



# Tufts

UNIVERSITY



DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

UNDERGRADUATE HANDBOOK

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# What is the Purpose of this Handbook?

This handbook introduces you to CEE undergraduate programs. It will help you to:

- know the faculty and staff
- understand the fields of civil and environmental engineering
- answer frequently asked questions
- record your progress
- plan your educational program
- understand the mission goals, objectives and outcomes of the ABET accredited degrees

**NOTE 1:** If you have any comments or suggestions regarding this handbook, please send them to the Chair of the Civil & Environmental Engineering Department - Professor Masoud Sanayei *Masoud.Sanayei@Tufts.edu*.

**NOTE 2:** Please bring this handbook when consulting with your advisor. There are also single page copies of all undergraduate degree checklists online.

**NOTE 3:** Please see our website for additional information.  
<http://engineering.tufts.edu/cee/>

# Faculty and Staff

## Faculty:

### Masoud Sanayei, Professor

#### **Department Chair**

Anderson 113, [masoud.sanayei@tufts.edu](mailto:masoud.sanayei@tufts.edu)

(Ph.D. University of California, Los Angeles)

Professor Sanayei teaches in the areas of mechanics, structural analysis, finite element analysis, and structural dynamics and earthquake engineering. His research activities include bridge health monitoring and damage assessment of structures, floor vibrations testing, and nondestructive laboratory and field-testing.

### Linda M. Abriola, Professor

#### **Dean, School of Engineering**

Anderson 105, [linda.abriola@tufts.edu](mailto:linda.abriola@tufts.edu)

(Ph.D., Princeton University)

Professor Abriola specializes in groundwater hydrology. Her primary research area is in the development and verification of models that describe reactive flow and transport in porous media. Recent research work involves the use of models, laboratory experiments, and field tests to explore processes influencing the persistence, distribution, and remediation of liquid chlorinated solvent contaminants in the subsurface and the environmental transport of carbon nanoparticles. Professor Abriola holds an Adjunct faculty appointment in the Department of Chemical and Biological Engineering. Her numerous service activities include membership on the governing Council of the National Academy of Engineering.

### Lawrence S. Bacow, Adjunct Professor

#### **President Tufts University**

### Steven C. Chapra, Professor

#### **Louis Berger Chair in Computing and Engineering**

Anderson 223, [steven.chapra@tufts.edu](mailto:steven.chapra@tufts.edu)

(Ph.D., University of Michigan)

Professor Chapra teaches in the areas of environmental engineering, engineering computing and numerical methods. His research activities focus on water quality modeling and management, environmental physics and chemistry, and advanced decision support systems in environmental engineering. He is an active participant in the Tufts WaterSHED Center.

### Lewis Edgers, Professor

#### **Associate Dean of Undergraduate Curriculum, S.O.E.**

Anderson 308D, [lewis.edgers@tufts.edu](mailto:lewis.edgers@tufts.edu)

(Ph.D., Massachusetts Institute of Technology)

Professor Edgers teaches in the areas of solid mechanics and geotechnical engineering. His current research focuses on natural hazards (rainfall induced landslides) and on offshore geotechnical engineering (for wind farms). He is a fellow of the American Society of Civil Engineers, past president of the Boston Society of Civil Engineers, a registered professional engineer, and recipient of the Henry and Madeline Fischer Award for excellence in teaching in the School of Engineering .

### Grant Garvin, Adjunct Professor,

Professor, Department of Geology

(Ph.D. University of British Columbia)

Dr. Garvin specializes in groundwater geology and hydrology.

### Mark Kachanov, Adjunct Professor

Professor, Department of Mechanical Engineering

(Ph.D. Brown University)

Dr. Kachanov specializes in solid mechanics and applied mathematics.

### Shafiqul Islam, Professor

#### **Associate Dean of Engineering for Research**

Anderson 311, [shafiqul.islam@tufts.edu](mailto:shafiqul.islam@tufts.edu)

(Sc.D., Massachusetts Institute of Technology)

Professor Islam's teaching and research interests are to understand, characterize, measure, and model land surface and boundary layer processes with a particular emphasis on scale issues and remote sensing. His research group emphasizes interdisciplinary collaborative partnership to address contemporary problems of environmental hydrology focusing on scarcity and abundance of water.

**Richard M. Vogel, Professor**

Anderson 308-E, [richard.vogel@tufts.edu](mailto:richard.vogel@tufts.edu)

(Ph.D., Cornell University)

Professor Vogel teaches in the areas of hydrology, river hydraulics, environmental statistics and water resource systems. His research activities are in the areas of: regional hydrology, watershed modeling, natural hazards, environmental statistics and water resource systems.

**Laurie G. Baise, Associate Professor**

Anderson 308C, [laurie.baise@tufts.edu](mailto:laurie.baise@tufts.edu)

(Ph.D., University of California, Berkeley)

Professor Baise teaches in the areas of engineering geology and geotechnical earthquake engineering. Her research activities are in earthquake ground motion modeling, geo-hazard assessment, and geo-statistical evaluation of data.

**Wayne A. Chudyk, Associate Professor**

Anderson 303, [wayne.chudyk@tufts.edu](mailto:wayne.chudyk@tufts.edu)

(Ph.D., University of Illinois at Urbana)

Professor Chudyk teaches in the areas of mechanics and environmental engineering. His research activities are in surface and ground water monitoring using portable, real-time instruments. He is the director of the BSCE program and an active leader in the interdisciplinary environmental studies program.

**Luis Dorfmann, Associate Professor**

Anderson 308B, [luis.dorfmann@tufts.edu](mailto:luis.dorfmann@tufts.edu)

(Ph.D., University of California, Los Angeles)

Professor Dorfmann's interests lie in the areas of structural engineering and applied mechanics. His teaching and research efforts span across the varied areas of engineering materials, solid mechanics and biomechanics. A recently developed interest is the application of coupled nonlinear magnetoelasticity theory in the modeling of magneto-sensitive elastomers and in the mechanics of electroelastic materials. Dr. Dorfmann also holds an Adjunct Associate Professor appointment in the Department of Biomedical Engineering at Tufts University.

**John L. Durant, Associate Professor**

Anderson 018A, [john.durant@tufts.edu](mailto:john.durant@tufts.edu)

(Ph.D., Massachusetts Institute of Technology)

Professor Durant teaches in the areas of environmental fluid mechanics and chemical fate and transport. His research involves the fate and transport of organic and inorganic pollutants in the aquatic environment with particular emphasis on sediment-water interactions, river restoration and watershed management. He is a member of both the Tufts Watershed Center and the Steering Committee of the Mystic Watershed Collaboration.

**Jeffrey Griffiths, Adjunct Professor**

Associate Professor, Tufts School of Medicine

(M.D., Albert Einstein College of Medicine, M.P.H. & T.M., Tulane University)

**David M. Gute, Associate Professor**

Anderson 310, [david.gute@tufts.edu](mailto:david.gute@tufts.edu)

(P.h.D, M.P.H. Yale University)

Professor Gute teaches courses in epidemiology, public health and occupational environmental health and safety and occupational environmental health and safety. His research activities are exploring the intersection of pollution prevention and occupational safety and health, assessing the impact of global climate change on human health and in developing effective means of communicating environmental risk to communities throughout New England. Dr. Gute holds faculty appointments in the School of Medicine and the School of Nutrition Science and Policy and coordinates the M.S. program in Environmental Health.

**Stephen H. Levine, Associate Professor**

Anderson 302, [stephen.levine@tufts.edu](mailto:stephen.levine@tufts.edu)

(Ph.D., University of Massachusetts, Amherst)

Professor Levine teaches in the areas of operations research and engineering economics. His research activities are in mathematical and computer modeling of environmental and economic systems, and in industrial ecology.

**Christopher W. Swan, Associate Professor**

**Faculty Fellow, University College of Citizenship and Public Service**

Anderson 111, [chris.swan@tufts.edu](mailto:chris.swan@tufts.edu)

(Sc.D., Massachusetts Institute of Technology)

Professor Swan specializes in the areas of waste reuse, geotechnical, and geoenvironmental engineering. He teaches courses in groundwater hydrology, site remediation, material mechanics, and laboratory (soil) measurement techniques. His most recent research focuses on the beneficial reuse of hazardous or non-hazardous waste materials. He is an active participant in the University College of Citizenship and Public Service which actively promotes education for active citizenship (E4AC) as a component of a student's education.

