2020-2021 Undergraduate Handbook for Environmental Engineering

Mission Statement for Environmental Engineering Program

- Educate the next generation of environmental engineering professionals and assist in the education of other engineers and environmental scientists;
- Discover and develop new knowledge in environmental engineering;
- Share cutting edge research and new information and ideas through scientific media and outreach programs.

As part of a world-class university, Cornell's Environmental Engineering Program inspires students and provides opportunities to engage with the local community, the nation and global society. The focus of the undergraduate program is to educate the leaders of the next generation's environmental engineering professionals working in industry and in government. However, we recognize the need for direct engagement in research and outreach to inform the undergraduate program, to help it to remain cutting-edge, and to provide those leaders with an appreciation of scientific and public issues.

Program Educational Objectives

The educational goals for the Environmental Engineering major are consistent with those of the College of Agriculture and Life Sciences, the College of Engineering and Cornell University. We are committed to providing an excellent undergraduate engineering program in a nurturing learning environment so that our graduates acquire knowledge and develop the needed skills for successful professional careers.

The Educational Objectives of the Environmental Engineering Major are to

- Produce graduates who demonstrate in their professional practice strong technical abilities and advance in careers in Environmental Engineering and related disciplines.

- Produce graduates who will complete advanced degrees in engineering and related professional fields.

- Produce graduates who assume leadership positions, and contribute to understanding environmental problems and the design, construction, and operation of solutions of societal problems involving environmental systems.

In the assessment of the program, the three learning objectives are supplemented by 12 desirable student outcomes, which are listed in the appendix.

This engineering degree program is offered jointly by the Department of Biological & Environmental Engineering (in the College of Agriculture and Life Sciences) and the School of Civil & Environmental Engineering (in the College of Engineering).

Handbook cover designed by Charissa King-O'Brien. Photography provided by Cynthia Chu; taken in Grand Tetons National Park, 2019

Introduction

The Department of Biological and Environmental Engineering (BEE) in the College of Agriculture and Life Sciences (CALS) and the School of Civil and Environmental Engineering (CEE) in the College of Engineering (CoE) jointly offer a B.S. degree program in Environmental Engineering. The Cornell B.S. in Environmental Engineering degree is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org. The program is administered by the EnvE Program Committee made up of faculty from the two departments, in cooperation with the offices of the BEE Director of Undergraduate Programs and the CEE Associate Director. Information about the program, student status information, and student records can be obtained from those offices.

This handbook presents a description of the undergraduate program and the curricular requirements for the Environmental Engineering degree.

We welcome your interest in our program, whether that interest is as a prospective or continuing student or parent, alumnus/alumna, or as a prospective employer of our students.

More information is available on our website: Environmental Engineering Major
If you have questions about the BS Environmental Engineering major, please contact program leaders in Riley-Robb and Hollister Halls.

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The rules and regulations stated in this handbook are for information only and in no way constitute a contract between the student and Cornell University. The University reserves the right to change any regulations or requirement at any time.

It is the policy of Cornell University to actively support equality of educational and employment opportunity. No person shall be denied admission to any educational program or activity or be denied employment on the basis of legally prohibited discrimination involving, but not limited to, such factors as race, color, creed, religion, national or ethnic origin, marital status, citizenship, sex, sexual orientation, gender identity or expression, age, disability or protected veteran status. The University is committed to maintenance of affirmative action programs that will assure the continuation of such equal opportunity. Sexual harassment is an act of discrimination and, as such, will not be tolerated. Inquiries concerning the application of Title IX may be referred to Cornell's Title IX coordinator (see Diversity and Inclusion or contact the Office of Workforce Policy and Labor Relations, 391 Pine Tree Rd., Ithaca, NY 14850; Phone: 607.254.7232; e-mail equalopportunity@cornell.edu.

Cornell University is committed to assisting those persons with disabilities who have special needs. Information for accommodations for faculty, staff, students and visitors may be found at www.cornell.edu/diversity.

What is Environmental Engineering?

We live at a time when no part of the natural environment is untouched by human activities. We have made great strides in addressing many of the natural resources and environmental problems caused by human activities, population growth and rising standards of living. Still these factors continue to stress the natural environment and generate a spectrum of environmental problems that need to be addressed. Environmental engineers are called upon to understand, arrange, and manipulate the biological, chemical, ecological, economic, hydrological, physical, and social processes that take place in our environment in an effort to balance our material needs with our impacts on the environment. Such are the challenges of sustainability and for renewable energy systems, while global climate change makes these tasks all the more important and difficult.

The Environmental Engineering major is structured to provide students with appropriate background in the physical, chemical and biological sciences together with the mathematical, planning, analysis and design tools necessary to address complex environmental engineering concerns. The graduate and research programs in BEE and CEE focus on the fate and transport of contaminants in natural aquatic systems, water and wastewater treatment processes, design and management of environmental and water resource systems, environmental fluid mechanics, and hydraulics and hydrology and the recycling of energy and materials. Others pursue sustainable/renewable energy generation by solar, wind, hydropower or geothermal resources to support our standard of living and human health while diminishing emissions of greenhouse gases and atmospheric pollutants.

In 2020, we are in the middle of a pandemic, which is a truly global public health emergency. The original motivation for Environmental Engineering in the 1800's was public health concerns, often water-borne diseases like Cholera and Typhoid. Think safe drinking water and safe waste disposal. Today's raging national debates about how to address the COVID pandemic mirror similar concerns with water, land and air quality management; and appropriate standards and responses to environmental health threats. The current global health emergency of today is a stark reminder of the need for professionals and leaders who can address the global sustainability crisis we will face over the coming decades.

The collaborative BEE/CEE major in Environmental Engineering is supported by excellent teaching and research facilities including: laboratories for the analysis of water chemistry, physical/chemical/biological processes, biochemistry and microbiology. Cornell University is also the home of the Cornell Center for Advanced Computing, the Institute of Biotechnology, and the Atkinson Center for Sustainability that oversees and supports interdisciplinary environmental, energy and sustainability research projects. The wide variety of teaching and research activities, the world-class research facilities, and the interdisciplinary centers at Cornell University provide students with excellent opportunities for study and research in Environmental Engineering.

Program Details

There are two administrative pathways Cornell students may use to complete the Environmental Engineering major. They may matriculate in the College of Engineering and affiliate with the Environmental Engineering major in the CEE department, or they may matriculate in the College of Agriculture and Life Sciences and major in Environmental Engineering in the BEE department. The curriculum and degree requirements are the same for all students in the Environmental Engineering major regardless of the administrative pathway a student selects, except for minor differences in the freshman year. Faculty advisors are assigned to each undergraduate at the time they formally enter the major.

Affiliation (College of Engineering Enrolled Students)

Students who matriculate in the College of Engineering (CoE) may affiliate with the Environmental Engineering major in their second year of study (transfer students entering the CoE typically affiliate with their major program at the time of transfer). Affiliated students pay endowed tuition and complete all Environmental Engineering requirements while enrolled in the Engineering College.

Affiliation (College of Agriculture and Life Sciences Enrolled Students)

Students who enroll in the College of Agriculture and Life Sciences (CALS) as freshmen majoring in Environmental Engineering affiliate immediately with the Department of Biological and Environmental Engineering. These students register in CALS for their freshmen and sophomore years and then are registered jointly with CALS and CoE during their junior and senior years. The primary college in the junior year and senior year continues to be with CALS. These students pay state contract college tuition all four years of their program.

Oversight of the Environmental Engineering major is provided by an EnvE Program Committee composed of faculty from BEE and CEE. See our web site: Environmental Engineering Major.

What do our graduates do?

Career opportunities for Environmental Engineering graduates cover the spectrum of private industry, public agencies, non-governmental organizations (NGOs), and educational institutions. Environmental Engineers may work as designers, planners, operators of pollution control facilities and water supply systems, educators, consultants to private and public businesses, business owners, government regulatory agency officials, or even as elected officials. In their careers, Environmental Engineers can engage in a wide range of activities: they can design systems to prevent, reduce, or repair environmental damage caused by human activities; they work to contain, reduce, or prevent hazardous waste, air pollution, and contaminated streams and groundwater; they design water treatment plants to deliver safe drinking water to municipal residents and also design pollution control systems for industries and cities to protect the environment and peoples from a range of possible emissions; they help in the reconstruction of wetlands and estuaries to preserve the environment and to maintain habitat for fish and wildlife. As our societies develop a sustainability focus, environmental engineers should be ready to focus and lead those efforts.

