Transportation Engineering, Geomatics and BIM

**Research Interests:**
Infrastructure Asset Management; Risk Assessment and Management; Trenchless Inspection, Repair, and Renewal Methods; Accelerated and Fast Track Construction
Svetoslava Todorova  
Ph.D. (Syracuse University), Professor of Practice  
Civil and Environmental Engineering  
Specialty: Environmental Engineering  
E-mail: stodorov@syr.edu

Sample Publications:

Teaching Interests:  
Environmental Engineering, Environmental Chemistry, Sustainable Engineering, Water and Wastewater Treatment

Research Interests:  
Aquatic Chemistry, Mercury Cycling and Bioaccumulation, Environmental Policy, Sustainable Infrastructure

Teng Zeng  
Ph.D. (University of Minnesota), Assistant Professor of Civil and Environmental Engineering  
Specialty: Environmental Chemistry  
E-mail: TBD

Sample Publications:  

Teaching Interests:  
Aquatic Chemistry, Environmental Organic Chemistry, Physical and Chemical Treatment Processes, Water and Wastewater Quality Analysis

Research Interests:  
Part-Time, Affiliated, and Emeritus 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
Research Interests:

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, History of Technology, Leonardo da Vinci Artist and Engineer, Engineering History of the Erie Canal
Research Interests:

Kimberly M. Driscoll
M.S.E.E. (Syracuse University), Research Faculty
Teaching Interests:
Environmental Engineering
Research Interests:
Environmental Systems

Alexander A. Friedman
D. Eng. (University of California-Davis), Emeritus Professor
Teaching Interests:
Environmental Engineering, Water and Wastewater Treatment.
Research Interests:
Water and Wastewater Treatment

Swiatoslav W. Kaczmar
Ph.D. (Michigan State University), Adjunct Faculty
Teaching Interests:
Principles of Toxicology, Industrial Hygiene
Research Interests:
Environmental Toxicology and Industrial Hygiene

Raymond D. Letterman
Ph.D. (Northwestern University), Emeritus Professor
Teaching Interests:
Environmental Engineering Fundamentals, Water Supply Design, Environmental Chemistry
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

Sinéad Mac Namara
Ph.D. (Princeton University), Affiliated Faculty
Teaching Interests:
Structural Analysis and Design
Research Interests:
Thin-shell concrete in nuclear containment structures

Peter W. Plumley
Ph.D. (UC-Santa Cruz), Research Faculty
Teaching Interests:
Geology, Computing, Freshman Engineering
Research Interests:
Science Education, K-12 Outreach

Suresh Santanam
Sc.D. (Harvard University), Adjunct Faculty
Teaching Interests:
Air Pollution, Environmental Regulations, Control System Design, Industrial Toxicology
Research Interests:
Air Quality Monitoring and Control, Indoor Air Quality, Air Pollution Exposure Modeling, Source Apportionment

Andria Costello Staniec
Ph.D. (California Institute of Technology), Associate Provost/Associate Professor
Teaching Interests:
Environmental Engineering, Environmental Microbiology, Bioremediation, Biotechnology
Research Interests:
Applied Environmental Microbiology, Bioremediation, Global Biogeochemical Cycles, Changes in Microbial Communities in Response to Anthropogenic Disturbance, Applications of Molecular Biology to Environmental Engineering

Laura J. Steinberg
Ph.D. (Duke University) Special Assistant to the Chancellor/Professor
Teaching and Research Interests:
Risk assessment, infrastructure resilience, natural and technological hazards

David S. Wazenkewicz
B.S. (Syracuse University), Adjunct Faculty
Teaching Interests:
Solid Waste Management
Research Interests:
Solid Waste Utilization and Management

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GRADUATE COURSE CATALOG

If you are not on campus, you can download the Syracuse University Course Catalog from http://coursecatalog.syr.edu/index.php.