**Babak Moaveni, Assistant Professor**

Anderson 206A, [babak.moaveni@tufts.edu](mailto:babak.moaveni@tufts.edu)

(Ph.D., University of California, San Diego)

Dr. Moaveni is interested in structural analysis, statistics and probability, structural dynamics, random vibrations, and parametric identification. His research activities include system and damage identification of civil structures, experimental modal analysis, and uncertainty quantification.

**Andrew Ramsburg, Assistant Professor**

Anderson 209, [andrew.ramsburg@tufts.edu](mailto:andrew.ramsburg@tufts.edu)

(Ph.D., Georgia Institute of Technology)

Dr. Ramsburg's research interests are centered on the fate, transport, and remediation of contaminants in the subsurface environment. He is currently working to develop and refine innovative aquifer remediation technologies for the clean-up of sites contaminated with organic solvents, as well as elucidate the impacts of physical-chemical processes on microbial degradation of groundwater contaminants.

**Brian Brenner, Professor of the Practice**

Anderson 320, [brian.brenner@tufts.edu](mailto:brian.brenner@tufts.edu)

(M.S., Massachusetts Institute of Technology)

Mr. Brenner, P.E., teaches in the areas of concrete design, bridge analysis and design, and structural analysis/design and mechanics. He comes to Tufts after 20 years of professional practice. He is interested in research in engineering education, bridge design topics, and engineering related to urban design and infrastructure. He is the Editor of the Journal of Leadership in Management and Engineering.

**Eric Hines, Professor of the Practice**

Anderson 320, [emhines@lemessurier.com](mailto:emhines@lemessurier.com)

(Ph.D., University of California, San Diego, P.E. Massachusetts)

Dr. Hines, P.E., teaches in the areas of steel design, earthquake engineering, and structural systems design. His research activities include the performance assessment of low-ductility structural systems in moderate seismic regions, the inelastic flexure-shear behavior of reinforced concrete members, and the assessment of building systems subject to low amplitude vibrations. Dr. Hines is an Associate at LeMessurier Consultants in Cambridge, where he is responsible for the structural design of building systems.

**Paul H. Kirshen, Research Professor**

**Director, Water: Systems Science and Society Interdisciplinary Graduate Education Program**

Anderson 322, [paul.kirshen@tufts.edu](mailto:paul.kirshen@tufts.edu)

(Ph.D., Massachusetts Institute of Technology)

Dr. Kirshen's research activities are in integrated water resources management and policy, decision support systems, and climate change. Projects are being conducted locally, nationally, and internationally, particularly in Africa. He is Director of the Water: Systems, Science, and Society, (WSSS) Program and teaches integrated water resources planning and management. He also is a member of the Mystic Watershed Collaborative.

**Lee R. Minardi, Senior Lecturer**

Anderson 304, [lee.minardi@tufts.edu](mailto:lee.minardi@tufts.edu)

(M.S., Tufts University)

Mr. Minardi teaches in the areas of Computer Aided Design and engineering mechanics. His research interests include geometric modeling of mechanical products and infrastructure systems, visualization of engineering principles and data, and the use of technology for enhancing the learning process. Sample research projects have included: the posting of real-time water quality data for the Mystic River Watershed on the internet, the visualization of PCBs in river sediment, web-based access to subsurface data, and the use of VBA for teaching CAD math.

**Mark Woodin, Senior Lecturer, Research Assistant Professor**

Anderson 113C, [mark.woodin@tufts.edu](mailto:mark.woodin@tufts.edu)  
(Sc.D., Harvard University)

Dr. Woodin teaches in the areas of epidemiology, environmental health, and biostatistics. His research activities currently include occupational epidemiology, the epidemiology of metal exposure, and community health research. He is Director of the Epidemiology Certificate Program and is active in the Technical Outreach and Service to Communities Program.

**Anne Marie C. Desmarais, Lecturer**

Anderson 321, [annemarie.desmarais@tufts.edu](mailto:annemarie.desmarais@tufts.edu)  
(M.S.P.H., University of Massachusetts)

Ms. Desmarais teaches graduate courses in risk and exposure assessment and undergraduate courses in environmental technology and hazardous materials management. Her interests are in developing quantitative methods to evaluate exposure to hazardous materials in environmental media.

**Linfield C. Brown, Emeritus Faculty**

[linfield.brown@tufts.edu](mailto:linfield.brown@tufts.edu)  
(Ph.D., University of Wisconsin-Madison)

Professor Brown teaches in the areas of environmental engineering, unit operations and processes, and engineering statistics. His research is in water quality modeling and the applications of statistics to a variety of environmental engineering problems. He is co-author of the book *Statistics for Environmental Engineers*, and recipient of the Lillian Liebner Award for excellence in teaching and advising.

**Part-Time Lecturers:**

- Lecturer Po-Shang Chen, *Structural Engineering***
- Lecturer Larry Cohen, *Hazardous Waste Treatment***
- Lecturer David Hatem, *Legal Issues***
- Lecturer Amy Hirschfeld, *Technical Writing***
- Lecturer Masoud Olia, *Applied Mechanics***
- Lecturer Michael Paster, *Geotechnical Engineering***
- Lecturer David Travis, *Engineering Management***

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# ACADEMIC AWARDS RECEIVED BY CEE STUDENTS (2007-2008)

## UNDERGRADUATE STUDENT AWARDS

### BSCES Awards

#### *Howe Walker Award*

James Kaklamanos

#### *William P. Morse Scholarship*

Ian A. McPherran

### Society of American Military Engineers Awards

#### *Avtges Award*

Matthew D. Farren

#### *Bocchino Award*

Jason C. Varney

#### *Boston Post Awards*

Matthew D. Farren (E'08) and Ian A. McPherran (E'08)

#### *Max O. Urbahn*

Andrea L. Northup (E'08)

## CEE DEPARTMENT AWARDS

### *Cataldo Awards*

Matthew D. Farren (E'09), Katie A. Muller (E'09), Felipe Ossa (E'09), Aliza M. Sandburg (E'09), Harrison J. Smith (E'09),  
Christine E. Thornton (E'09), and Deirdre S. Tomlinson (E'09)

### *Littleton Awards*

Dania A. El Hassan (E'08), Lyndsey A. Gibbons-Neff (G'08), Ian A. McPherran (E'08), Jason C. Varney (E'08),  
and Lauren B. Vasey (E'08)

### *Littleton Fellowships for graduate studies*

James Kaklamanos (E'08 and G'10) and Eric J. Pheifer (E'08 and G'10)

## GRADUATE STUDENT AWARDS

### *Littleton Awards*

Christie L. Wilson (G'08), Mary E. McCormick (G'08), and Scott R. Douglas (G'08)

### *Littleton Fellowship*

Karen C. Kosinski (G'11)

### *Jonathan Curtis Fellowship*

Elizabeth Steele Homa (G'08)

### *Kentaro Tsutsumi Fellowship*

Christopher J. DiCarlo (E'06, G'08)

# What is Civil and Environmental Engineering?

**C**ivil engineering, the oldest branch of nonmilitary engineering, is one of the most diverse engineering disciplines. Civil and environmental engineers are responsible for the planning, design, construction, and operation of the physical structures and facilities that are essential to the environment and infrastructure of modern society. Traditionally these structures have included buildings, highways, water and waste treatment plants, tunnels, airports, harbors, railroads, channels, bridges, and dams. The present day civil and environmental engineer is also involved in research and development in a wide variety of physical and natural systems that contribute to the convenience of society, protection of the environment, and the safety and health of the public. These activities include the development of new construction materials, the rebuilding of the nation's infrastructure, the management of water resource systems, and forecasting the impact of human activity on environmental quality with the use of mathematical models.

The practice of civil and environmental engineering is divided into a number of functional areas. The department offers professional degree programs with specialty options in four of those areas: environmental engineering, geotechnical engineering, structural engineering, and water resources engineering.

**Environmental engineers** work on problems related to environmental quality including climate change, sustainability, alternative energy, and public health issues in the developing world. Environmental engineers improve society's well-being through the planning and design of air and water pollution control facilities, the treatment and disposal of hazardous wastes, and the improvement of safety and health in the living, work, and recreational environments.

**Geotechnical engineers** specialize in the study of soil and rock mechanics and in the analysis of problems of soil response to loads, groundwater flow, and environmental contaminants. Geotechnical engineers design foundations for buildings, bridges, and offshore structures such as wind turbines. They develop solutions for a range of environmental problems including the characterizations and remediation of contaminated sites. Geotechnical engineers evaluate the risk associated with a number of geohazards including earthquakes, landslides, tsunamis, and floods.