Many graduates with an Environmental Engineering degree continue their education at the finest graduate schools around the world. They pursue Master of Engineering (M. Eng.), Master of Science (M.S.), or Doctoral (Ph.D.) programs in various related engineering disciplines, or they sometimes complement their engineering degrees with Master of Engineering Management, a Master of Business Administration (MBA) or Doctor of Law (LLD) degree. Because of the requirements for coursework in biology and chemistry, the undergraduate major in Environmental Engineering is also an excellent choice for students interested in a broad range of environmental issues or in medicine.

Environmental Engineering
Major Degree Requirements

Environmental Engineering Major

Degree Requirements

A student earning a Bachelor of Science degree in the Environmental Engineering major must complete the following academic requirements, which apply to students matriculating in the fall semester of 2015 or later. A minimum of 125 credit hours is required.[f]

Group	Subject Matter	Credit Hours
1.	**Mathematics** (1910, 1920, 2930, 2940) All math courses in this sequence must be completed with a grade of C- or better.	16
2.	**Chemistry** General Chemistry (2070, 2090 or 2150) Organic Chemistry (1570 recommended or 3530, 3570)	7
3.	**Physics** Calculus-based physics (1112, 2213 or 2217)	8
4.	**Computer Programming** Intro to Computing (CS 1110 or CS 1112)	4
5.	**Biological Sciences** Introductory Biology (BIOEE/BIOSM 1610, BIOMG 1350, BIOEE/BIOSM 1780, BIOG 1440 or 1445)	3-4
6.	**First-Year Writing Seminars (FWS)** First-Year Writing Seminars	6
7.	**Engineering Distribution and Field Courses** (all must be taken for letter grade) *Introduction to Engineering* ENGRI 1XXX (3 credits) (ENGRI 1130 is recommended) *Engineering Distribution Courses* Engineering Processes for Environmental Sustainability - ENGRD/BEE 2510 (3 credits) ENGRD XXXX - (ENGRD 2020 is recommended) (3-4 credits)[a] *Environmental Engineering Core Courses* Mechanics of Solids - ENGRD 2020 (4 credits) [a] Bioengineering Thermodynamics – BEE 2220 (3 credits) or Thermodynamics -ENGRD 2210 (3 credits) or Engineering Computation - CEE/ENGRD 3200 (3 credits) Uncertainty Analysis in Engineering - CEE 3040 (4 credits)[b] Engineering Management - CEE 3230 (3 credits) Fluid Mechanics - CEE 3310 (4 credits) Earth Science (select one course) - (see list of approved courses on page 10) (3 or 4 credits) Environmental Quality Engineering - CEE 3510 (3 credits) Microbiology for Environmental Engineering - CEE 4510 (3 credits)[c] Engineering Laboratory (select one course) - (see list of approved courses on page 10) (3 or 4 credits) Environmental Systems Analysis - BEE 4750 (3 credits) Environmental Engineering Design Electives (9 credits) (see list of approved courses on page 10; at least three credits must be from a Capstone Design Elective, with any remaining credits coming from Design Electives) Environmental Engineering Major-Approved Electives (6 credits) (see list of approved courses on page 11) Other Environmental Engineering Electives to bring total category to 57 credits. These will generally consist of technical engineering courses at 2000 level or above from BEE, CEE or the College of Engineering. A maximum of 4 credits of BEE 4970-4990 or CEE 3090, 4010 (teaching, research, and individual projects) may be used in this category, without a petition. Technical Communication Requirement. Approved technical communication courses are listed in the Engineering Undergraduate Handbook Technical Communication Requirement BEE 4730 is on the approved list.[d]	57

[f]Students in CALS need to take BEE 1050 in the Fall of their freshman year.

Degree Requirements (continued)

Group	Subject Matter	Credit Hours

8. **Liberal Studies** (6 courses)[e] 18

Liberal Studies courses are listed in the *Courses of Study*, College of Engineering section.
At least six courses must be completed, including at least three of the seven categories:

1. Cultural Analysis (CA)
2. Historical Analysis (HA)
3. Literature and the Arts (LA)
4. Knowledge, Cognition, and Moral Reasoning (KCM)
5. Social & Behavioral Analysis (SBA)
6. Foreign Language (not literature) (FL)
7. Communications in Engineering (CE)

At least 2 courses must be 2000 level or higher.

9. **Advisor Approved Electives** 6

These courses are selected by the student with approval of the Faculty Advisor. A maximum of 4 credits of project team may be included.

TOTAL MINIMUM 125

[a]Substitution for Distribution Course. ENGRD 2020 is required by the major. It is recommended that students take ENGRD 2020 as their second engineering distribution. Students who do so then have the flexibility to take any other ENGRD or a 3000 level or higher engineering course (that is not cross-listed as a liberal studies course) to fulfill the required credit minimum for the major.

[b]ENGRD 2700 is accepted (by petition) to substitute for CEE 3040 if taken prior to affiliation with the Environmental Engineering Major, or if necessary because of scheduling conflicts caused by Co-op or Study Abroad. A supplemental learning style exercise is required before petition is approved to fulfill ABET student learning objectives.

[c]Students may take BIOMI 2900 in place of CEE 4510.

[d]Students meeting the technical communications requirement with a course that fulfills another requirement (e.g. Liberal Studies, Captsone Design, Major-Approved Elective) may use it to satisfy both requirements.

[e]Starting Academic year 20-21, the Engineering College has followed the lead of the Arts and Sciences and changed the structure of the liberal arts courses. There are now 6 groups (instead of 7) because 1 and 3 were combined, and each of these groups have sub-categories. Students still must take courses from at least 3 groups. Students who entered 2019 and prior should follow the old policy, which is shown in the Degree Requirements above. To see the new groups and categories go to pages 18-23 in the *Engineering Undergraduate Handbook* found at https://cornellengineeringhandbook.freeflowdp.com/cornellengineeringhandbook/1964897423616532/MobilePagedReplica.action?pm=2&folio=20#pg22

[f]Students in CALS need to take BEE 1050 in the Fall of their freshman year.

Physical Education

Two semesters of physical education are required. All students must pass a swim test prior to graduation. Transfer students are exempted from one semester of PE for each full-time semester they transfer into Cornell.

Letter and S/U Grading

All courses must be taken for letter grade except for Liberal Studies and Advisor Approved Electives

Lab Safety Training

Students must complete EHS Online Lab Safety training (#2555) before graduation by going to the following link: Cornell Learning Management System. Please email your certificate of completion to the environmental engineering student coordinator in your department: Laura Ricciuti, CEE – lr482@cornell.edu or Brenda Marchewka, BEE – bls19@cornell.edu.

Special Courses

Courses such as PHYS 1012 do not count toward graduation requirements.

Additional program information is provided in the College of Engineering section of the Courses of Study and in the College of Engineering Undergraduate Handbook including descriptions of allowable minors.

Approved Laboratory and Earth Science Courses

Course Descriptions can be found in the Cornell courses of study

Laboratory Courses

BEE 4270 Water Measurement and Analysis Methods (3 cr., not offered 2020-21)
CEE 4370/6370 Experimental Methods in Fluid Dynamics
(3/4 cr., Spring, Offered Even-Numbered Years)[1]
CEE 4530 Lab Research in Environmental. Engineering. (3 cr., confirmed for Spring 2021)

Earth Science Courses

BEE/EAS 4800 Our Changing Atmosphere: Global Change and Atmospheric Chemistry
(3 cr., Fall)
EAS 2250 The Earth System (4 cr., Fall)
EAS 2680 Climate and Global Warming (3 cr., Spring)
EAS 3010 Evolution of the Earth Systems (4 cr., Fall)
EAS 3030 Introduction to Biogeochemistry (4 cr., Fall)
EAS 3050/5051 Climate Dynamics (3 cr., Fall)
EAS 4830 Environmental Biophysics (3 cr., Fall, Offered Alternate Years)
PLSCS 2600 Soil Science (4 cr., Fall)
PLSCS 3650 Environmental Chemistry: Soil, Air, and Water (3 cr., Spring)
NTRES 3240 Sustainable, Ecologically Based Management of Water Resources (3 cr., Spring)
Note: More advanced Earth Science courses generally accepted by petition.