CONTACT INFORMATION

For more information about how you can continue your education in the Department of Civil and Environmental Engineering at Syracuse University, please contact:

Ossama M. Salem  
Chair, Department of Civil and Environmental Engineering  
151G Link Hall  
Syracuse University  
Syracuse, NY 13244-1240  
Tel: 315-443-2311 Fax: 315-443-1243  
E-mail: omsalem@syr.edu

Elizabeth Buchanan  
Academic Coordinator  
Department of Civil and Environmental Engineering  
151S Link Hall  
Syracuse University  
Syracuse, NY 13244-1240  
Tel: 315-443-2558 Fax: 315-443-1243  
E-mail: ebuchana@syr.edu
APPENDIX A

M.S. PROGRAM OF STUDY FORMS
PROGRAM OF STUDY FORM

M.S. in Environmental Engineering

All MSEE students are required to take the courses listed in this Program of Study Form.

**M.S. without Thesis**

1. All the courses in Group I (9 credit hours)
2. One course from Group II (3 credit hours)
3. One course from Group III (3 credit hours)
4. One course from Group IV (3 credit hours)
5. Three additional courses from Groups II through V upon advisor’s approval, one of which can be CIE 690 - Independent Study (9 credit hours)
6. One of the three options (a), (b) or (c) below:
   a. CIE 996 – Master’s Project (3 credit hours)
   b. CIE 600 – Environmental Assessment (3 credit hours)
   c. CIE 995 – Master’s Exit Paper (0 credit hours) and one additional course from Groups II through V (3 credit hours). The exit paper must address a topic relevant to environmental engineering. The paper can be 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.

Total number of credit hours = 30

**M.S. with Thesis**

1. All courses in Group I (9 credit hours)
2. One course from Group II (3 credit hours)
3. One course from Group III (3 credit hours)
4. One course from Group IV (3 credit hours)
5. Two additional courses from Groups II through V, or CIE690 – Independent Study, upon advisor’s approval (6 credit hours)
6. CIE 997–Master’s Thesis (6 credit hours)

Total number of credit hours = 30
### PROGRAM OF STUDY FORM

**M.S. in Environmental Engineering**

<table>
<thead>
<tr>
<th>Group</th>
<th>Course Title</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group I</strong> Core Courses</td>
<td>CIE 642 – Treatment Processes in Environmental Engineering</td>
<td>All are required in this group for MSEE students</td>
</tr>
<tr>
<td></td>
<td>CIE 671 – Environmental Chemistry and Analysis</td>
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<td></td>
<td>CIE 672 – Applied Environmental Microbiology</td>
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<tr>
<td><strong>Group II</strong> Advanced Fundamentals</td>
<td>CIE 554 – Principles of Environmental Toxicology</td>
<td>Select at least one course from this group</td>
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<td></td>
<td>CIE 565/CEN565 – Bioremediation</td>
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<td></td>
<td>CIE 567/CEN567 – Biotechnology</td>
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<tr>
<td></td>
<td>CIE 663 – Introduction to Sustainable Engineering</td>
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<td></td>
<td>CIE 651 – Physical-Chemical Processes</td>
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<td>CIE 652 – Biological Processes</td>
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<td></td>
<td>CIE 653 – Applied Aquatic Chemistry</td>
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<td></td>
<td>CIE 657 – Biogeochemistry</td>
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<tr>
<td></td>
<td>CIE 662 – Chemistry of Soils and Natural Surfaces</td>
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<tr>
<td></td>
<td>CIE 673 – Transport Processes in Environmental Engineering</td>
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<tr>
<td></td>
<td>CIE 764 – Industrial Hygiene Engineering and Radiological Health</td>
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</tr>
<tr>
<td><strong>Group III</strong> Design</td>
<td>CIE 555 – Hazardous Waste Management</td>
<td>Select at least one from this group</td>
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<tr>
<td></td>
<td>CIE 558 – Solid Wastes-Collection and Disposal</td>
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<td></td>
<td>CIE 561 – Air Resources (or SUNY ESF equivalent by petition: GNE 661)</td>
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<tr>
<td></td>
<td>CIE 570 – Water and Wastewater Treatment Plant Design</td>
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<td></td>
<td>CEN 551 – Biochemical Engineering</td>
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<tr>
<td><strong>Group IV</strong> Advanced Tools</td>
<td>CIE 529 – Risk Analysis in Civil Engineering</td>
<td>Select at least one course from this group</td>
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<tr>
<td></td>
<td>CIE 571 – Water Quality Modeling</td>
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<td></td>
<td>CIE 687 – Environmental Geostatistics</td>
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<td></td>
<td>GEO 683 – Geographic Information Systems</td>
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<tr>
<td></td>
<td>Course in probability and statistics and/or regression analysis</td>
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</tr>
<tr>
<td><strong>Group V</strong> Some Suggested Elective Areas</td>
<td>Construction Management Advanced Hydrology</td>
<td>Advisor’s approval is required before a student can take courses from this group</td>
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<tr>
<td></td>
<td>Law and Public Policy Management</td>
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<td></td>
<td>Computer Programming</td>
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<tr>
<td></td>
<td>Other CIE graduate courses not listed above</td>
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</tbody>
</table>
PROGRAM OF STUDY FORM

