Northwestern | McCORMICK SCHOOL OF ENGINEERING

Civil and Environmental Engineering

Undergraduate Civil and Environmental Engineering Handbook

2017-2018

August 2017

Revision 1 – 5 January 2018

Also available online

http://www.mccormick.northwestern.edu/civil-environmental/current-students/forms-documents.html

Name:_____

Campus Address:_____

Phone: _____

E-mail: _____

Faculty Adviser: _____

Office/E-mail: _____

********** **Important Notice to All Advisees** **********

Please bring the following information with you when you meet with your adviser:

- Your career plan
- Your course selection for the next quarter
- Questions on academic, career, and personal matters
- Anything you wish to ask your adviser

Academic Time Table

YEAR 1

What		When	How
Academic	Learn about civil and environmental engineering (CEE) majors	Orientation Week	Attend CEE Freshman Welcome BBQ, the day before first day of class.
		Start in Fall quarter	Meet with Professor Chou (Tech A218, karen-chou@northwestern.edu) for civil engineering and Professor Gaillard (Tech A324, jf-gaillard@northwestern.edu) for environmental engineering; speak with upper division students (Tech AG 52), attend NU ASCE (asce.mccormick.northwestern.edu) and NSEE (enveus.mccormick.northwestern.edu) events
		Fall quarter	Take CivEnv 195 Introduction to Civil & Environmental Engineering, a zero credit course.
	Declare major	Preferably by 4th week of Spring quarter	Submit ***McCormick Freshman Declaration or Change of Major Form****, page* ***77***, to McCormick Undergraduate Engineering Office (Tech L269)
	Plan for sophomore year curricula (BSCE and BSEE)	Spring quarter	Attend ***CEE Rising Sophomore Advising Seminar;*** develop your curriculum plan (see page 61)
	Begin completing social science and humanity theme	Can be as early as fall quarter of year 1 and should not be later than spring quarter of year 2	Discuss with your academic adviser; speak with upper-division students (NU ASCE and NSEE (Northwestern Society of Environmental Engineers) members); submit ***Theme Form via MAS****, page* ***63***
	Explore certificate programs, multiple majors, minors, BS/MS	Can be as early as Fall quarter of year 1	Discuss with your academic adviser; develop your curriculum plan (see page 61)
Professional and Career	Learn more about the CEE profession and meet with practitioners	Start at Evening with McCormick during fall orientation week	Join and be an active member of NU ASCE (asce.mccormick.northwestern.edu) or NSEE (enveus.mccormick.northwestern.edu); attend job fairs
	Explore part time research opportunities in CEE department	Start in Fall quarter	Go to CEE department office (Tech A236) to inquire; speak with upper division CEE students (NU ASCE or NSEE) to inquire their experience; speak with CEE faculty to learn their research activities
	Find summer internship in engineering	Start in Fall quarter	Visit CEE career opportunities web page http://www.mccormick.northwestern.edu/civil-environmental/career-opportunities/ for job postings; speak with upper–classmen; meet with McCormick Office of Career Development (MCD) adviser; register with McCormick Connect (http://www.mccormick.northwestern.edu/mcd/McCormickConnect/index.html); take a career development course CRDV 301 (a zero credit, no tuition course); talk with CEE faculty members

Academic Time Table

YEAR 1

continued

What		When	How
Professional and	Find summer internship in engineering	October	**attend CEE Fall Career Fair**
			attend Meet-N-Greet, an informal conversation with senior engineers and recent alumni about CEE careers; held in conjunction with Fall CEE Career Fair
		Start in mid-fall	Visit potential employers while home during holiday breaks
		January	**attend CEE Winter Career Fair**
		Winter & spring quarters	Take GenEng 220-1,2
$$$$	Explore fellowships such as Fulbright, Barry Goldwater, etc.	Spring quarter	Visit Office of Fellowships (http://www.northwestern.edu/fellowships/about/index.html)

Academic Time Table

YEAR 2

What		When	How
Academic	Transfer major from other engineering programs or Weinberg	Now	Meet with staff in McCormick Undergraduate Engineering Office (Tech L269); meet with Professor Chou (Tech A218, karen-chou@northwestern.edu) for civil engineering and Professor Gaillard (Tech A324, jf-gaillard@northwestern.edu) for environmental engineering; submit ***McCormick Change of Major, Adviser, Catalog Year Form****, page* ***78,*** to McCormick Academic Services (Tech L269)
	Complete social science and humanity theme	Continue from Year 1	Discuss with your academic adviser; speak with upper-division students (NU ASCE and NSEE (Northwestern Society of Environmental Engineers) members); submit ***Theme Form via MAS****, page* ***63***
	Explore certificate programs, multiple majors, minors, BS/MS	Continue from Year 1	Discuss with your academic adviser; develop your curriculum plan (see page 61)
	Explore Study Abroad	Fall quarter, see deadlines posted on Study Abroad Office website	Visit Study Abroad Office (http://www.northwestern.edu/studyabroad/index.html); discuss with your academic adviser; develop your curriculum plan (see page 61)
Professional and Career	Learn more about the CEE profession and meet with practitioners	Continue from Year 1	Join and be an active member of NU ASCE (asce.mccormick.northwestern.edu) or NSEE (enveus.mccormick.northwestern.edu) activities; attend job fairs
	Explore part time research opportunities in CEE department	Continue from Year 1	Go to CEE department office (Tech A236) to inquire; speak with upper division CEE students (NU ASCE or NSEE) to inquire their experience; speak with CEE faculty to learn their research activities
	Find summer internship in CEE	Start in Fall quarter	Visit CEE career opportunities web page http://www.mccormick.northwestern.edu/civil-environmental/career-opportunities/ for job postings; speak with upper–classmen; talk with CEE faculty members
		October	**attend CEE Fall Career Fair**
			attend Meet-N-Greet, an informal conversation with senior engineers and recent alumni about CEE careers; held in conjunction with Fall CEE Career Fair
		Start in mid-fall	Visit potential employers while home during holiday breaks
		January	**attend CEE Winter Career Fair**
		Continue from Year 1	Meet with McCormick Office of Career Development (MCD) adviser; register or visit McCormick Connect (http://www.mccormick.northwestern.edu/mcd/McCormickConnect/index.html) and check job availability; or take a career development course CRDV 301 (a zero credit, no tuition course)
		Start in the fall quarter	Take CivEnv 195 Introduction to Civil & Environmental Engineering and GenEng 220-1,2 if not taken in Year 1