**Structural engineers** specialize in the planning, analysis, design, construction, and health monitoring of buildings, bridges, industrial facilities, and other components of infrastructure. The structural engineer's activity ranges from analysis and design of basic structural components such as beams and columns to the study of material properties in engineering mechanics.

**Water resources engineers** are concerned with the design, planning, operation and management of water resource systems. Water resource engineers are involved in projects ranging from storm water management, climate change studies, hydropower systems, water supply systems, river and watershed restoration, management of both the quality and quantity of natural water resources such as rivers, lakes, and estuaries and the protection against natural (floods and droughts) and human induced (terrorism and sea level rise) hazards.

Degree programs with specialty options in architectural studies and environmental health; the environmental studies second major and; minors in architectural studies and engineering management are also available.

# Professionally Accredited Degree Programs

## **Bachelor of Science in Civil Engineering (BSCE)**

*Program Coordinator: Associate Professor Wayne A. Chudyk*

The BSCE program encompasses environmental, geotechnical, structural, and water resources engineering. Students completing this program are also well qualified for a professional career in Civil and Environmental Engineering, graduate study in engineering, construction, architecture, business, management, and law. Program objectives are achieved by developing a broad understanding of civil engineering, its relationship to the fundamental engineering sciences, and its interaction with the humanities, arts, and social sciences. The curriculum emphasizes the application of basic science, computing, and mathematics to the particular needs of the engineer. This program is accredited by the Accreditation Board of Engineering and Technology (ABET).

The BSCE educational program objectives are to provide our undergraduates with the disciplinary breadth in preparation for the following:

1. To enter into professional civil engineering practice as a competent engineer.
2. To attend a top tier graduate or professional school
3. To eventually assume a leadership role in civil engineering or a related field.

## **Bachelor of Science in Environmental Engineering (BSEVE)**

*Program Coordinator: Professor John L. Durant*

The BSEVE degree program offered by the Department of Civil and Environmental Engineering provides students with undergraduate educational experiences that give them a sound basis for professional practice in environmental engineering and for life-long learning. Our primary goal is for students to learn the fundamental principles of environmental engineering, to become proficient in the use of engineering methods to solve challenging problems, and to communicate these solutions to technical and non-technical communities. The faculty is dedicated to accomplishing this mission through the integration of teaching, research, and professional practice.

The educational objectives of the BSEVE program are to provide our undergraduates with the disciplinary breadth in preparation for the following:

1. To enter into professional engineering practice as a competent engineer
2. To attend a top-tier graduate or professional school
3. To eventually assume a leadership role in environmental engineering or a related field

# **BSCE Program Mission Statement**

The mission of the BSCE program offered by the Department of Civil and Environmental Engineering is to provide students with undergraduate educational experiences that give them a sound basis for professional practice in civil engineering and a career of life-long learning. Its fundamental goal is for students to learn the fundamental principles of civil engineering, to master engineering methods for solving challenging problems, and to communicate these solutions to the technical and non-technical community. The faculty is dedicated to accomplishing this mission through the integration of teaching, research, and professional practice.

## **Specific Goals of the BSCE Program**

- A. Provide students with educational experiences that prepare them for continual learning and productive careers in engineering as well as other professions.
- B. Offer high-quality instruction that encompasses not only technical content, but also will allow students to become leaders in the solution of important societal problems of the twenty-first century.
- C. Present a curriculum built on fundamental principles of mathematics, sciences, and engineering that uses departmental disciplinary strengths and gives students the ability to integrate and apply these principles.
- D. Furnish curriculum tools that allow learning the use of information technology for managing complex systems through integrated experiences in analysis, computation, experimentation, design, and evaluation.
- E. Include individual and team-based experiences in problem definition and solution and the communication of these solutions to the technical as well as non-technical communities.
- F. Promote appreciation and application of the linkages between engineering disciplines, as well as interdisciplinary studies.
- G. Encourage students, through advising and curriculum structure, to pursue individualized plans of study including elective courses, internships, and undergraduate research.
- H. Advocate a strong technical focus on environmental, geotechnical, structural, and water resources engineering.

## **BSCE Program Outcomes**

The BSCE program outcomes have been modeled after the ABET Criterion 3 requirements. They also have been augmented to specifically address the ASCE program criteria for civil engineering programs. Each graduate of the BSCE program should be able to demonstrate:

- A. Ability to apply knowledge of mathematics, science, and engineering.
- B. Ability to design and conduct experiments as well as to analyze and interpret data.
- C. Ability to design a system, component, or process to meet desired needs.
- D. Ability to function on multidisciplinary teams.
- E. Ability to identify, formulate, and solve engineering problems.
- F. Understanding of professional and ethical responsibility.
- G. Ability to communicate effectively.
- H. Broad education necessary to understand the impact of engineering solutions in a global/societal/economic context.
- I. Recognition of the need for and an ability to engage in lifelong learning.
- J. Knowledge of contemporary issues.
- K. Ability to use the techniques, skills, and modern engineering tools necessary for civil engineering practice.
- L. Preparation for professional leadership in society.

# **BSEVE Program Mission Statement**

The mission of the BSEVE degree program offered by the Department of Civil and Environmental Engineering is to provide students with undergraduate educational experiences that give them a sound basis for professional practice in environmental engineering and for life-long learning. Our primary goals are for students to learn the fundamental principles of environmental engineering, become proficient in the use of engineering methods to solve challenging problems, and develop effective communication skills for informing both technical and non-technical audiences. The faculty is dedicated to accomplishing this mission through the integration of teaching, research, and professional practice.

## Specific Goals of the BSEVE Program

- A. Provide students with educational experiences that prepare them for life-long learning and productive careers in engineering as well as other professions.
- B. Offer high quality instruction that encompasses the technical content of environmental engineering and that encourages an understanding of the interaction between technology and society.
- C. Provide a curriculum built on fundamental principles of mathematics, the sciences, and engineering that utilizes departmental disciplinary strengths and gives students the ability to integrate and apply these principles.
- D. Provide a curriculum that promotes the use of information technology for managing complex systems, through integrated experiences in analysis, computation, experimentation, design, and evaluation.
- E. Include individual and team-based experiences in problem definition and solution and the communication of these solutions to technical and non-technical communities.
- F. Promote an understanding of best professional environmental engineering practice, and the roles of public institutions, private organizations, and citizens in environmental management.
- G. Encourage students, through advising and curriculum structure, to pursue coherent, individualized plans of study including their elective courses, internships, study abroad, and undergraduate research.
- H. Encourage student recognition of the global dimensions of environmental management

## **BSEVE Program Outcomes**

Each graduate of the BSEvE program should be able to demonstrate:

- A. Ability to apply knowledge of mathematics, science, and engineering to the analysis and design of environmental engineering systems
- B. Ability to design and conduct experiments as well as to analyze and interpret data through laboratory and field experiences
- C. Ability to design a system, component, or process to meet desired needs by engaging in environmental engineering design projects
- D. Ability to function on multidisciplinary teams through participation in senior capstone design projects and in opportunities to participate in projects involving other technical and non-technical disciplines
- E. Ability to identify, formulate, and solve environmental engineering problems
- F. Understanding of professional and ethical responsibility as related to the contemporary practice of environmental engineering
- G. Ability to communicate effectively through oral presentations and written reports
- H. Broad education necessary to understand the impact of engineering solutions in a global/societal context through coherence in selection of non-technical and technical elective courses
- I. Recognition of the need for and an ability to engage in lifelong learning through participation in internships, open-ended projects, summer employment, undergraduate research, and/or other professionally related activities
- J. Knowledge of contemporary societal issues that impact the practice of environmental engineering
- K. Ability to use the techniques, skills, and modern engineering tools necessary for environmental engineering practice through computing and information technology
- L. Preparation for professional leadership in society

# Other Degree Programs

## **Bachelor of Science in Engineering Program in Art and Architectural History**

*Faculty Coordinator: Professor Masoud Sanayei*

A Bachelor of Science in Engineering with a program in art and architectural history is available for students interested in a professional career in architecture or in the historical, aesthetic, and engineering aspects of buildings and other structures. This program, offered jointly by the Department of Civil and Environmental Engineering and the Department of Art and Art History, provides a solid foundation in both the technical aspects of structural systems and the aesthetic and functional characteristics of buildings from an architectural and art history point of view. The flexibility of the B.S.E. degree allows greater concentrations in both art history and studio courses than would otherwise be possible, while providing a coherent basis for graduate work in architecture or design.

