

# CIVIL ENGINEERING, BS

## Department Chair

Dr. Andria Costello Staniec, 151G Link Hall, 315-443-1057, [costello@syr.edu](mailto:costello@syr.edu)

## Program Director

Dr. Yilei Shi, 151E Link Hall, 315-443-3307, [yshi83@syr.edu](mailto:yshi83@syr.edu)

## Civil Engineering Faculty

Riyad S. Aboutaha, Elizabeth Carter, Ruth Chen, Andria Costello Staniec, Charles T. Driscoll Jr., Chris E. Johnson, Min Liu, Yizhi Liu, Eric M. Lui, Sinead Mac Namara, Aaron Mohammed, Dawit Negussey, Zhao Qin, Fabrizio Sabba, Baris Salman, Yilei Shi, Svetoslava Todorova, John Trimmer, Kun-Hao Yu, Teng Zeng

The mission of the Civil and Environmental Engineering Department is to promote learning and the creation, dissemination, and application of knowledge in civil and environmental engineering through integration of teaching, scholarship, and service.

The goal of the Civil and Environmental Engineering Department is to prepare students for engineering practice, advanced study, and lifelong learning in civil and environmental engineering. Graduates are expected to be proficient in the fundamentals of sustainable engineering analysis and design and understand the importance and methods of effective communication. Students are encouraged to use the extensive international network and educational resources of Syracuse University and the Syracuse community to broaden and enhance the quality of their university education.

## Civil Engineering B.S. Program Educational Objectives

The program educational objectives of the Bachelor of Science in Civil Engineering in the Department of Civil and Environmental Engineering at Syracuse University describe what graduates of the program are expected to attain within a few years of graduation. Syracuse University civil engineering graduates will:

1. Secure and maintain employment in industry, government, and non-governmental organizations and/or pursue graduate education or research in civil engineering and related fields.
2. Engage in professional development through continuing education and trainings related to their professional goals, including pursuit of licensure as appropriate.
3. Incorporate social, environmental, ethical, and public safety considerations in their professional activities, reflecting a diverse, global, and changing environment.
4. Assume positions with increasing responsibilities and demonstrate leadership within multidisciplinary teams.
5. Embrace emerging technology, using sound engineering judgment, to apply knowledge appropriately to serve their community, society, and profession.

## Civil Engineering Description

Civil engineering is the broadest of the engineering disciplines, extending across many interrelated technical specialties. These technical specialties include structures, hydraulics, geotechnical, environmental,

transportation, construction, and water resources. Civil engineers plan, design, and construct facilities essential to modern life in both the private and the public sectors. These facilities vary widely in nature, size, and scope, and include bridges, buildings, tunnels, highways, transit systems, dams, airports, irrigation projects, facilities for water, collection and treatment facilities for wastewater, and many others.

The first-year curriculum emphasizes the physical and mathematical sciences. Additional courses in mathematics and the sciences, as well as introductory courses in civil engineering are taken during the second year. The last two years of the program focus on planning, design, analysis, and management in civil engineering. The curriculum provides flexibility to allow students to customize their academic programs and take advantage of the diversity across both the college and all of Syracuse University. The four-year program includes coursework in the social sciences and humanities necessary for a well-rounded academic background.

By selecting electives carefully, students may specialize in any of the following areas: structural engineering, which deals with the analysis, design, and rehabilitation of structures under static and dynamic loads; environmental engineering, which involves the purification and distribution of water in cities and the proper disposal of sewage and industrial wastes; geotechnical engineering, which analyzes the properties of soils and rocks that support and affect the behavior of structures, pavements, and underground facilities, and construction engineering which concerns the planning and execution of large-scale construction and infrastructure projects. Students may also complete minors in a variety of subjects.

This program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.

Adjustments in the program can be made to accommodate transfer students from accredited two- and four-year institutions so they may develop their programs of study as soon as possible after admission.

## Student Learning Outcomes

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

# Civil Engineering Curriculum

<b>Year 1</b>		
<b>Fall</b>		
MAT 295	Calculus I	4
CHE 106	General Chemistry Lecture I	3
CHE 107	General Chemistry Laboratory I	1
ECS 101	Introduction to Engineering and Computer Science	3
WRT 105	Studio 1: Practices of Academic Writing	3
FYS 101	First Year Seminar	1
SS/HUM Elective		3
<b>Credits</b>		<b>18</b>
<b>Spring</b>		
MAT 296	Calculus II	2-4
CEE 198	Computer-aided Drafting, Design, and Modeling	3
PHY 211	General Physics I	3
PHY 221	General Physics Laboratory I	1
Select one of the following:		4
EAR 203	Earth System Science	
EAR 105 & EAR 104	Earth Science and Earth Sciences Laboratory	
Note: EAR 104 is the laboratory course for EAR 105 and must be taken concurrently.		
<b>Credits</b>		<b>13-15</b>
<b>Year 2</b>		
<b>Fall</b>		
MAT 397	Calculus III	4
PHY 212	General Physics II	3
PHY 222	General Physics Laboratory II	1
ECS 104	Engineering Computational Tools	3
ECS 221	Statics	3
CEE 273	Introduction to Geomatics and GIS	3
<b>Credits</b>		<b>17</b>
<b>Spring</b>		
MAT 485	Differential Equations and Matrix Algebra for Engineers	3
ECS 222	Dynamics	3
CEE 274	Sustainability in Civil and Environmental Systems	3
WRT 205	Studio 2: Critical Research and Writing	3
CEE 325	Mechanics of Materials	3
<b>Credits</b>		<b>15</b>
<b>Year 3</b>		
<b>Fall</b>		
CEE 331	Analysis of Structures and Materials	3
CEE 337	Introduction to Geotechnical Engineering	4
CEE 341	Introduction to Environmental Engineering	3
CEE 327	Prin of Fluid Mechanics	4
SS/HUM Elective		3
<b>Credits</b>		<b>17</b>
<b>Spring</b>		
CEE 329	Probability, Statistics and Risk for Civil and Environmental Engineering	4
CEE 332	Design of Concrete Structures	3
CEE 338	Foundation Engineering	3
CEE 352	Water Resources Engineering	4
SS/HUM Elective		3
<b>Credits</b>		<b>17</b>
<b>Year 4</b>		
<b>Fall</b>		
CEE 326	Engineering Materials	3
CEE 401	Construction Engineering and Project Management	3
CEE 443	Transportation Engineering	3
Technical elective		3

SS/HUM Elective		3
	Credits	15
Spring		
CEE 475	Civil and Environmental Engineering Design	4
Liberal Arts/Science Elective		3
Technical electives		3
Professional Elective		3
	Credits	13
	Total Credits	125-127