M.S. in Environmental Engineering Science

All MSEES students are required to take the courses listed in this Program of Study Form.

M.S. without Thesis

1. Both courses in Group I (6 credit hours)
2. Two courses from Group II (6 credit hours)
3. Two courses from Group III (6 credit hours)
4. Three additional courses from Groups II through IV upon advisor’s approval. Courses from the suggested areas in Group IV are recommended. One of these courses can be CIE 690 - Independent Study (9 credit hours)
5. One of the three options (a), (b) or (c) below:
   a. CIE 996 – Master’s Project (3 credit hours)
   b. CIE 600 – Environmental Assessment (3 credit hours)
   c. CIE 995 – Master’s Exit Paper (0 credit hours) and one additional course from Groups II through V (3 credit hours). The exit paper must address a topic relevant to environmental engineering science. The paper can be 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.

Total number of credit hours = 30

M.S. with Thesis

1. Both courses in Group I (6 credit hours)
2. Two courses from Group II (6 credit hours)
3. Two courses from Group III (6 credit hours)
4. Two additional courses from Groups II through IV upon advisor’s approval. Courses from the suggested areas in Group IV are recommended. One of these courses can be CIE 690 - Independent Study (6 credit hours)
5. CIE 997–Master’s Thesis (6 credit hours)

Total number of credit hours = 30
<table>
<thead>
<tr>
<th>Group</th>
<th>Course Title</th>
<th>Notes</th>
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<tbody>
<tr>
<td><strong>Group I</strong> Core Courses</td>
<td>CIE 671 – Environmental Chemistry and Analysis</td>
<td>Both courses in this group are required for MSEES students</td>
</tr>
<tr>
<td></td>
<td>CIE 672 – Applied Environmental Microbiology</td>
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<tr>
<td><strong>Group II</strong> Advanced Fundamentals</td>
<td>CIE 554 – Principles of Environmental Toxicology</td>
<td>Select at least two courses from this group</td>
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<td></td>
<td>CIE 565/CEN565 – Bioremediation</td>
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<td>CIE 567/CEN567 – Biotechnology</td>
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<td>CIE 663 – Introduction to Sustainable Engineering</td>
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<td>CIE 653 – Applied Aquatic Chemistry</td>
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<td>CIE 662 – Chemistry of Soils and Natural Surfaces</td>
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<td>CIE 673 – Transport Processes in Environmental Engineering</td>
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<td>CIE 764 – Industrial Hygiene Engineering and Radiological Health</td>
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<tr>
<td><strong>Group III</strong> Advanced Tools</td>
<td>CIE 529 – Risk Analysis in Civil Engineering</td>
<td>Select at least two courses from this group</td>
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<td></td>
<td>CIE 571 – Water Quality Modeling</td>
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<td>CIE 687 – Environmental Geostatistics</td>
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<td>GEO 683 – Geographic Information Systems</td>
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<td></td>
<td>Course in probability and statistics and/or regression analysis</td>
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<tr>
<td><strong>Group IV</strong> Some Suggested Elective Areas</td>
<td>Advanced Hydrology</td>
<td>Advisor’s approval is required before a student can take courses from this group</td>
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<tr>
<td></td>
<td>Law and Public Policy</td>
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<td>Management</td>
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<td>Computer Programming</td>
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<td></td>
<td>Other CIE graduate courses not listed above</td>
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</tbody>
</table>
PROGRAM OF STUDY FORM

M.S. in Civil Engineering
(with an emphasis in Construction Engineering and Management)

M.S. without Thesis

1. All courses in Group I (12 credit hours)
2. One course from Group II (3 credit hours)
3. One course from Group III - (3 credit hours)
4. One course from Group IV (3 credit hours)
5. Two additional courses from Groups II through V upon advisor’s approval, one of which can be CIE 690 - Independent study (6 credit hours)
6. One of the two options (a) or (b) below:
   a. CIE 996 – Master’s Project (3 credit hours) The Master’s Project must be a construction engineering topic approved by the student’s advisor and at least one additional reader.
   b. CIE 995 – Master’s Exit Paper (0 credit hours) and one additional course from Groups II through V (3 credit hours). The exit paper must address a topic relevant to construction engineering. The paper can be 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.