## **Bachelor of Science in Engineering in Environmental Health**

*Faculty Coordinator: Associate Professor David M. Gute*

The Department of Civil and Environmental Engineering offers a B.S.E. program in environmental health. This course of study is particularly appropriate for students wishing to pursue a professional career involved in public health, the health sciences, and such activities as risk assessment and regulatory affairs. Historically, programs in environmental health were established to promote research on control of infectious disease, purification of water supplies, and sanitary disposal of human wastes. Today, focal points of concern have been broadened to such challenging issues as environmental pollution, epidemiological aspects of chronic illnesses, occupational health, risk assessment and management. The specific requirements for the B.S.E. degree in environmental health are developed on an individual basis with your advisor but are based on the general 38 course distribution specified in the bulletin of Tufts University.

## **Bachelor of Science in Engineering (BSE)**

The civil and environmental engineering department administers several programs of study that lead to the degree of Bachelor of Science in engineering. These curricula are not accredited by the professional engineering societies (ABET) but offer the student an engineering program that departs somewhat from the traditional concentration requirements in civil and environmental engineering. The BSE programs in Art and Architectural History and in Environmental Health are described in the following paragraphs.

## **Bachelor of Science**

The Bachelor of Science program provides a broad liberal education within the School of Engineering, but a less technical one than the Bachelor of Science in Civil Engineering, the Bachelor of Science in environmental Engineering or the Bachelor of Science in Engineering. Students working toward this degree normally place a heavier emphasis on the humanities and social sciences than students working in the other programs.

## **Second Major**

### **Environmental Studies Program**

*Department Representatives: Associate Professor Wayne A. Chudyk and Associate Professor Stephen H. Levine*

Many CEE majors combine their engineering studies with the interdisciplinary environmental studies program. This affords them the opportunity for more in-depth study of science, and social issues related to environment than the conventional BSCE program. This interdisciplinary program is offered as a major only in conjunction with enrollment in a regular undergraduate departmental major. The Environmental Studies Program has been designed with three tracks. Track I, *Environmental Science*; Track II, *Environment and Technology*; and Track III, *Environment and Society*. CEE majors find the Environment and Technology track particularly attractive because of the ability to double count CEE foundation and concentration courses. Students in all tracks are required to complete a core curriculum which captures the fundamental principles of the central contributory disciplines in the three tracks. The core requires students to master basic scientific principles of environmental processes, to examine interactions between technology and the environment, and to explore the societal context for implementing environmental policy. Completion of the environmental studies program is designed to confer a level of capability and credibility that will enhance an individual's capacity for sound environmental decision-making and positive community leadership, as well as prepare him or her for pursuit of graduate work in environmental areas. For more information interested students should please consult their CEE advisor, the CEE/faculty coordinator, and also contact the program office in Barnum Hall, (617) 627-3188.

# Minor Programs

## Minor in Engineering Management

*Department Representative: Associate Professor Stephen H. Levine*

Many CEE majors select the engineering management minor of the School of Engineering. CEE majors can use their foundation, concentration, and liberal arts electives to satisfy the requirement of the engineering management minor. This minor offers excellent preparation to CEE majors who will be managing large and complex projects during their professional careers. Two current examples of such projects include the Boston Harbor Cleanup and the Central Artery/Third Harbor Tunnel projects.

Five courses are required for this minor.

Four are designated:

- Engineering Science 51 - Technical Writing
- Engineering Science 52 - Engineering Management
- Civil and Environmental Engineering 53 - Engineering Economy
- Economics 5 - Principles of Economics

One must be selected from the following:

- Chemical Engineering 110 - Optimization
- Chemical Engineering 155 - The Chemical Processing Industries: Management, Structure, and Dynamics
- Civil and Environmental Engineering 102 - Probability and Statistics in Engineering
- Economics 3 - Principles of Accounting
- Engineering Science 151 - Engineering Systems: Deterministic Models
- Engineering Science 152 - Engineering Systems: Stochastic Models
- Mechanical Engineering 54 - Management of Technology and Innovation
- Political Science 104 - Public Administration
- Political Science 105 - Constitutional Law
- Psychology 17 - Industrial and Organizational Psychology
- Sociology 122 - Organizational Behavior

# Minors in Geology and in Geoengineering

The Geology Department and Civil and Environmental Engineering Department have developed a Minor in Geoengineering for non-CEE majors, with the reciprocal introduction of a Geology Minor for Civil and Environmental Engineering students. A Geology Minor will provide engineers with the background to interpret soil and rock data, predict subsurface variations, understand the geologic basis for natural hazards such as earthquakes and landslides, and recognize the importance of geology in the solution of groundwater and subsurface environmental problems. The Geoengineering Minor will provide geology students with some engineering background to more easily communicate with engineers and to appreciate the engineering approach to subsurface problems.

## **Geology Minor**

*Faculty Coordinator: Associate Professor Anne Gardulski, Geology*

*Department Representative: Professor Lewis Edgers*

The Geology Department offers a Minor in Geology available to students in the College of Engineering. Five courses are required for the minor, which will normally include:

**GEO 1** The Dynamic Earth

**GEO 2** Environmental Geology

**GEO 22** Structural Geology

**GEO 32** Geomorphology

One elective chosen from:

**GEO 35** Sedimentology

**GEO 36** Stratigraphy

**GEO 115** Quaternary and Glacial Geology

**GEO 131** Hydrogeology

All of the Geology courses numbered higher than GEO 2 are offered in alternate years, and have either GEO 1 or GEO 2 prerequisites.

## **Geoengineering Minor**

*Faculty Coordinator: Professor Lewis Edgers, Civil and Environmental Engineering*

The Civil and Environmental Engineering Department offers a minor that is available to all non-CEE majors. Five courses are required as follows:

**ES 5** Applied Mechanics (Statics)

**ES 9** Applied Mechanics (Strength of Materials)

**CEE 12** Introduction to Hydraulic Engineering

**CEE 42** Introduction to Geotechnical Engineering

One elective selected from:

**CEE 112** Hydrology and Water Resource Engineering

**CEE 113** Groundwater Hydrology

**CEE 146** Foundation Engineering

**CEE 149** Earth Support Systems

Prerequisites for the above course sequence are Math 12 and Physics 12.

# Minor Field in Architectural Studies for Engineering and Liberal Arts Students

(Last Updated 2008/08/25)

The Department of Art and Art History is offering a minor in architectural studies that is open to students from both the School of Engineering and School of Liberal Arts. This minor is appropriate for both BSCE and BSE degrees.

The minor in Architectural Studies includes five courses:

FAH-001	Art, Ritual, and Culture
FAH-008	History of Architecture, 1400 to the Present
EN2 (Intro to Engineering Graphics & CAD) or an EN-CEE Course	Engineering*
FAM-20, FAM-26, FAM-63, or FAM-22	Studio Art
100-level architecture history course (area A)	Advanced architectural history/theory class

*Note: Engineering students minoring in architectural studies replace the engineering requirement with an approved course from the major's disciplinary areas A, B, or C (see Tufts Bulletin under "Architectural Studies", p.84).*

## **Civil Engineering Contact Faculty:**

Professor Masoud Sanayei, Civil and Environmental Engineering  
(617) 627-3211

## **Advisor:**

Associate Professor Daniel Abramson, Art and Art History  
(617) 627-2015

**Minor Field in Architectural Engineering**  
**For**  
**Liberal Arts Students**

(Last Updated 2008/08/25)

The Department of Civil and Environmental Engineering is offering a minor in Architectural Engineering that is open to students in Liberal Arts pursuing a Bachelor of Arts. This minor will provide curricular recognition for the technological track in Architectural Studies (see Tufts Bulletin p. 84).