Design and Major Approved Electives

A total of 5 Capstone Design, Design and Major-Approved Electives must be selected from among the courses in the list below. At least three of these five courses must be Capstone Design or Design Electives. At least one of the three design electives must be a capstone design elective. Capstone design courses are designated with an asterisk (*).

Design and Capstone Design Electives

CEE 4210 Renewable Energy Systems (3 cr., Fall)
* BEE 4350 Principles of Aquaculture (3 cr., Spring)
CEE 4565 Waste Water Processes and Resource Recovery (3 cr., Fall)
* BEE 4730 Watershed Engineering (4 cr., Fall)
BEE 4760 Solid Waste Engineering (3 cr., Spring)
* BEE 4870 Sustainable Bioenergy Systems (3 cr., Fall, Offered Odd-Years, Next Offered 2021-2022)
CEE 4350 Coastal Engineering (4 cr., Spring, Next Offered 2020-2021)
* CEE 4640/6648 Sustainable Transportation Systems Design (3 cr., fall)
CEE 6370 Experimental Methods in Fluid Mechanics (4 cr., Spring, Offered Even-Numbered Years)[1]MAE 4020 Wind Power (3 cr., Fall)
* MAE 4021 Wind Power (4 cr., Fall)

Major-Approved Electives

BEE 3299 Sustainable Development (3 cr., Spring)
BEE 3710 Physical Hydrology for Ecosystems
(3 cr., Spring, Offered Odd-Numbered Years, Next Offered 2020-2021)
BEE 4110/6110 Hydrologic Engineering in a Changing Climate (3 cr., Fall)
BEE 4310/6310 Multivariate Statistics for Environmental Applications (3 cr., Spring)
BEE/EAS 4710 Introduction to Groundwater
(3 cr., Spring; Offered Even-Numbered Years)
BEE/EAS 4800 Our Changing Atmosphere: Global Change and Atmospheric Chemistry
(3 cr., Fall)
BEE 4880 Applied Modeling and Simulation for Renewable Energy Systems (3 cr., Spring, Offered Even-Numbered Years, Next Offered 2021-2022)
CEE 3410 Geotechnical Engineering for Energy, Environment and Civil Infrastructure (4 cr., Fall)
CEE/PLSCS 4110 Applied Remote Sensing and GIS for Resource Inventory and Analysis (3 cr., Fall)
CEE 4320/6320 Hydrology (3 cr., Fall)
CEE4330 Flow in Porous Media and Groundwater (3 cr., Spring)
CEE 4370 Experimental Methods in Fluid Mechanics (3 cr., Spring, Offered Even-Numbered Years)
CEE 5420 Energy Technologies and Subsurface Resources (3 cr., Spring)
CEE 5970 Risk Analysis and Management (3 cr., offered 2020 Fall)
CEE 6000 Numerical Methods for Engineers (3 cr., Fall, Next Offered 2021-2022)
CEE/CSS 6100 Remote Sensing Fundamentals (3 cr., Fall)
CEE 6200 Water Resources Systems Engineering (3 cr., Spring)
CEE 6300 Spectral Methods for Incompressible Fluid Flows (3 cr., Fall)
CEE 6530 Water Chemistry (3 cr., Fall)
CEE 6550 Transport, Mixing and Transformation in the Environment (3 cr., Spring)
CEE 6560 Physical/Chemical Processes (3 cr., Fall)
CEE 6570 Biological Processes (3 cr., Spring)
CHEME 6610 Air Pollution Control (3 cr., Spring)
CHEME 6660 Analysis of Sustainable Energy Systems (3 cr., Fall)
EAS 4570 Atmospheric Air Pollution (3 cr., Fall, Offered Even-Numbered Years, Next Offered 2020-2021)
EAS/MAE 6480 Air Quality & Atmospheric Chemistry (3 cr., Fall, Offered Odd-Numbered Years)
MAE 5010 Future Energy Systems (3 cr., Spring)
PLSCS 4200 Geographic Information Systems (3 cr., Spring)

Note: EnvE *Major Approved Electives* are 3 or 4 credit environmental engineering-related technical courses that support the professional objectives of the student and which have either (1) a technical prerequisite that is a required engineering course in the EnvE curriculum, or (2) an advanced rank limited to juniors or above.

[1]CEE 6370 can be used to fulfill both lab and design requirement, but students must then take an additional major approved elective from list.

EnvE Elective Courses for Undergraduates Offered by BEE and CEE

Energy and Sustainable Development

BEE 3299 Sustainable Development – Richards
BEE 3800 Sustainability and Sustainable Energy Systems – Steinschneider
BEE 4760 Solid Waste Engineering – Haith
BEE 4870 Sustainable Bioenergy Systems – Hunter
BEE 4880 Applied Modeling & Simulation for Renewable Energy Systems – Anderson
CEE 1130 Sustainable Engineering of Energy, Water, Soil and Air Resources – Reid
CEE 3410 Geotechnical Engineering for Energy, Environment and Civil Infrastructure – Gadikota
CEE 4210 Renewable Energy Systems – Vanek
CEE 4640/6648 Sustainable Transportation System Design – Vanek
CEE 5420 Energy Technologies and Subsurface Resources – Gadikota
CEE 5970 Risk Analysis and Management – Stedinger
CEE 6055 Energy Demand Analysis – Daziano
ENMGT 5200 Economics of the Energy Transition – Mays
MAE 4020/21 Wind Power – Barthelmie
MAE 5010 Future Energy Systems – Zhang
CHEME 6660/6661/6670 Analysis of Sustainable Energy Systems – Tester

Environmental Justice and Governance

AEM 6510 Environmental and Resource Economics – Rudik
ECON 3850 Economics and Environmental Policy – Sanders
ECON 3865 Environmental Economics – Li
ENGRG 3600 Ethical Issues in Engineering Practice – Doing
STS 3311 Environmental Governance – Wolf
STS 4280 Health and Environmental Justice – LeBlanc