Total number of credit hours = 30

M.S. with Thesis

1. All courses in Group I (12 credit hours)
2. One course from Group II (3 credit hours)
3. One course from Group III - (3 credit hours)
4. One course from Group IV (3 credit hours)
5. One additional course from Groups II through V upon advisor’s approval, one of which can be CIE 690 - Independent study (3 credit hours)
6. CIE 997 – Master’s Thesis (6 credit hours)

Total number of credit hours = 30
# PROGRAM OF STUDY FORM

## M.S. in Civil Engineering
(with an emphasis in Construction Engineering and Management)

<table>
<thead>
<tr>
<th>Group</th>
<th>Course Title</th>
<th>Notes</th>
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<tr>
<td><strong>Group I</strong></td>
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<tr>
<td>Core Courses</td>
<td>CIE 601 – Construction Engineering and Project Management*</td>
<td>All are required in this group</td>
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<tr>
<td></td>
<td>CIE 639/ECS636 – Sustainable Development and Infrastructure Management</td>
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<td></td>
<td>CIE 600 – Construction Estimating and Scheduling</td>
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<td>CIE 500 – Construction Control Systems</td>
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<tr>
<td><strong>Group II</strong></td>
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<tr>
<td>Advanced Fundamentals</td>
<td>CIE 677 – Design of Structural Systems</td>
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<td></td>
<td>CIE 637 – Advanced Soil Mechanics and Foundation Engineering I</td>
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<td>CIE 678 – Rehabilitation of Civil Infrastructure*</td>
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<td></td>
<td>CIE 663 – Introduction to Sustainable Engineering</td>
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<td></td>
<td>MAE 548 – Engineering Economics and Technology Valuation**</td>
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<td></td>
<td>MFE 629 – Modeling and Optimization</td>
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<td>MFE 634 – Productivity and Quality Control</td>
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<td>CIE 600 – Construction Regulations and Organizational Management</td>
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<tr>
<td><strong>Group III</strong></td>
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<td>Design</td>
<td>CIE 535 – Structural Steel Design</td>
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<td>CIE 536 – Prestressed Concrete Design</td>
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<td>CIE 545 – Pavement Design</td>
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<td>CIE 549 – Geofoam Properties and Application</td>
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<td>CIE 558 – Solid Wastes-Collection and Disposal</td>
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<td>CIE 570 – Water and Wastewater Treatment Plant Design*</td>
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<td>CIE 638 – Advanced Soil Mechanics and Foundation Engineering II</td>
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<td>CIE 641 – Seepage and Earth Dam Design</td>
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<td>CIE 643 – Transportation Engineering*</td>
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<td>CIE 739 – Soil Stabilization</td>
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<tr>
<td><strong>Group IV</strong></td>
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<tr>
<td>Management and Advanced Tools</td>
<td>ECS 526 – Statistics for Engineers</td>
<td>Select at least one course from this group</td>
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<td>BUA 600 – Interpersonal &amp; Group Skills for Managers</td>
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<td>ECS 650 – Managing Sustainability</td>
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<td>GEO 683 – Geographic Information Systems</td>
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<td></td>
<td>LPP 758 – Environmental Law and Public Policy</td>
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<tr>
<td></td>
<td>MBC 616 – Operations Management (1.5 crdt) and MBC 617 – Supply Chain Management (1.5 crdt)</td>
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<td></td>
<td>PPA 709 – Public Organizations and Management*</td>
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<td></td>
<td>PPA 734 – Public Budgeting, or PPA 731 - Financial Management in State and Local Governments**</td>
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<td>PPA 895 – Managerial Leadership**</td>
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<td>SCM 656 – Project Management</td>
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<td></td>
<td>SCM 701 – Introduction to Supply Chain Management</td>
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<td>SCM 702 – Principles of Management</td>
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<tr>
<td><strong>Group V</strong></td>
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<tr>
<td>Some Suggested Elective Courses</td>
<td>Engineering and Computer Science courses not listed above</td>
<td>CEM Advisor’s approval is required before a student can take courses from this group</td>
</tr>
<tr>
<td></td>
<td>Architecture</td>
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<tr>
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<td>Construction Management (ESF)</td>
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<tr>
<td></td>
<td>Public Administration and Management courses not listed above</td>
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</tr>
</tbody>
</table>