Of the five course credits that are required for this minor, three are designated:

ES-5	Introduction to Mechanics: Statistics & Dynamics
ES-9	Applied Mechanics: Strength of Materials
ES-88	CAD for Engineers

Two additional course credits must be selected from the following:

ES-2	Introduction to Computing in Engineering
EN-2	Introduction to Engineering Graphics & CAD (0.5 credit)
EN-5-CEE	Skyscrapers, Architecture, and Engineering (0.5 credit)
EN-23-CEE	Building Big: Infrastructure Engineering (0.5 credit)
EN-39-CEE	Bridge Design (0.5 credit)
EN-75-CEE	Geohazards Engineering (0.5 credit)
EN-80-CEE	Structural Art (0.5 credit)
CEE-1	Introduction to Civil Engineering
CEE-22	Structural Analysis
CEE-24	Steel Design
CEE-25	Reinforced Concrete Design
CEE-42	Introduction to Geotechnical Engineering
CEE-188	Engineering Design with CAD

**Liberal Arts Contact Faculty:**

Associate Professor Daniel Abramson, Art and Art History  
(617) 627-2015

**Advisor:**

Professor Masoud Sanayei, Civil and Environmental Engineering  
(617) 627-3211

# Combined Degree Programs

## Combined Five-Year Liberal Arts/Engineering Program

For most students entering college, the choice between liberal arts and engineering is a clear-cut matter. For some students, however, the choice is quite difficult. For the latter, both the professional flavor and occupational orientation of the engineering programs on the one hand, and the variety of course selection in the liberal arts curriculum on the other, have strong appeal. At Tufts it is possible for students to secure the advantages of both types of education under the combined five-year program.

With a normal course load in each of ten semesters, students may complete the degree requirements in both engineering and liberal arts. The five-year program includes two fields of major concentration, one in liberal arts and one in engineering. The plan has particular appeal for engineering students who wish to secure a more liberal arts education than is possible in a four-year engineering curriculum and for liberal arts students who desire a strong technological background. Two degrees are awarded on completion of the program. Both degrees are awarded only on completion of the entire program; a student may not receive one degree earlier, even if the requirements for that degree have been met.

Students who start a five-year program but decide within two years not to continue may complete the degree requirements for either engineering or liberal arts in the usual period of four years.

Students may apply for and be admitted to the combined five-year program only after entrance to Tufts. Because the program requires careful planning, students are encouraged to apply as early as possible. Application forms are available in Academic Services. Admission decisions are made twice a year, in January and in June. Five-year students are required to confer with their faculty advisers at the beginning of each semester to make certain that the courses that have been selected constitute a proper program. Five-year students must complete a minimum of forty-six courses and fulfill the foundation, distribution, and concentration requirements of both engineering and liberal arts. Within the School of Engineering, the B.S. degree may not be used as part of this program, except for the engineering psychology (human factors) program.

## Combined Bachelor's/Master's Degrees Program

Combined bachelor's/master's degrees programs are offered by the College of Liberal Arts, the School of Engineering, and the Graduate School of Arts and Sciences. Exceptional students may combine undergraduate and graduate courses and are simultaneously enrolled in bachelor's and master's degrees programs. *Both degrees are awarded only on completion of the entire program; a student may not receive one degree earlier, even if the requirements for that degree have been met.* Combined- degrees students must pay four years of undergraduate tuition and the entire tuition for the master's degree.

The combined-degrees program is one way of recognizing the fact that an increasing number of undergraduates are entering college with exceptional preparation in certain areas and that many are capable of doing graduate work in their junior and senior years.

Students seeking admission to the program should consult their undergraduate major advisers and their prospective graduate advisers before applying to the graduate school. Combined degrees students are expected to fulfill all the requirements of the undergraduate and graduate programs. No courses offered in fulfillment of one set of requirements may be used for the other.

Admission to the program is normally during the junior year. Only in exceptional cases will an application be accepted after the junior year. Therefore, students interested in the program should contact their advisers early in their academic career to facilitate program planning. A student may elect to withdraw from the program at any time by filing the appropriate petition.

## Other Programs

### Prearchitectural Programs

Students with interest in the field are urged to seek advising early and to familiarize themselves with the variety of courses within the Tufts curriculum that are relevant to architecture. There is no single course of study which serves as preparation for graduate study for the Master of Architecture (first professional degree), but Tufts offers excellent preparation for graduate programs in architecture which are widely available to students with an undergraduate degree in another field. These students may find particularly attractive the BSE program in Art and Architectural History, described earlier.

### Internship Programs

Internships provide students with the opportunity to apply their education and skills directly toward a field-based situation, usually at an off-site organization. Most often, internships are paid positions that are performed on a full-time basis over the summer months, or for approximately ten to fifteen hours a week during the semester. The Office of Engineering Internships and Employer Outreach, located in Dowling Hall, helps qualified engineering students identify potential internship opportunities.

Internships are typically performed without an academic component, in which case students focus directly on the practical experience and tasks at hand. However, in some departments, students also have the option of performing an internship for academic credit. Students who wish to receive academic credit for an internship must have a faculty sponsor on campus as well as professional-level supervision at the workplace. Students must register for the relevant course within the department, and an internship agreement must be completed at the time of registration. All agreements must be signed no later than the add-drop deadline for the semester. At the end of the internship, students are expected to complete a written project, which demonstrates what has been learned during the internship experience. A minimum of 150 hours of work for the semester is required.

### Exchange Programs

#### Study Abroad - Tufts Programs

Students are encouraged to study abroad under one of the established programs sponsored by Tufts University. To apply to a Tufts Program Abroad, students must plan a program relevant to their degree program at Tufts, secure in advance the approval of their adviser, and meet the requirements of the program to which they are applying. (For further information on requirements, see <http://ase.tufts.edu/studyabroad/>.) Among other requirements, students participating in Tufts Programs Abroad must be in good academic and disciplinary standing from the time of application through participation in the program.

#### Study Abroad - Non-Tufts Programs

To study abroad, students must plan a program relevant to their degree program at Tufts and must secure in advance the approval of their adviser and the director of Programs Abroad. Transfer credit toward the Tufts degree will be accepted only from students who are in good academic and disciplinary standing at the time of enrollment in the foreign program. A list of recommended non-Tufts programs is available in Dowling Hall. In order to have a semester of study away from Tufts count as one of the eight semesters of full-time study required for graduation, a student must attempt the equivalent of three or more transferable Tufts credits. To meet the costs of administrative procedures connected with study at other institutions, students studying on a non-Tufts program abroad will be charged a fee of \$200.

## General information

### Dean's List

Each semester, students who have been enrolled with a minimum of 4.0 credits, received letter grades in a minimum of three credits, completed every course in which they were enrolled with no work incomplete (I, Y, or NG), and earned a grade point average of 3.20 in the School of Engineering will be placed on the Dean's List.

### Grade Requirements

For graduation, grades of C- or better are required in two-thirds of the courses submitted for the degree. For students who transfer to Tufts, grades of C- or better must be earned in more than two-thirds of the courses taken at Tufts. It is expected that grades of C- or better will be earned in at least seventy-five percent of the courses taken in the department of concentration.

### Degrees with Honors

**Honorable mention (*cum laude*)** is conferred at commencement on deserving students who earned an academic average of 3.20 or higher.

**High distinction (*magna cum laude*)** is conferred at commencement on deserving students who had an academic average of 3.50 or higher.

Each ABET accredited program may nominate the two students with highest cumulative average of 3.75 or higher. Non-ABET accredited programs, taken together may nominate the two students with highest cumulative average of 3.75 or higher. The nominations are approved by a special vote of the faculty. With the consent of the faculty, students who graduate at a time other than May will be granted the honor summa cum laude if they have a cumulative average equal to or greater than the average of students who received the award in their disciplines at the previous May ceremony. The above criteria may be replaced by special evaluation of the Tufts academic record if substantial transfer credit is submitted in fulfillment of the degree requirements, or if the degree program is of unusual duration. Students whose permanent record includes a serious disciplinary infraction will not normally be eligible for degrees with honors. Exceptions to this policy can be made only after disclosure by the dean of students of the details of the infraction and subsequent vote by the faculty.

### Tau Beta Pi

*Tau Beta Pi*, the national engineering honor society, founded in 1885, affords engineering students the same recognition for high scholastic achievement and exemplary character as is provided for liberal arts students in *Phi Beta Kappa*. The Tufts chapter is designated Delta Chapter of Massachusetts [www.tbp.org](http://www.tbp.org).

### ASCE Student Chapter

The Tufts Students chapter of the American Society of Civil Engineers (ASCE) allows students to interact with the vibrant local and national professional communities. They do this by means of guest lecturers and field trips. Students in the ASCE design and build steel bridges and a concrete canoe each year for regional competitions. Student members also tutor at local schools as a service to the community. Please visit the website for further information: <http://www.ase.tufts.edu/cee/asce/>.