Environmental Processes

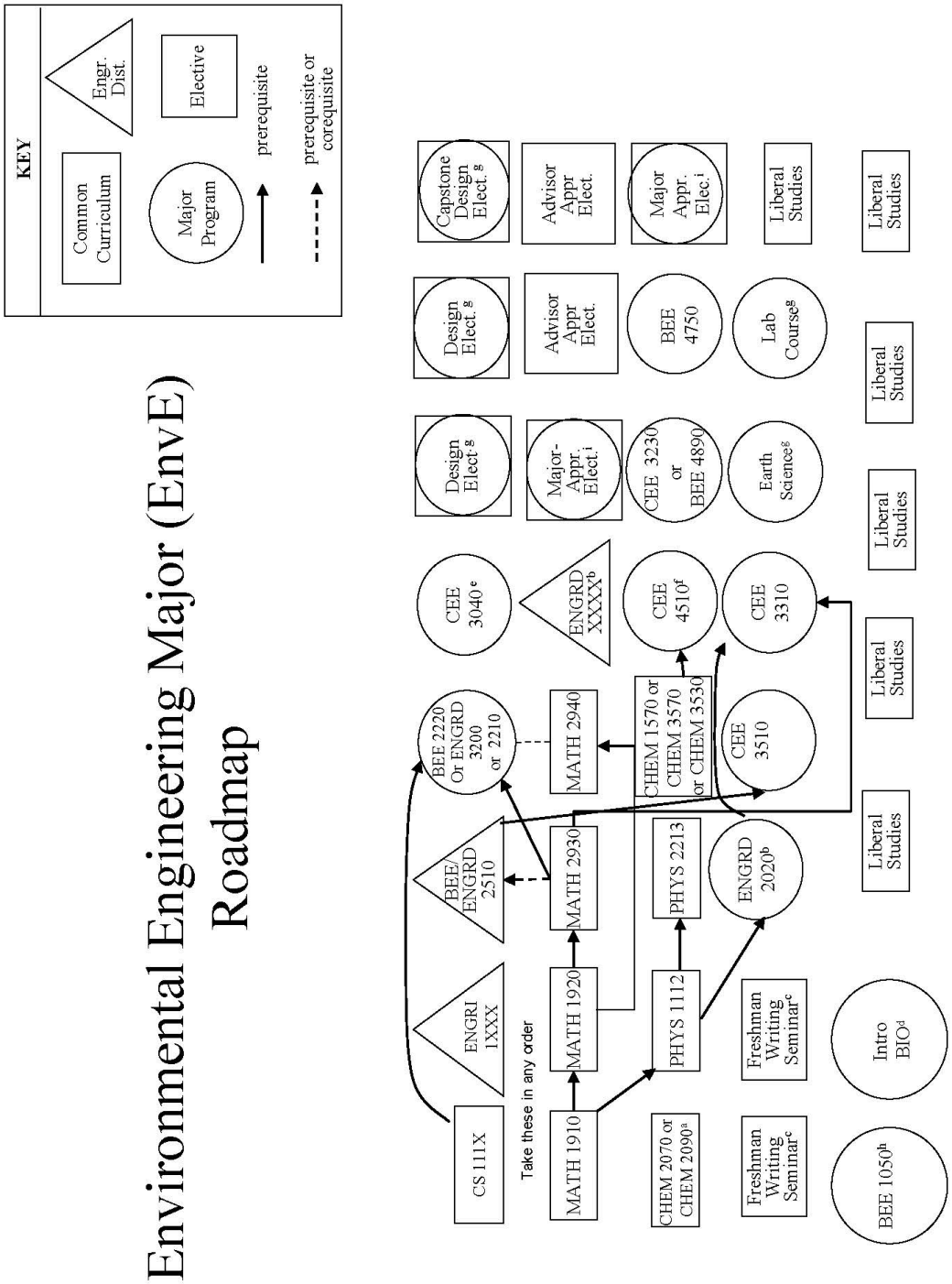
BEE 2220 Bioengineering Thermodynamics and Kinetics – Hunter
BEE 4350 Principles of Aquaculture – Timmons
BEE 4590 Capstone Design in Biological Engineering – Jung
BEE 4870 Sustainable Bioenergy Systems – Hunter
CEE 4530 Laboratory Research in Environmental Engineering – Reid
CEE 4565/6565 Waste Water Processes and Resource Recovery – Gu
CEE 6530 Water Chemistry for Environmental Engineering – Reid
CEE 6550 Transport, Mixing, and Transformation in the Environment – Albertson
CEE 6560 Physical/Chemical Processes – Helbling
CEE 6570 Biological Processes – Reid
CEE 6585 Biogeochemical Reaction Modeling – Reid
CEE 6590 Environmental Organic Chemistry – Helbing

Hydrology and Fluid Mechanics

BEE 3710 Physical Hydrology for Ecosystems – Walter
BEE 4110/6110 Hydrologic Engineering in a Changing Climate – Steinschneider
BEE 4710 Introduction to Groundwater – Steenhuis
BEE 4730 Watershed Engineering – Walter
BEE/EAS 4800 Our Changing Atmosphere: Global Change & Atmospheric Chemistry – Hess
CEE 4320 Hydrology – Albertson
CEE 4330 Flow in Porous Media and Groundwater – Li
CEE 4350 Coastal Engineering – Cowen
CEE 4370 Experimental Methods in Fluid Dynamics – Cowen
CEE 6550 Transport, Mixing and Transformation in the Environment – Albertson

Modeling and Systems Analysis

BEE 4310/6310 Multivariate Statistics for Environmental Applications – Steinschneider
BEE 4880/6880 Applied Modeling & Simulation for Renewable Energy Systems – Anderson
CEE 4110 Remote Sensing for Environmental Resource Inventory – Laba
CEE 5970 Risk Analysis and Management – Stedinger
CEE 6200 Water Resources Systems Engineering – Reed
CEE 6930 Public Systems Modeling – Loucks
CEE 6550 Transport, Mixing and Transformation in the Environment – Albertson
ENMGT 5200 Economics of the Energy Transition – Mays
ENMGT 5930 Data Analytics for Engineering Managers – Nozick
ENMGT 5970 Risk Analysis and Management – Stedinger
ENMGT 5980 Decision Framing and Analytics – Reed



[a]Engineering matriculates must enroll in CHEM 2090 (fall, spring); CALS matriculates must enroll in CHEM 2070 (fall). Students in either college may also substitute CHEM 2150 for CHEM 2090 or CHEM 2070.

[b]ENGRD 2020 is required by the major. It is recommended that students take ENGRD 2020 as their second engineering distribution. Students who do so have the flexibility to take any other ENGRD or a 3000 level or higher engineering course (that is not cross-listed as a liberal studies) to fulfill the required credit minimum in the major.

[c]In addition to the first-year writing seminars, an engineering communications course must be taken as an engineering distribution, liberal studies, approved elective or major course. An approved COMM or ENGRC course, or BEE 4730, will satisfy this requirement. Students

meeting the technical communications requirement with a course that fulfills another requirement (e.g. Liberal Studies, Lab, Design, Capstone) can use that one course to satisfy both requirements.

[d]Choose one of the following biology courses: BIOEE/BIOSM 1610, BIOMG 1350, BIOEE/BIOSM 1780, BIOG 1440, BIOG 1445. Complete before semester 5. If you received a 4 on AP BIO, you will receive 4 credits of intro bio. If you received a 5 on AP BIO, you will receive 8 credits of intro bio and 4 credits will satisfy the intro bio requirement.

[e]ENGRD 2700: Basic Engineering Probability and Statistics is accepted (by petition) to substitute for CEE 3040 if taken prior to affiliation with Environmental Engineering, or if necessary, because of scheduling conflicts caused by co-op or study abroad programs. A supplemental learning style exercise is required before petition is approved.

[f]Students may take BIOMI 2900 General Microbiology Lectures, in place of CEE 4510.

[g]The lists of suggested courses are published in the Undergraduate Handbook for Environmental Engineering. At least one design elective must be chosen from the list of Capstone design courses.

[h]Students in CALS are required to take BEE 1050 in the Fall of their freshman year.

Student Program Progress Form

The progress of each student toward completion of degree requirements is charted on a Program Progress Form. A blank Progress Form appears on the following pages. On this form, courses that have been completed are shown in their appropriate categories. Students are encouraged to examine their Program Progress Form and to report errors and desired adjustments to the Undergraduate Coordinator in either 207 Riley-Robb Hall (BEE) or 221 Hollister Hall (CEE). It is important that a student's record be complete and accurate because it is used for course planning and finally determination of a student's eligibility for graduation.

ENVIRONMENTAL ENGINEERING PROGRAM PROGRESS FORM

(Applies to students matriculating in the Fall Semester of 2017 or later)

Name: **Email:** **Advisor:**
CU ID: **Last Revised:**
2nd Major: **Minor:** **Antic. Grad Date:**

COURSE	#	CR	GRADE	TERM	COMMENTS
1) ***Math, Chemistry, Physics, Computing, Biology (38 credits)***					
MATH	1910	4			
MATH	1920	4			
MATH	2930	4			
MATH	2940	4			
CHEM	2090, 2070 or 2150	4			
CHEM	1570 or 3570, 3530	3			
PHYS	1112	4			
PHYS	2213 or 2217	4			
CS	1110 or 1112	4			
BIOG	1XXX	3			
2) ***Engineering Distribution & Major Courses -- all letter grade (42 credits)***					
ENGRI	1XXX	3			
BEE	2510	3			ENGRD 2510
ENGRD	XXXX	3			Use ENGRD 2020 here and add 3rd Major Approved Elective
ENGRD	2020	4			
ENGRD 3200 or 2210 or BEE 2220		3			
CEE	3040	4			
CEE	3230 or BEE 4890	3			
CEE	3310	4			
CEE	3510	3			
CEE	4510	3			
BEE	4750	3			
Earth Science		3			See Approved List on Page 11
Lab course		3			See Approved List on Page 11
3) ***Design Courses & Major-Approved Electives (See approved List; 15 credits)***					
		3			Design Course - Capstone
		3			Design Course
		3			Design Course
		3			M-A Elective
		3			M-A Elective
4) ***Courses to Bring Total Env Program Credits in Section 2 & 3 to 57 Because of Substitutions***					
5) ***Freshman Writing Seminars (6 credits)***					
		3			
		3			