** These courses are required to complete the Certificate of Public Infrastructure Management and Leadership.

* One of these courses is needed to complete the Certificate of Public Infrastructure Management and Leadership.
PROGRAM OF STUDY FORM

M.S. in Civil Engineering
(with an emphasis in Geotechnical Engineering)

All MSCE students interested in Geotechnical Engineering are required to follow this program of study.

M.S. without Thesis

1. Three courses in Group I (9 credit hours)
2. One course from Group II (3 credit hours)
3. Two courses from Group III (6 credit hours)
4. One course from Group IV (3 credit hours)
5. Two courses from Groups II to V with advisor approval, one can be CIE690 - Independent study (6 credit hours)
6. One of the two options (a) or (b) below:
   a. CIE 996 – Master’s Project (3 credit hours) The Master’s Project must be a geotechnical engineering topic approved by the student’s advisor and at least one additional reader.
   b. CIE 995 – Master’s Exit Paper (0 credit hours) and one additional course from Groups II through V (3 credit hours). The exit paper must address a topic relevant to geotechnical engineering. The paper can be 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.

Total number of credit hours = 30

M.S. with Thesis

1. Three courses in Group I (9 credit hours)
2. One course from Group II (3 credit hours)
3. Two courses from Group III (6 credit hours)
4. One course from Group IV (3 credit hours)
5. One course from Groups II to V, or CIE 690-Independent Study, with approval of the advisor (3 credit hours)
6. CIE997 Master’s Thesis (6 credit hours).

Total number of credit hours = 30
## PROGRAM OF STUDY FORM

**M.S. in Civil Engineering (MSCE)**  
*(with an emphasis in Geotechnical Engineering)*

<table>
<thead>
<tr>
<th>Group</th>
<th>Course Title</th>
<th>Notes</th>
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<tbody>
<tr>
<td><strong>Group I</strong></td>
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<tr>
<td>Core Courses</td>
<td>CIE637 - Soil Mechanics and Foundation Engineering I</td>
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<td></td>
<td>CIE638 - Soil Mechanics and Foundation Engineering II</td>
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<td></td>
<td>and either CIE549 – Designing with Geofoam</td>
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<td></td>
<td>or CIE584 – Designing with Geosynthetics</td>
<td>Three courses are required.</td>
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<tr>
<td><strong>Group II</strong></td>
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<tr>
<td>Advanced Fundamentals</td>
<td>CIE538 – Dynamics of Structures</td>
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<td>CIE 633 – Finite Element Analysis</td>
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<td>CIE 737 – Applied Soil Mechanics</td>
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<td>CIE 739 – Soil Stabilization</td>
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<td>CIE 740 – Soil Dynamics</td>
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<tr>
<td><strong>Group III</strong></td>
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<td><em>Design</em></td>
<td>CIE 545 - Pavement Design</td>
<td>Select at least two from this group</td>
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<tr>
<td></td>
<td>CIE 549 - Designing with Geofoam</td>
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<td>CIE 584 - Designing with Geosynthetics</td>
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<td>CIE641 – Seepage and Earth Dam Design</td>
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<td><strong>Group IV</strong></td>
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<tr>
<td>Advanced Tools</td>
<td>CIE629 – Reliability of Civil Systems</td>
<td>Select at least one from this group</td>
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<tr>
<td></td>
<td>CIE678 – Rehabilitation of Civil Infrastructure</td>
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<td></td>
<td>EAR 601 Hydrogeology</td>
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<td>EAR 603 Geomorphology</td>
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<td></td>
<td>ERE 527 - Storm Water Management</td>
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<td>ERE 551 – GIS for Engineers</td>
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<td>ERE 693 – GIS Based Modelling</td>
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<td><strong>Group V</strong></td>
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<td>Suggested Elective</td>
<td>Earth Science</td>
<td>Advisor’s approval is required before a student can take courses from this group</td>
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<td>Areas</td>
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<td>Construction Engineering</td>
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<td>Information Technology</td>
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<td></td>
<td>Other CIE graduate courses</td>
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*Design courses in Group III are required when offered.*
PROGRAM OF STUDY FORM

M.S. in Civil Engineering
(with an emphasis in Structural Engineering)

All MSCE students interested in Structural Engineering are required to take the courses listed in this Program of Study Form.