**President** – Jeremy Lancaster

**Vice President** – Eloy Montenegro

**Vice President, Environmental** – Allison McCarthy

**Vice President, Steel Bridge** – Jason Varney and Ian McPherran

**Vice President, Concrete Canoe** – Jeremy Lancaster

**Secretary** – Natalie Varner

**Treasurer** – Kaon Lam

**Corporate Liaison** – Allison Klein

**Social Director** – Patrick Barber

**Publicity Chair** – Rachael Hogan

**Faculty Advisor** – Professor Mehdi Modares

**Webmaster** – Mike Sidebottom

**Undergraduate Advisor** – Jim Kaklamanos

# TUFTS UNIVERSITY

## Department of Civil and Environmental Engineering

### MISSION STATEMENT

The mission of the Civil and Environmental Engineering Department is to educate civil and environmental engineering students to become leaders in the solution of important societal problems of the twenty-first century. Technically rigorous and broad in scope, our programs focus on the interactions between the natural and built environments. CEE programs make extensive use of information technology for managing complex systems and for integrating the teaching, research, and design components of engineering education. Our program breadth includes linkages between engineering disciplines such as environmental, geotechnical, and chemical engineering, as well as interdisciplinary studies in areas such as architecture, geology, chemistry, and environmental policy.

The Civil and Environmental Engineering Department's strategic goals, ordered by priority, are:

#### **1. TO PROVIDE TECHNICALLY RIGOROUS YET BROAD UNDERGRADUATE PROGRAMS IN CIVIL AND ENVIRONMENTAL ENGINEERING AND RELATED FIELDS.**

- BSCE ABET accredited program.
  - Technical focus: **environmental, geotechnical, structural, and water resources options.**
- BSEVE ABET accredited program
  - Technical focus: **water and waste-water, solid and hazardous waste, and environmental health engineering**
- Complementary non-ABET accredited programs (BSE/minors).
  - Subject areas: **architectural studies, environmental health.**

#### **2. TO PROVIDE TECHNICALLY RIGOROUS YET BROAD GRADUATE PROGRAMS IN SPECIFIC AREAS OF CIVIL ENGINEERING AND RELATED FIELDS.**

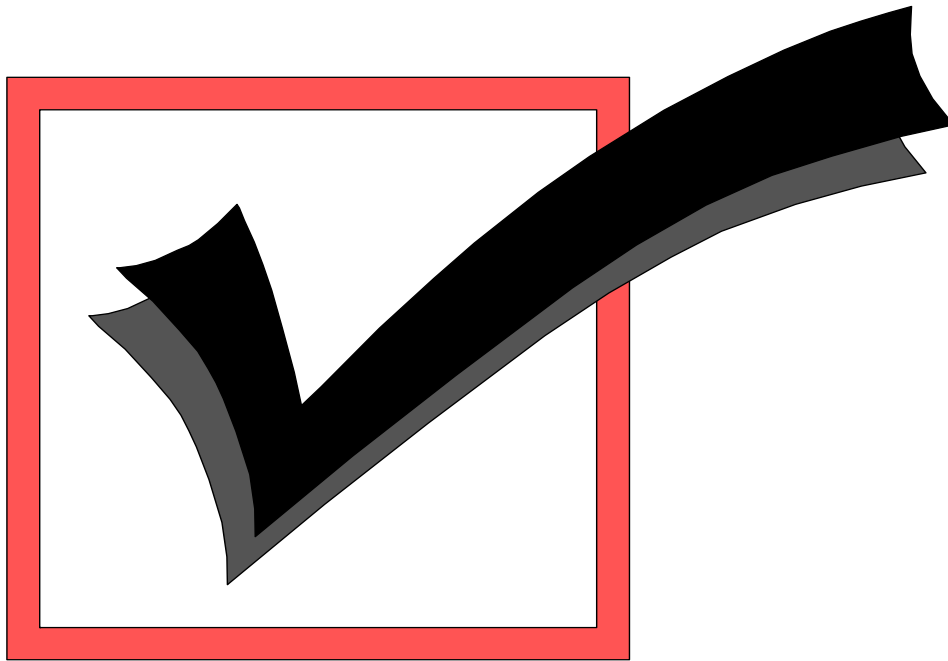
- Professional MS and MEng Programs
- Multidisciplinary MS Programs
- Ph.D. Programs
- Continuing education

#### **3. TO UNDERTAKE FOCUSED, STUDENT-CENTERED RESEARCH PROGRAMS IN SELECTED AREAS OF CIVIL AND ENVIRONMENTAL ENGINEERING AND RELATED FIELDS.**

- Collaborative research
- Individual research

# Frequently Asked Questions

- **How do I know which program to take?**  
You should consult with your professors or advisor to discuss which area of expertise interests you most. It is also helpful to participate in the ASCE student chapter activities.
- **How do I select or change my advisor?**  
You may obtain a Declaration and/or Change of Major and Advisor Form at the Student Services Lobby, located at Dowling Hall, 7th floor. Once this form is completed you may submit it to anyone at the Student Services Desk and your information will be updated on SIS. Forms are also available in the CEE Office.
- **How often should I meet with my advisor?**  
You should meet with your advisor a minimum of two times per academic year. It is important to keep in contact with your advisor throughout the year to keep him/her abreast with the progress of your program.
- **When may I take advantage of the pass/fail option?**  
Certain introductory courses must be taken for a grade (see Introductory Course Requirement on the Tufts Bulletin for the School of Engineering). Not more than eight pass/fail courses may be counted toward the credits required for graduation. For the accredited programs, no departmental concentration course may be taken pass/fail and only one foundation credit may be taken pass/fail. Normally no more than one course per semester may be taken pass/fail. No distinction is made between regular courses that students elect under the pass/fail grading and those courses in which grading is pass/fail. All decisions regarding the pass/fail option must be made within the first four weeks of any term. After the four weeks, the only choices are to complete a course under the existing grading system or to withdraw for the remainder of the term. For the accredited BSCE degree program, no CEE concentration course and only one foundation course may be taken pass/fail.
- **How do I drop/add a course?**  
During the first two weeks of a semester, a course may be dropped or added by submitting the form included in the registration packet. (extra forms are usually available in the CEE office, Room 113) After the first two weeks of the semester, a petition obtained from and returned to the Office of the Dean of Engineering must be submitted for a student to be added to or withdrawn from a course.
- **When are the Fundamentals of Engineering or Engineering In Training exams held and what purpose do they serve?**  
To begin the process of professional registration, all engineering students are encouraged to take this exam during the spring of their senior year. These exams are usually held in the spring. You should contact the Deans office of the College of Engineering or the ASCE student chapter for time and date of the exam as well as information regarding application procedures and a study guide.
- **How do I know when and where my courses are being held?**  
Copies of the current course offerings are available in the CEE office and on the world wide web, (<http://www.ase.tufts.edu/cee>). The course offerings schedule lists the instructor, meeting time and location of current CEE courses.



## Recording Your Progress

The following pages are check off sheets for the various degree programs available. Please use these sheets to keep track of the courses you have taken to fulfill your degree requirements. **You must bring a current check-off sheet when you meet with your advisor to plan your academic program.**

### Checklists:

BSCE

- Degree Requirement
- Typical Course Sequence

BSE In Architectural Studies  
BSE in Environmental Health  
BSE General Program

BSEvE

- Degree Requirements
- Typical Course Sequence

## Bachelor of Science in Civil Engineering (BSCE)

Class of 2012 (CEE Internal Document)

**Student:**

**Advisor:**

**ID #**

Introductory (10 Credits)	Term	Grade
EN 2 (0.5) Intro to Graphics & CAD*		
EN Elective (0.5)*		
ES 2 Intro to Computing*		
Math 11 Calculus I*		
Math 12 Calculus II*		
Math 13 Calculus III*		
Math 38 Differential Equations*		
Physics 11*		
Chemistry 1 or 16*		
Physics 12 or Chemistry 2		
Natural Science Elective (a)		
* No Pass/Fail		
Humanities/Social Sci./Arts (6 Credits) (e)	Term	Grade
English 1* or 3		
Humanities		
Social Science		
Hum / SS / Arts		
Hum / SS / Arts		
Hum / SS / Arts		
* No Pass/Fail		
Free Electives (2 Credits)	Term	Grade
Free Elective		
Free Elective		