Name:

COURSE	#	CR	GRADE	TERM	COMMENTS

6) *Liberal Studies: 6 courses (at least 2 courses at 2000 level or above and 3 catagories; 18 total credits)*

(CA)	Cultural Analysis	KCM)	Knowledge, Cognition, and Moral Reasoning
(HA)	Historical Analysis	(SBA)	Social & Behavioral Analysis
(LA)	Literature and the Arts	(FL)	Foreign Language (not literature)
(CE)	Communications in Engineering		

3				
3				
3				
3				
3				
3				

7) *Approved Electives (6 cr. Minimum)*

3				
3				

8) *Additional Courses (Not required for graduation)*

TOTAL CREDITS: **125**

Min. Credits for Graduation: 125

_____ Tech Writing
_____ PE
_____ PE

Minors

Environmental Engineering majors may choose to complete one of over a hundred different minors offered by departments and colleges. Most students can complete a minor within their Environmental Engineering program in 8 semesters provided they work closely with their faculty advisor to carefully plan and schedule their courses. Completion of a minor is noted on the final Cornell transcript as official recognition of academic achievement above and beyond the student's Bachelor of Science degree requirements. The Minor in Environmental Engineering offered by BEE and CEE is NOT available to Environmental Engineering majors.

Minors are listed on-line at: Engineering Majors and Minors. More detailed information on engineering minors can be found in the Engineering Undergraduate Handbook Engineering Undergraduate Handbook , specifically on page https://cornellengineeringhandbook.freeflowdp.com/cornellengineeringhandbook/1964897423616532/MobilePagedReplica.action?pm=2&folio=102#pg104

Other Special Programs

Please consult the Engineering Undergraduate Handbook for information on the following additional special programs: the Independent Major, Double Majors, Dual Degree, Study Abroad, and the Undergraduate Research Program.

Information on the Exchange Program with the Universidad de Cantabria in Santander, Spain is available at University of Cantabria Exchange Program

Good Academic Standing

Undergraduates in Environmental Engineering are in *Good Standing* if they are making acceptable progress toward completion of the requirements for graduation. Acceptable progress in EnvE is defined as meeting the following requirements:

- Semester GPA ≥ 2.0.
- Cumulative GPA ≥ 2.0.
- A semester GPA ≥ 2.0 in Core EnvE Courses, Design Courses, Major-approved Electives, and Engineering Distribution Courses (Tech GPA).
- 12 credit hours each semester.
- No failing grades.
- *At most one grade below C- can be used to fulfill the EnvE degree requirements in the following four categories: required Core Courses, Design Courses, Major-approved Electives, and Engineering Distribution Courses.

*Grade(s) below C– in these courses, beyond the first, will require that one or more course(s) be repeated. (The College of Engineering also requires that each course in the required mathematics sequence – MATH 1910, 1920, 2930, 2940 - be passed with a grade of C- or better.)

Students who fail to achieve good-standing status may receive a warning, be required to take a leave of absence for one or more terms, or required to withdraw. The specific action in each case is based upon the pertinent circumstances as well as the student's previous academic record.

EnvE's policy about academic action procedures provides for two separate reviews of the student's record by the Program's Committee on Academic Standards, Petitions and Credits (CASPAC). The first review is to identify those students who have not made satisfactory progress during the term and to assign academic actions where deemed appropriate. Students who receive actions are notified by letter sent to both their home and email addresses. This letter includes a request for information about possible extenuating circumstances and an invitation to appeal the committee's action. Appeals must be in writing. If an appeal is made, CASPAC will review the appeal and render its decision.

Honors Program

The environmental engineering honors program consists of at least nine credits beyond the minimum required for graduation in the environmental engineering major. These nine credits must be drawn from one or more of the following categories with at least 3 credit hours in the first category:

1. A significant research experience or honors project under the direct supervision of an Environmental Engineering faculty member using BEE 4993 Honors Thesis (3 credits) or CEE 4000: Senior Honors Thesis (1 to 6 credits per semester). A significant written report or senior honors thesis must be submitted to the research advisor as part of this component. Letter grade only.
2. A significant teaching experience under the direct supervision of a faculty member using a regularly recognized Engineering College course (i.e., Undergraduate Engineering Teaching, BEE 4980 or CEE 4010 [1 to 4 credits per semester]).
3. Advanced or graduate courses at the 4000 level or above.

No research, independent study, or teaching for which the student is paid may be counted toward the honors program.

Eligibility: students must enter with and maintain a cumulative GPA equal or greater than 3.50.

Application: students must apply no later than the beginning of the first semester of their senior year but are encouraged to apply as early as the first semester of their junior year. All honors program students must be in the program for at least two semesters before graduation.

Note – Latin Honors

- Cum laude is awarded to all engineering students with an overall GPA >3.50. Cum laude is also awarded to all engineering students who received a semester GPA >3.50 in each of the last four semesters of attendance at Cornell; in each of these semesters, at least 12 letter-grade credits must be taken with no failing, unsatisfactory, missing, or incomplete grades. If the student is an Engineering Co-op student, then the Engineering Co-op summer term will count as one of the last four. Students who were approved for prorated tuition in their final semester will be awarded cum laude if they received a semester GPA >3.50 in their last semester and meet the conditions above in the prior four semesters.
- Magna cum laude is awarded to all engineering students with a GPA > 3.75 (based on all credits taken at Cornell).
- Summa cum laude is awarded to all engineering students with a GPA > 4.0 (based on all credits taken at Cornell).
- All GPA calculations are minimums and are not rounded.

AWARD: Walter Lynn Medal

The Walter Lynn Medal is given annually to an outstanding graduating senior majoring in Environmental Engineering of admirable character whose scholastic achievement is most distinguished over the four consecutive years of study at Cornell. The award consists of a gold medal and a certificate. This award was established in 2011 in honor of Professor Walter Lynn, an active Cornell faculty member for fifty years, founder of the environmental and water resources systems engineering program at Cornell, and Director of the School of Civil and Environmental Engineering from 1970-1978. During his tenure at Cornell, he was the founding Director and head of the Cornell Center for Environmental Quality Management; Director for the Program on Science, Technology, and Society; Director of the Center for the Environment; and Dean of the Cornell Faculty. Professor Lynn was known nationally as a leader on environmental issues and was founding chair of the U.S. National Research Council's Board on Natural Disasters.

Double Major with Civil Engineering or Biological Engineering

Students in Environmental Engineering wishing to pursue a double major with Civil Engineering or with Biological Engineering must have a program plan that reflects distinct thrusts in the two areas. Among the five courses used for Design and Major-approved Electives, the five used for the BSCE or the BSBE degree should include four courses not used for the core program or Design and Major-approved elective for the Environmental degree program, and vice versa. The extra courses may be used as advisor approved electives. If interested, please complete the double major form available in Engineering Advising (180 Rhodes Hall) or at the undergraduate coordinator's office (HLS 221 or RRB 207).

BEE and CEE Faculty Affiliated with EnvE Undergraduate Major and Their Interests

Beth A. Ahner (BEE)
Biogeochemistry of trace metals in aquatic ecosystems and soil, plant-based biomediation, plant and algae-based production of raw materials and energy.

John D. Albertson (CEE)
Hydrology, Boundary Layer Meteorology, Land-Atmosphere Interaction, Turbulent transport processes, Wind energy.

Louis D. Albright (BEE, Emeritus)
Energy conservation and management, indoor environment quality, sustainable food production systems, and renewable energy systems analysis and design.

C. Lindsay Anderson (BEE)
Renewable energy systems and integration with existing markets and power systems. Computational modeling and system optimization.

James J. Bisogni, Jr. (CEE, Emeritus)
Environmental engineering, biological wastewater treatment processes, aquatic chemistry, remediation of acid lakes.

Wilfried H. Brutsaert (CEE, Emeritus)
Hydrology, land-atmosphere interactions, hydraulics, groundwater flow.

Edwin A. Cowen (CEE)
Environmental fluid mechanics, wave hydrodynamics, coupled air-water transfer processes, mixing and transport processes in the environment, experimental methods.