**M.S. without Thesis**

1. All courses in Group I (9 credit hours)
2. One course from Group II (3 credit hours)
3. Two courses from Group III, one of which must be steel design and the other must be concrete design or bridge engineering (6 credit hours)
4. One course from Group IV (3 credit hours)
5. Two additional courses from Groups II through V upon advisor’s approval, one of which can be CIE 690 - Independent study (6 credit hours)
6. One of the two options (a) or (b) below:
   a. CIE 996 – Master’s Project (3 credit hours) The Master’s Project must be a structural engineering topic approved by the student’s advisor and at least one additional reader.
   b. CIE 995 – Master’s Exit Paper (0 credit hours) and one additional course from Groups II through V (3 credit hours). The exit paper must address a topic relevant to structural engineering. The paper can be 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.

Total number of credit hours = 30

**M.S. with Thesis**

1. All courses in Group I (9 credit hours)
2. One course from Group II (3 credit hours)
3. Two courses from Group III, one of which must be steel design and the other must be concrete design or bridge engineering (6 credit hours)
4. One course from Group IV (3 credit hours)
5. One additional course from Groups II through V or CIE 690 – Independent Study, upon advisor’s approval (3 credit hours)
6. CIE 997 – Master’s Thesis (6 credit hours)

Total number of credit hours = 30
# PROGRAM OF STUDY FORM

## M.S. in Civil Engineering
(with an emphasis in Structural Engineering)

<table>
<thead>
<tr>
<th>Group</th>
<th>Course Title</th>
<th>Notes</th>
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</thead>
</table>
| **Group I**  
Core Courses | CIE 677 – Design of Structural Systems  
CIE 633 – Finite Element Analysis  
MAE 635 – Advanced Mechanics of Materials | All are required in this group |
| **Group II**  
Structural Analysis | CIE 629 – Reliability of Civil Systems  
CIE 631 – Structural Analysis I  
CIE 634 – Stability Analysis of Structural Systems  
CIE 678 – Rehabilitation of Civil Infrastructure  
CIE 733 – Plate and Shell Structures | Select at least one course from this group |
| **Group III**  
Structural Design | CIE 535 – Structural Steel Design  
CIE 536 – Prestressed Concrete Design  
CIE 635 – Advanced RC Design  
CIE 636 – Plastic Design of Steel Structures  
CIE 666 – Design of Concrete Bridges | Select at least one course on steel design  
AND  
one course on concrete design or bridge engineering from this group |
| **Group IV**  
Dynamics/Earthquake Engineering | CIE 538 – Dynamics of Structures  
CIE 632 – Structural Analysis II  
CIE 740 – Soil Dynamics  
MAE 626 – Vibration of Mechanical Systems | Select at least one course from this group |
| **Group V**  
Some Suggested Elective Areas | Architecture  
Construction Management  
Political Science  
Engineering and Computer Science  
Information Studies  
Management  
Public Communications  
Other CIE graduate courses not listed above | Advisor’s approval is required before a student can take courses from this group |

*Structural Design courses are required when offered to satisfy the minimum requirements of Group (III): “one course on steel design,” and “one course on concrete design or bridge engineering”.*
M.S. GRADUATE ADVISING FORM

SYRACUSE UNIVERSITY
Department of Civil and Environmental Engineering

Student’s Name: _______________________
E-Mail: ______________________________

Advisor’s Name: _______________________
E-Mail: ______________________________

Program: _________________________________________________________

FIRST SEMESTER:

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<tr>
<th>Subject &amp; Catalog Number</th>
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<th>Group Number</th>
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THIRD SEMESTER:

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FOURTH SEMESTER:

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