Foundation (8 Credits)*	Term	Grade
ES 5 Statics / Dynamics		
ES 8 Fluid Mechanics		
ES 9 Strength of Materials		
ES 56 Probability and Statistics		
CEE 53 or 55 Eng. Econ. or Num. Meth.		
Foundation Elective (a, b, c)		
Foundation Elective (a, b, c)		
Foundation Elective (a, b, c)		
* No Pass/Fail		
Concentration (12 Credits)*	Term	Grade
Required (5 Credits)		
CEE 1 Intro to Civil & Env. Eng		
CEE 12 Hydraulic Eng		
CEE 22 Structural Analysis		
CEE 32 Environmental Engineering		
CEE 42 Geotechnical Engineering		
Electives (5 Credits)		
CEE Design Elective (f)		
CEE Design Elective (f)		
Concentration Elective (a,b,d)		
Concentration Elective (a,b,d)		
Concentration Elective (a,b,d)		
Capstone & Professional Practice (2 Credits)		
CEE 81 CEE Capstone Design		
CEE 84 Professional Issues in CEE		
* No Pass/Fail		

**Advisor Signature and Date:** \_\_\_\_\_

**Bachelor of Science in Civil Engineering (BSCE)**

Class of 2012 (CEE Internal Document)

**Possible Electives**

- (a) A natural science elective. For the list of accepted courses in natural sciences, visit Tufts Bulletin online at: <http://ase.tufts.edu/bulletin/> and select “**School of Engineering – Accepted Natural Science Courses**”.
- (b) A mathematics elective. Courses not limited to those in the Department of Mathematics. For the list of accepted courses in natural sciences, visit Tufts Bulletin online at: <http://ase.tufts.edu/bulletin/> and select “**School of Engineering – Accepted Mathematics Courses**”.
- (c) A technical elective in preparation for advanced work. Approved courses include:  
ES 3, 4, 7, 25, 27, 51, 52, 88
- (d) One concentration elective course in CEE, BME, ChBE, Comp. Sci., ECE, ES or ME.
- (e) Humanities, Arts, and Social Sciences (HASS):  
Courses selected must include a minimum of one credit each in each area of humanities (H) and social sciences (SS). In addition, at least two courses must be taken in the same department. For the list of accepted courses, visit Tufts Bulletin online at: <http://ase.tufts.edu/bulletin/> and select “**School of Engineering – Accepted Humanity/Art/Social Science Courses**”. HASS requirements may also be satisfied through a special minor in language and culture. See the appropriate department for details.
- (f) CEE Design Electives: must be selected from two different CEE sub-disciplines; senior standing required.

<u>Environmental Engineering</u> CEE-133 Water/Wastewater Plant Design CEE-136 Air Pollution CEE-143 Site Remediation Techniques	<u>Structural Engineering</u> CEE-24 Steel Design CEE-25 Reinforced Concrete Design
<u>Geotechnical Engineering</u> CEE-146 Foundation Design CEE-149 Earth Support Systems	<u>Water Resources Engineering</u> CEE-112 Hydrology & Water Res. Eng. CEE-131 River Hydraulics and Restoration

## Bachelor of Science in Civil Engineering (BSCE)

Class of 2012 (CEE Internal Document)

### Typical Course Sequence

<p>In the list below please use the <input type="checkbox"/> to indicate that you have taken or are currently taking a course. This will assist your advisor in selecting future courses. <b>Please see the notes on the Degree Requirement Checklist.</b></p>	
<b>First Year</b>	
<p><b><u>Fall Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> EN 2 Graphics &amp; CAD (0.5 course)</li> <li><input type="checkbox"/> EN Elective (0.5 course)</li> <li><input type="checkbox"/> Mathematics 11</li> <li><input type="checkbox"/> Physics 11 or Chemistry 1</li> <li><input type="checkbox"/> English 1</li> </ul>	<p><b><u>Spring Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> ES 2 Computing</li> <li><input type="checkbox"/> Mathematics 12</li> <li><input type="checkbox"/> Physics 12 or Chemistry 1</li> <li><input type="checkbox"/> HASS Elective</li> <li><input type="checkbox"/> Natural Science elective</li> </ul>
<b>Second Year</b>	
<p><b><u>Fall Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> ES 5 Applied Mechanics – Statics &amp; Dynamics</li> <li><input type="checkbox"/> Mathematics 13</li> <li><input type="checkbox"/> Physics 12 or Chemistry 2</li> <li><input type="checkbox"/> Foundation elective</li> <li><input type="checkbox"/> HASS Elective</li> </ul>	<p><b><u>Spring Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> ES 9 Strength of Materials</li> <li><input type="checkbox"/> CEE 1 Intro to Civil &amp; Env Engr</li> <li><input type="checkbox"/> Mathematics 38 Differential Equations</li> <li><input type="checkbox"/> Foundation elective</li> <li><input type="checkbox"/> HASS Elective</li> </ul>
<b>Third Year</b>	
<p><b><u>Fall Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> ES 8 Fluid Mechanics</li> <li><input type="checkbox"/> CEE 22 Structural Analysis</li> <li><input type="checkbox"/> CEE 42 Geotechnical Engineering</li> <li><input type="checkbox"/> CEE 53 or 55 Eng. Economy/Num. Methods</li> <li><input type="checkbox"/> HASS Elective</li> </ul>	<p><b><u>Spring Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> CEE 12 Hydraulic Engineering</li> <li><input type="checkbox"/> CEE 32 Environmental Engineering</li> <li><input type="checkbox"/> ES 56 Probability &amp; Statistics</li> <li><input type="checkbox"/> Foundation elective</li> <li><input type="checkbox"/> HASS Elective</li> </ul>
<b>Fourth Year</b>	
<p><b><u>Fall Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> CEE 84 Professional Practice</li> <li><input type="checkbox"/> CEE design elective</li> <li><input type="checkbox"/> Concentration elective</li> <li><input type="checkbox"/> Concentration elective</li> <li><input type="checkbox"/> Free elective</li> </ul>	<p><b><u>Spring Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> CEE 81 Capstone design</li> <li><input type="checkbox"/> CEE design elective</li> <li><input type="checkbox"/> Concentration elective</li> <li><input type="checkbox"/> Free elective</li> </ul>

## Bachelor of Science in Environmental Engineering (BSEvE)

Class of 2012 (CEE Internal Document)

**Student:**

**Advisor:**

**ID #**

Introductory (10 Credits)	Term	Grade
EN 2 (0.5) Intro to Graphics & CAD*		
EN Elective (0.5)*		
ES 2 Intro to Computing*		
Math 11 Calculus I*		
Math 12 Calculus II*		
Math 13 Calculus III*		
Math 38 Differential Equations*		
Physics 11 with lab*		
Chemistry 1 or 16*		
Chemistry 2		
Geology 2		
* No Pass/Fail		
Humanities/Social Sci./Arts (6 Credits) (f)	Term	Grade
English 1* or 3		
Humanities		
Social Science		
Hum / SS / Arts		
Hum / SS / Arts		
Hum / SS / Arts		
Free Electives (2 Credits)	Term	Grade
Free Elective		
Free Elective		

Foundation (8 Credits)*	Term	Grade
ES 5 Statics / Dynamics		
ES 8 Fluid Mechanics		
ES 11 or Biology 13 with lab		
ES 51 Technical Writing		
ES 56 Probability & Statistics		
Chemistry 31		
Foundation Elective (a, b, c)		
Foundation Elective (a, b, c)		
* No Pass/Fail		
Concentration (12 Credits)*	Term	Grade
Required (5 Credits)		
CEE 12 Hydraulic Engineering		
ES 27 Public Health Engineering		
CEE 30 Environmental Chemistry		
CEE 32 Intro to Environmental Eng.		
CEE 132 Environ. Eng. Processes.		
Electives (6 Credits)		
CEE (a,b,d)		
CEE (a,b,d)		
CEE (a,b,d)		
CEE (a,b,d)		
CEE (e)		
CEE (e)		
Capstone & Professional Practice (2 Credits)		
CEE 81 CEE Capstone Design		
* No Pass/Fail		

**Advisor Signature and Date:** \_\_\_\_\_

**Bachelor of Science in Environmental Engineering (BSEvE)**

Class of 2012 (CEE Internal Document)

**Possible Electives**

- (a) A natural science elective. For the list of accepted courses in natural sciences, visit Tufts Bulletin online at: <http://ase.tufts.edu/bulletin/> and select “**School of Engineering – Accepted Natural Science Courses**”.
- (b) A mathematics elective. Courses not limited to those in the Department of Mathematics. For the list of accepted courses in natural sciences, visit Tufts Bulletin online at: <http://ase.tufts.edu/bulletin/> and select “**School of Engineering – Accepted Mathematics Courses**”.
- (c) A technical elective in preparation for advanced work. Approved courses include:  
ES 3, 4, 7, 9, 25, 52, 88
- (d) One concentration elective course in CEE, BME, ChBE, Comp. Sci., EE, ES or ME.
  - (e) CEE 112, CEE 133, CEE 136, CEE143
- (f) Humanities, Arts, and Social Sciences (HASS):  
Courses selected must include a minimum of one credit each in each area of humanities (H) and social sciences (SS). In addition, at least two courses must be taken in the same department. For the list of accepted courses, visit Tufts Bulletin online at: <http://ase.tufts.edu/bulletin/> and select “**School of Engineering – Accepted Humanity/Art/Social Science Courses**”. HASS requirements may also be satisfied through a special minor in language and culture. See the appropriate department for details.