Peter J. Diamessis (CEE)
Environmental fluid mechanics, hydrodynamics of the coastal/open ocean and lakes, turbulence modeling, hydrodynamic instability theory, spectral methods in scientific and engineering computation, high performance parallel scientific computing.

Richard I. Dick (CEE, Emeritus)
Water and wastewater treatment, residue management, sludge treatment/disposal

Greeshma Gadikota (CEE)
Assistant Professor, (Ph.D. Columbia): sustainable energy and resource recovery, chemo-morphological coupling, fluid recovery and storage, designing novel chemical pathways, low carbon and negative emissions technologies, and engineering elemental cycles.

H. Oliver Gao (CEE)
Environment/energy and transportation systems, transportation energy consumption and emissions inventory estimation and impact analysis, statistical and mathematical modeling.

Jillian Goldfarb (BEE)
Renewable energy, biomass conversions, pyrolysis, tomefaction, hydrothermal carbonization, integrated biorefinery, sustainable carbonaceous materials, materials for contaminate remediation, energy policy, public understanding of science

James M. Gossett (CEE, Emeritus)
Water and waste treatment, microbiological phenomena and processes, treatment of contaminated groundwater.

Andrea Giometto (CEE)
Ecological patterns and processes, spatial growth of microbial communities, spatiotemporal dynamics of biological invasions.

April Gu (CEE)
Biotechnology for water and wastewater treatment, biological nutrient removal and recovery, biosensors for water quality monitoring, toxicogenomics-based toxicity assessment, phosphorus cycling and bioavailability of nutrients.

Douglas A. Haith (BEE, Emeritus)
Environmental systems analysis, nonpoint source pollution, solid waste management, watershed modeling, risk assessment.

Damian E. Helbling (CEE)
Water quality, chemical and biological processes, transport and fate of emerging contaminants, sustainable water and wastewater treatment technologies.

Peter G. Hess (BEE)
Understanding how anthropogenic and natural processes affect the chemical composition of the atmosphere. The composition of the atmosphere affects air quality and the response of the climate system to global change. The coupling between atmospheric chemistry and climate and in predicting future changes.

Jean B. Hunter (BEE)
Bioprocess engineering, fermentation and enzyme technology, biospearations, food engineering

James T. Jenkins (CEE, Emeritus)
Fluid mechanics, mechanics of continuous media and discrete aggregates, and dense-shearing flows of inelastic particles

William J. Jewell (BEE, Emeritus)
Ecological engineering, biological and chemical mechanisms of pollution control and energy generation.

Qi Li (CEE)
Boundary layer turbulence, fluid-structure interactions, urban heat island, pollutant dispersion, urban sustainability, computational fluid dynamics.

Leonard W. Lion (CEE, Emeritus)
Aquatic chemistry, biogeochemical fate of toxic pollutants, interfacial reactions of pollutants in aqueous systems.

Philip L-F. Liu (CEE, Emeritus)
Fluid mechanics, water wave dynamics, coastal oceanography and engineering, tsunami dynamics and numerical methods

Daniel P. Loucks (CEE, Emeritus)
Environmental and water resource systems planning and management modeling, and predicting the impacts of water management on ecosystems.

Jacob P. Mays (CEE)
Optimization under uncertainty, statistical learning, electricity markets, energy systems

Thomas D. O'Rourke (CEE)
Geotechnical and geoenviromental engineering, environmental site remediation, water supply performance during extreme events.

Jean-Yves Parlange (BEE, Emeritus)
Analysis of infiltration, surface runoff, denitrification and solute transport, groundwater movement, erosion and sediment transport, and watershed models.

William D. Philpot (CEE)
Remote sensing, digital image processing, radiative transfer.

Patrick M. Reed (CEE)
Environmental and water resources systems; multi-objective planning and management, evolutionary computation; high-performance computing; uncertainty in decision making.

Matthew C. Reid (CEE)
Environmental biogeochemistry; coupled biological and physiochemical processes in soil-water systems; engineered ecosystems for sustainable water quality improvement

Ruth E. Richardson (CEE)
Microbiology of water and soil systems, molecular techniques, fate and transport of contaminants.

Michael Rolband (CEE, Professor of Practice)
Wetland and stream restoration, rain gardens, mitigation banking, environmental regulations and land use.

Norman R. Scott (BEE, Emeritus)
Bioengineering, sustainable development, bio-fuels, renewable energy, recycling, energy conservation, and managed ecosystems.

Christine A. Shoemaker (CEE, Emeritus)
Modeling groundwater contamination and remediation, pesticide source reduction, optimization algorithms, supercomputing.

Scott Steinschneider (BEE)
Water resources risk management, sustainable design and management of integrated water resource systems.

Jery R. Stedinger (CEE)
Stochastic hydrology, water resource systems operations and planning, risk analysis.

Harry Stewart (CEE)
Geotechnical engineering, dynamic behavior of soils, instrumentation.

Tammo S. Steenhuis (BEE)
Management of soil and water resources, fate of agricultural toxics and nutrients.

Michael B. Timmons (BEE)
Aquaculture, water quality and management systems, biological filtration.

Michael F. Walter (BEE, Emeritus)
International development, sustainable development, ecological engineering and water management.

M. Todd Walter (BEE)
Ecohydrology, hydrological controls on environmental transport, and watershed modeling.

Your Faculty Advisor

Each Environmental Engineering student is assigned a faculty advisor. The primary role of the advisor is to guide you through your academic program and to assist with questions or problems you may have along the way. You will pre-register for each semester's classes in the middle of the previous semester using the Student Center. You should plan on meeting with your faculty advisor early in the pre-enrollment process to discuss your progress and course selections. Advisors do not select your courses for you and you are responsible for meeting all graduation requirements. (The program does track your progress and alert you of your progress toward graduation in each semester of the junior and senior year.) The appendix on Student Outcomes has suggestions addressing topics that you may want to pursue in your program.

Your advisor will also enjoy getting to know you and will appreciate hearing about your successes in academics and in life. Your advisor will talk with you about career plans, provide letters of recommendation and assist you with applying to graduate or professional schools if this is what you want to do next. Faculty advisors help students applying for internships, study abroad, and provide advice as you look for summer jobs and undergraduate research. Therefore, you are encouraged to make opportunities to visit with your advisor at times other than during the scramble of pre-enrollment.

Everyone (especially students) at Cornell is busy juggling different responsibilities and activities. The following suggestions will allow you to maximize the help your advisor can offer with regard to your academics. If you follow them, you will get the most out of your relationship with your advisor.

- **Plan ahead**! Schedule routine appointments ahead of time.
- When you need **to see your Environmental Engineering advisor**, use E-mail to **schedule an appointment in advance** and indicate why you wish to meet. If your advisor is unavailable or **if you are experiencing an emergency**, in BEE contact the Student Services Coordinator) or and in CEE contact the Undergraduate Program Coordinator. They will work with you and bring your advisor into the loop as quickly as possible.
- **Be prepared to think about the big picture.** Your future plans may change, but it helps both you and your advisor to see in the beginning where you think you are headed.
- **Always have a copy of your schedule** or a list of courses with you when you meet with your advisor to discuss pre-enroll.
- Make a **list** of **questions and concerns** that you want to discuss with your advisor before you meet so you remember everything that is important.
- **Share good news and personal accomplishments** with your advisor. This helps them get to know you and gives you another good reason to say hello.

If you have questions about your academic focus or decide to make some changes in the direction of your education, you may change faculty advisors (or majors) if your interests shift. To change advisors, if your records are with BEE in Riley-Robb contact the Student Services Coordinator or if your records are with CEE in Hollister contact the Undergraduate Program Coordinator. Contact the Counseling and Advising Office in Roberts Hall at 607.255.2257. If you are seeking a new major in CALS contact the College of Engineering Advising Office in 180 Rhodes Hall at 607.255.7414 if you are seeking to transfer to a different Engineering field. Environmental Engineering Advisors are knowledgeable about other majors in both colleges, and will talk with you even if you feel you might want to change majors. Our interest is in your education and what is best for you!

Academic Support Services

Having problems managing your workload or your time? Have you been sleeping more but still feel tired all the time? Having problems getting out of bed and getting motivated? Each year, many students in the College and the University find that they are having problems academically, socially, and/or personally. Deciding how you respond to these obstacles can profoundly affect your level of success at Cornell.

Cornell offers several resources to help students with their academic work. The best time to visit is as soon as you identify a problem – don't wait until it's overwhelming.

Biology Advising Center
8:30am-4:00pm Monday-Thursday and 8:30am -3:30pm on Friday; 216 Stimson Hall
Tel: 607.255.5233; Fax: 607.255.0470; Email: bioadvising@cornell.edu
Office of Undergraduate Biology

Engineering Advising Office
8:00am-4:30pm Monday-Friday; 180 Rhodes Hall
Tel: 607.255.7414; Fax: 607.255.9297; Email: adv_engineering@cornell.edu
Cornell Engineering Advising

The Learning Strategies Center
8:30am-4:30pm Monday-Thursday, 8:30am-4pm Friday; 420 Computing and Communications Center (CCC) Tel: 607.255.6310; Email: learningstrategiescenter@cornell.edu, The Learning Strategies Center

Math Support Center
Open during Academic Year – see web site for specific hours; 256 Malott Hall
Tel: 607.255.4658; Email: mst1@cornell.edu
Department of Mathematics Courses, Mathematics Support Center

Writing Workshop
8:30am-5pm Monday-Friday – see website to schedule an appointment; 174 Rockefeller Hall
Tel: 607.255.6349; Fax: 607.255.4010; Email: thc33@cornell.edu
John S. Knight Institute

Minority & Women's Programs in Engineering
8am-4:30pm; 146 Olin Hall
Tel: 607.255.6403; Fax: 607.255.2834; Email: dpeng@cornell.edu
Diversity Programs in Engineering

Free Tutoring Services
Tau Beta Pi (Student and Campus Life) and
Ho-Nun-De-Kah (The Official Honor Society of Cornell)
Peer Tutoring Request a Tutor , Cues Tutoring

Student Disability Services
(Student Disability Services) Tel: 607.254.4545; Email: sds_cu@cornell.edu

Mental Wellness Support

Sometimes obstacles aren't rooted in study habits but in medical or psychological problems. These range from low iron or blood sugar to depression or anxiety. For many students this is the first time they are living away from home and are responsible for their own well-being. Although many people see you each day and may genuinely care about you, no one is making sure that you are eating well, getting regular exercise, and are healthy. Indeed, it is less likely that people will recognize if you're facing some minor or major emotional problem, especially if you are living off-campus. It is important that you care for yourself, and ask for help and direction from your Resident Advisor, faculty advisor, or other campus or community office/agency.

Cornell offers mental wellness support to students through the following services, among others:

CAPS (Counseling and Psychological Services) at Cornell Health: Cornell University Health Services; Tel: 607.255.5155; Email: cornellhealth@cornell.edu Cornell Health Services
CAPS has noted a trend that engineering students tend to wait a long time before they seek assistance. This behavior results from the mistaken belief that the problem solving skills of engineers extend to emotional and psychological issues. Failure to seek help usually ends up putting the student in more academic and personal risk. If you are really stressed, tired all the time, having trouble getting yourself to class, not able to complete assignments on time, confused about life in general, sad, anxious, or just want someone to talk to so you can decompress, contact CAPS. Oftentimes just talking with a trained professional can help you feel better. Note: each student is limited to 12 individual counseling sessions per year, this is not long-term counseling. Let's Talk:
Welcome to Cornell Health

EARS (Empathy, Assistance, and Referral Service); Tel: 607.255.3277
Free and confidential.
Empathy Assistance and Referral Service

General Medical Problems
Cornell Health; Tel: 607.255.5155; Email: cornellhealth@cornell.edu, Cornell Health If you've had a lingering health concern, please have it checked out. Even minor illnesses can detract from your overall enjoyment of 'the college experience'.

Professional Registration

Engineers must have a professional engineering license (obtained after passing two examinations and also having 4 years of suitable experience) to practice engineering in each state of the U.S. While not required for all Environmental Engineering jobs, licensure is important for environmental engineers because they are responsible for public safety in much of their work. Most states and communities require that a registered engineer give final approval to all plans and specifications for engineering projects. Students can take the first step towards obtaining their Professional Engineering (PE) license while still a senior at Cornell. Students are eligible during their last term to take Part A of the nationwide examination, the "Fundamentals of Engineering (FE) Examination." Successful completion earns the title "Intern Engineer" (often also called "Engineer-in-Training"). Because Part A emphasizes fundamental knowledge gained in engineering distribution courses and core courses, there is a comparative advantage in taking this exam during your last term, while this material is still relatively "fresh" in your memory. **Please be sure to have BEE or CEE notified of your exam results so we receive the feedback we need to document the success of our graduates.** Success or failure in this examination has no bearing on your academic standing at Cornell.

Students can sign up to take the Fundamental of Engineering (FE) exam held throughout the year in consecutive months starting each January & February with one month between the next pair of active months, i.e., no exams given in March, but April & May, not June, etc. Students sign up directly with the NCEES site (see Engineering Licensure). Each state has Pearson testing centers (similar to GRE exam or SAT's); in NY, the closest exam sites are: 421-423 E. Main Street, Endicott, NY, and 6700 Kirkville Rd, E. Syracuse, NY. There are fees paid to both NCEES and NY State associated with the registration (total ~$200). Once the nationally conducted FE exam is passed, it is valid forever and is valid in any state for Professional Engineering registration (requires an additional 4 years of experience under another registered engineer). More details on New York licensure can be found at Office of the Professions.

Part B of the examination may be taken after four years for engineering students who have suitable engineering experience after passing Part A. Successful completion of Part B will give you the title "Professional Engineer" in the state where you took the Part B exam. With some exceptions registration in other states may usually be obtained by reciprocity rather than taking another exam.

BEE 5330, Engineering Professionalism, prepares the student for the general national FE Examination. FE review homework addresses FE exam preparation, and students complete the formal comprehensive review of engineering subjects associated with the Fundamentals of Engineering Exam.

Graduate Education

It's not too early to consider additional study beyond your bachelor's degree. For students who wish to continue their graduate program at Cornell, there are several options, as described below, leading to a Master of Engineering, Master of Science, or a Doctor of Philosophy degree.

MASTER OF ENGINEERING

B.S. degree holders in engineering from Cornell who have a minimum grade point average of 2.7 are generally eligible for admission to the three Master of Engineering programs outlined below. However, each application is evaluated individually, and BEE and CEE faculty reserve the right to make final admission decisions. To apply visit: Cornell University Graduate School

All MEng students must register for a minimum of one semester in the Graduate School.

1. MASTER OF ENGINEERING (BIOLOGICAL AND ENVIRONMENTAL ENGINEERING) PROGRAM

The Master of Engineering (MEng) degree builds on the foundation of the engineering BS degree to prepare candidates for a professional career. The program integrates technical engineering with the biological and life sciences, enabling graduates to solve technical problems on a scale ranging from molecular to whole organism to eco system depending on their interests. Graduates assume positions in production companies, consulting firms, government and agencies, and in the public service sector. The degree may also be used as a pathway to advanced study in science and engineering or professional study in business, law and medicine.

2. MASTER OF ENGINEERING (CIVIL AND ENVIRONMENTAL ENGINEERING) PROGRAM

A report prepared by a task force of the American Society for Engineering Education (ASEE) recommended that baccalaureate students who plan to pursue careers in engineering practice be encouraged to complete, on a full-time basis, an advanced degree program focused upon engineering practice. Our School has long believed that the four-year B.S. program is limited in preparing young engineers for the rigors of engineering practice and to provide them with sufficiently meaningful and significant design experience. CEE's solution to this problem has been the fifth-year Master of Engineering Program in Civil and Environmental Engineering or Engineering Management. Professionally-oriented, the Master of Engineering (Civil) degree programs are particularly popular graduate degrees for CEE seniors and represents the fifth year of an integrated five-year Civil Engineering program leading to a Master of Engineering degree.