**Bachelor of Science in Environmental Engineering (BSEvE)**

Class of 2012 (CEE Internal Document)

**Typical Course Sequence**

<p>In the list below please use the <input type="checkbox"/> to indicate that you have taken or are currently taking a course. This will assist your advisor in selecting future courses. <b>Please see the notes on the Degree Requirement Checklist.</b></p>	
<b>First Year</b>	
<p><b><u>Fall Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> EN 2 Graphics &amp; CAD (0.5 course)</li> <li><input type="checkbox"/> EN Elective (0.5 course)</li> <li><input type="checkbox"/> Mathematics 11</li> <li><input type="checkbox"/> Chemistry 1</li> <li><input type="checkbox"/> English 1</li> </ul>	<p><b><u>Spring Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> ES 2 Computing</li> <li><input type="checkbox"/> Mathematics 12</li> <li><input type="checkbox"/> Chemistry 2</li> <li><input type="checkbox"/> Physics 11</li> </ul>
<b>Second Year</b>	
<p><b><u>Fall Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> ES 5 Applied Mechanics – Statics &amp; Dynamics</li> <li><input type="checkbox"/> Mathematics 13</li> <li><input type="checkbox"/> Chemistry 31</li> <li><input type="checkbox"/> ES 51 Technical Writing</li> <li><input type="checkbox"/> HASS Elective</li> </ul>	<p><b><u>Spring Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Geology 2 Environmental Geology</li> <li><input type="checkbox"/> Mathematics 38 Differential Equations</li> <li><input type="checkbox"/> CEE 27</li> <li><input type="checkbox"/> CEE 32</li> <li><input type="checkbox"/> Biology 1</li> </ul>
<b>Third Year</b>	
<p><b><u>Fall Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> ES 8 Fluid Mechanics</li> <li><input type="checkbox"/> CEE 30 Environmental Chemistry</li> <li><input type="checkbox"/> ES 56 Probability &amp; Statistics</li> <li><input type="checkbox"/> HASS Elective</li> <li><input type="checkbox"/> Foundation Elective</li> </ul>	<p><b><u>Spring Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> CEE 12 Hydraulic Engineering</li> <li><input type="checkbox"/> CEE 132 Environ. Eng. Processes</li> <li><input type="checkbox"/> Concentration Elective</li> <li><input type="checkbox"/> Foundation Elective</li> <li><input type="checkbox"/> HASS Elective</li> </ul>
<b>Fourth Year</b>	
<p><b><u>Fall Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Concentration Elective</li> <li><input type="checkbox"/> Concentration Elective</li> <li><input type="checkbox"/> Concentration Elective</li> <li><input type="checkbox"/> HASS Elective</li> <li><input type="checkbox"/> Free Elective</li> </ul>	<p><b><u>Spring Semester</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> CEE 81 Capstone Design</li> <li><input type="checkbox"/> Concentration Elective</li> <li><input type="checkbox"/> Concentration Elective</li> <li><input type="checkbox"/> HASS Elective</li> <li><input type="checkbox"/> Free Elective</li> </ul>



# BSE-Arch

Last Updated: 2008/8/25

## Bachelor of Science in Engineering Program in Architectural Studies

Class of 2012 (CEE Internal Document)

Student:	Advisor:			ID #	
<b>Introductory (10 Credits)</b>	<b>Term</b>	<b>Grade</b>	<b>Architectural Studies (7 Credits)</b>	<b>Term</b>	<b>Grade</b>
EN 2 (0.5) Intro to Graphics & CAD*			FAH 1 Art, Ritual & Culture		
EN Elective (0.5)*			FAH 8 Architecture 1400-present		
ES 2 Intro to Computing*			FAM 20, 26, or 63		
Math 11 Calculus I*			FAM 22 Design: Architectural		
Math 12 Calculus II*			FAH 100-Level Course		
Math 13 Calculus III*			(Area A) (a)		
Math 38 Differential Equations*			Architectural Elective		
Physics 11*			(Area A, B, or C) (a)		
Chemistry 1 or 16*			FAH 98 Senior Project Seminar		
Physics 12 or Chemistry 2					
Natural Science Elective (b)			<b>Engineering Science (4 Credits)</b>	<b>Term</b>	<b>Grade</b>
			ES 5 Intro to Mechanics		
			ES 9 Applied Mechanics		
<i>* No Pass/Fail</i>			ES 88 CAD for Engineers		
<b>Humanities/Social Sci./Arts (6 Credits) (d)</b>	<b>Term</b>	<b>Grade</b>	ES Elective (c)		
English 1* or 3					
Humanities					
Social Science			<b>Civil Engineering (6 Credits)</b>	<b>Term</b>	<b>Grade</b>
Hum / SS / Arts			CEE 1 Intro to Civil Engineering		
Hum / SS / Arts			CEE 22 Structural Analysis		
Hum / SS / Arts			CEE 42 Intro to Geotechnical Eng.		
			Three of the following:		
<b>Free Electives (5 Credits)</b>	<b>Term</b>	<b>Grade</b>	CEE 24, 25, 80, 81, 123, 124, 125, 129, 146, 149, 188		
Free Elective					
Free Elective			CEE		
Free Elective			CEE		
Free Elective			CEE		
Free Elective					

### Notes:

- (d) The list of architectural studies electives A, B, and C can be found on page 84 of the Tufts Bulletin (<http://ase.tufts.edu/bulletin/>) under “**Architectural Studies**”.
- (e) A natural science elective. For the list of accepted courses in natural sciences, visit Tufts Bulletin online at: <http://ase.tufts.edu/bulletin/>, “**School of Engineering – Accepted Natural Science Courses**”
- (f) A technical elective in preparation for advanced work. Approved courses include: ES 3, 4, 7, 25, 27, 51, 52, 88
- (g) For accepted courses, visit Tufts Bulletin online at <http://ase.tufts.edu/bulletin/>, “**School of Engineering – Accepted Humanity/Art/Social Science Courses**”

Advisor’s Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**Bachelor of Science in Engineering Program in Environmental Health**

Class of 2012 (CEE Internal Document)

Student:	Advisor:			ID #
<b>Introductory (10 Credits)</b>	<b>Term</b>	<b>Grade</b>	<b>Civil Engineering (6 Credits)</b>	<b>Term</b> <b>Grade</b>
EN 2 (0.5) Intro to Graphics & CAD*			CEE	
EN Elective (0.5)*			CEE	
ES 2 Intro to Computing*			CEE	
Math 11 Calculus I*			CEE	
Math 12 Calculus II*			CEE	
Math 13 Calculus III*			CEE	
Math 38 Differential Equations*				
Physics 11*				
Chemistry 1 or 16*				
Physics 12 or Chemistry 2				
Natural Science Elective (a)				
* No Pass/Fail				
<b>Humanities/Social Sci./Arts (6 Credits) (b)</b>	<b>Term</b>	<b>Grade</b>	<b>Electives (12 Credits)</b>	<b>Term</b> <b>Grade</b>
English 1* or 3			<i>Select from the above categories to form a coherent program</i>	
Humanities				
Social Science				
Hum / SS / Arts				
Hum / SS / Arts				
Hum / SS / Arts				
<b>Engineering Science (4 Credits)</b>	<b>Term</b>	<b>Grade</b>		
ES Elective (c)				
ES Elective (c)				
ES Elective (c)				
ES Elective (c)				

**Notes:**

- (h) A natural science elective. For the list of accepted courses in natural sciences, visit Tufts Bulletin online at: <http://ase.tufts.edu/bulletin/> and select “**School of Engineering – Accepted Natural Science Courses**”
- (i) At least one credit must have a college-level prerequisite. Please mark it with an \*.
- (j) A technical elective in preparation for advanced work. These courses must include a minimum of two courses from Engineering Science 3-9, and a maximum of one course from Engineering Science 11-30.

**Advisor’s Signature:** \_\_\_\_\_

**Date** \_\_\_\_\_