The Master of Engineering degree is a course work and project-oriented program. It is normally completed in two semesters of (civil) intensive study. Thirty credit hours consisting of course work in major and supporting areas and a project are required. Master of Engineering students in Environmental Engineering may focus their studies in one of the following subject areas: environmental processes, environmental fluid mechanics and hydrology, and environmental and water resource systems engineering. For the M.Eng. program in Environmental Engineering, each program typically consists of course work in a subject area and supporting areas as well as a project.

3. MASTER OF ENGINEERING (ENGINEERING MANAGEMENT) PROGRAM

The M.Eng. program in engineering management is aimed at engineers who want to stay in a technical environment, but focus on managerial roles. Students learn to identify problems, formulate and analyze

models to understand these problems, and interpret the results of analyses for managerial action. Projects in the management area focus on integrating technical and economic analysis to create results that can support effective management decisions.
Each student's program of study is designed individually in consultation with an academic adviser and then submitted to the Chair of the Engineering Management Program for approval. Graduates of this program are in demand by environmental engineering consulting firms, management consultants, industrial companies, and other organizations that focus on the efficient management of projects and technical systems.

COOPERATIVE PROGRAMS WITH THE JOHNSON GRADUATE SCHOOL OF MANAGEMENT
There are several special programs that allow a student to earn a degree from the Engineering College and the Johnson Graduate School of Management in less time than if the degrees were pursed sequentially. Here we describe two programs that start with a Cornell Engineering B.S. degree, and one than considers a joint MEng. Degree from the Engineering College with an M.B.A. from the Johnson School.

JOINT B.S./M.ENG. (ENVIRONMENTAL) /M.B.A. AND JOINT B.S./M.B.A.
Two special programs make it possible for students to earn degrees from both a bachelor's degree from the College of Engineering and an M.B.A. from Johnson Graduate School of Management. One program, completed in five years, leads to a B.S. degree in engineering and a Master of Business Administration (M.B.A.) degree. The other program, which takes six years, earns three degrees: the B.S. in engineering, the Master of Engineering (M.Eng.), and the M.B.A.

Both programs require taking a specific set of courses at the undergraduate level; these curricula allow for a shortening of the combined programs by one academic year. Information about the specific requirements for each area is available from the appropriate undergraduate major coordinator and graduate program coordinator. The curriculum must include nine core courses required for the M.B.A. or allowed substitutes. See the *Engineering Undergraduate Handbook*.

Students who decide to pursue either of these programs should take the GMAT exam, which is required by the Johnson School of Management, in March of their junior year (or earlier).

The joint B.S./M.Eng. (Environmental) /M.B.A. program is very attractive in that both Masters degrees are received within two years after the B.S. This program must be initiated in the junior year. This special program requires early planning so those electives taken during the junior and senior year can be used to meet requirements of the M.B.A. degree. By March 1 of the sixth term of enrollment, a student must apply for admission to the M.B.A. program through the Johnson Graduate School of Management. Application to the M.Eng. program should take place by February 1 in the student's senior year at Cornell. Students are encouraged to go to Engineering Advising and the Johnson School for more information.

JOINT M.ENG./M.B.A. PROGRAM

For those interested in both the M.Eng. and M.B.A. degrees, but who do not participate in the six-year joint program described above, an alternative opportunity is the five-semester joint program. Application to this program can begin as late as the first few weeks of enrollment in the M.Eng. program. The five-semester program is open to students with B.S. degrees from Cornell or elsewhere.

MASTER OF SCIENCE AND PH.D. PROGRAMS

Some students pursue a research-oriented Master of Science (M.S.) program either here or elsewhere. An increasing percentage of our students continue on to the Ph.D. for careers in research, teaching, or consulting. A Ph.D. degree can be pursued after earning a M.S. or an M.Eng. degree. Some students prefer to take a job immediately after receiving the B.S. and then return for graduate study a few years later. Ask your advisor, professors, or the BEE or CEE Director of Graduate Studies for information about graduate study.

EARLY ADMISSION PROGRAM

Cornell undergraduates who have between one and eight credit hours to earn towards completion of their undergraduate degree in the last semester of their senior year may apply for "early admission" to the Master of Engineering program. If approved, the student may begin earning credits towards their Master of Engineering degree while completing their undergraduate degree. Double-counting of credits will not be allowed; credits used towards undergraduate requirements may not also be used towards M.Eng. requirements. Admitted applicants must spend a minimum of one semester registered with the Graduate School.

There are two advantages to starting the M.Eng. Program early: (1) students may take a slightly heavier course load and complete the M.Eng. degree in one Graduate School semester after completion of the undergraduate degree; or (2) students may either take a lighter course load over two Graduate School semesters upon completion of the undergraduate degree or take extra courses they are interested in that do not count towards the M.Eng. Degree. Courses taken as part of a graduate program can also be transferred to other graduate programs. A special form and guidance are required before submitting the Graduate School application for Early Admission; therefore, you need to see the Graduate Program Coordinator of the Field to which you intend to apply for this form and instructions.

Academic Integrity and Plagiarism

Absolute integrity is expected of every Cornell student in all academic undertakings. Integrity entails a firm adherence to values most essential to an academic community, including honesty with respect to the intellectual efforts of oneself and others. Both students and faculty at Cornell assume the responsibility of maintaining and furthering these values. However, a Cornell student's submission of work for academic credit implies that the work is the student's own. Outside assistance should be acknowledged, and the student's academic position truthfully reported. In addition, Cornell students have the right to expect academic integrity from each of their peers. It is plagiarism for anyone to represent another person's work as his or her own. As stated in the University Code of Academic Integrity, "The maintenance of an atmosphere of academic honor . . . is the responsibility of the student and faculty. . ." Gray areas sometimes exist when students study and work together. It is important that faculty state clearly what is expected, and that students understand what authorship citations an instructor expects. To become better acquainted with academic integrity responsibilities, each student should read the Code of Academic Integrity available on the web at Dean of Faculty . A hard copy may be obtained from the Engineering Advising Office, 180 Rhodes Hall, or from the Dean of the Faculty, 315 Day Hall Guide to AI can be found at: Essential Guide to Academic Integrity which includes the *Code of Academic Integrity, Acknowledging the Work of Others, Dealing with Online Sources, Working Collaboratively, and Beware of Businesses Buying and Selling Course Materials Without Authorization.*

Freedom from Sexual Harassment

The College feels it is essential for the well-being of the University community that every individual be treated with respect. Sexual harassment and sexist comments are incompatible with this goal.

Unwelcome sexual advances, requests for sexual favors, or other verbal or physical contact or written communication of a sexual nature is sexual harassment when any of the following occurs:

1. Submission to such conduct is made either explicitly or implicitly a term or condition of employment or academic standing; or
2. Submission to or rejection of such conduct is used as the basis for employment or academic decisions affecting the individual; or
3. Such conduct has the purpose or effect of unreasonably interfering with an individual's work, academic performance, or participation in extracurricular activities; or creating an intimidating, hostile, or offensive working or learning environment.

Any student, staff employee, or faculty member who believes she/he has been victimized by sexual harassment is encouraged to promptly contact a title IX coordinator via the Office of Workforce Policy and Labor Relations at 607.254.7232 or equalopportunity@cornell.edu . Individuals may also contact the University Ombudsman at 607.255.4321 in 118 Stimson Hall, 8:30am-4:30pm Monday-Friday or other times by appointment.

Appendix– Student Outcomes

Program Educational Objectives are listed on the first page of this Handbook. The following **Student Outcomes (SOs)** are assessed in the evaluation of our Environmental Engineering BS degree program. Our success in achieving these outcomes is periodically reviewed by our faculty, and by the Engineering Accreditation Commission of ABET (ABET) as part of its accreditation process.

We advise EnvE students to think about these desirable outcomes and consider how through their choice of electives and co-curricular activities they can develop these abilities, and desired knowledge and understanding. Some students may want to emphasize particular issues or skills. But, none should be neglected – the successful environmental engineer needs to have a broad understanding of social and technical issues and the ability to communicate, as well as being outstanding technically.

As a result of their completion of the BS EnvE program, students should have the ability to:

(1) identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
(2) 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) communicate effectively with a range of audiences.
(4) 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) function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
(6) develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
(7) acquire and apply new knowledge as needed, using appropriate learning strategies.

NOTES