Academic Time Table

YEAR 2

continued

What		When	How
Career *(cont'd)*	Explore co-op programs	Starts in the Fall quarter	Meet with MCD adviser; register with McCormick Connect (http://www.mccormick.northwestern.edu/mcd/McCormickConnect/index.html) and check job availability; take a career development course CRDV 301 (a zero credit, no tuition course)
$$$$	Apply for external scholarships sponsored by professional and other organizations	Winter and Spring quarters	Information disseminated through CEE website and NUASCE and NSEE listserv and websites.
	Explore or apply fellowships such as Fulbright, Barry Goldwater, and others	Start in Fall quarter	Visit Office of Fellowships (http://www.northwestern.edu/fellowships/about/index.html)

Academic Time Table

YEAR 3

What		When	How
Academic	Explore Architectural Engineering & Design (AED) or interested in AED Certificate	Start in Fall quarter for 3 quarters	Begin taking CivEnv 385-1 and continue onto CivEnv 385-2 in the Winter quarter and CivEnv 385-3 in the Spring quarter.
	Transfer major from other engineering programs or Weinberg	Now may be challenging; it may not be possible to fulfill the BSCE or BSEE requirements in the rest of year 3 and year 4 without taking extra classes	Meet with a staff in McCormick Undergraduate Engineering Office (Tech L269); meet with Professor Chou (Tech A218, karen-chou@northwestern.edu) for civil engineering and Professor Gaillard (Tech A324, jf-gaillard@northwestern.edu) for environmental engineering; complete ***McCormick of Major, Adviser, Catalog Year Form**, page **78***
	Complete social science and humanity theme	Continue from Years 1 and 2	Discuss with your academic adviser; speak with upper-division students (NU ASCE and NSEE members); submit ***Theme Form via MAS**, page **63***
	Develop spreadsheet plans to complete certificate programs, multiple majors, minors, BS/MS	Now; multiple majors, minors, or certificate programs requires detailed planning	Discuss with your academic adviser; develop your curriculum plan (see page 61)
	Explore writing an Honor thesis, GPA ≥3.50	Fall quarter	Speak with faculty in your area(s) of interest to identify a thesis adviser. There are GPA and special course requirements. Consult with Professor Corr (Tech A224, d-corr@northwestern.edu) for civil engineering and Professor Gaillard (Tech A324, jf-gaillard@northwestern.edu) for environmental engineering (see page 67)
Getting Ready to Graduate	Apply for graduation	by Winter quarter	Submit ***McCormick Bachelor's Degree Application*** to McCormick UG Engineering Office (see page 69)
	Declare minors and certificates in McCormick	Winter quarter	Use appropriate declaration or intent to pursue form in CEE UG handbook if minor or certificate program is in CEE; otherwise, use forms from department/college houses minor or certification program.
	Persuading dual engineering degrees	As soon as you know	discuss with academic adviser; submit ***Dual Engineering Degree*** form (see page 71 or 73)to McCormick UG Engineering Office
	Explore graduate school	Start in Winter quarter	Study for and take GRE exam by October; speak with faculty
		Quarter break and summer	Visit potential graduate schools
	Explore dual BS/MS program if GPA > 3.50	Within 4 courses from completing BS degree	Discuss with MS program coordinator (http://www.civil.northwestern.edu/undergraduate/BS_MS/index.html); meet with Dr. Bruce Lindvall, Assistant Dean for Graduate Studies in McCormick (Tech L261, b-lindvall@northwestern.edu); get a fee waiver code from Dr. Lindvall and submit the application online through CollegeNet https://www.applyweb.com/nugrad/index.ftl

Academic Time Table

YEAR 3

continued

What		When	How
Professional and Career	Learn more about the CEE profession and meet with practitioners	Continue from Years 1 and 2	Join and be an active member of NU ASCE (asce.mccormick.northwestern.edu) or NSEE (enveus.mccormick.northwestern.edu) activities; attend job fairs
	Rekindle exploration of part time research opportunities in CEE department	Start in Fall quarter	Go to CEE department office (Tech A236) to inquire; speak with upper division CEE students; speak with CEE faculty to learn their research activities
	Begin next cycle of finding summer internship in CEE	Start in Fall quarter	Visit CEE career opportunities web page http://www.mccormick.northwestern.edu/civil-environmental/career-opportunities/ for job postings; speak with upper–classmen; talk with CEE faculty members
		Start in Fall quarter if you didn't do it in Year 1 or Year 2	Meet with MCD adviser; register with McCormick Connect (http://www.mccormick.northwestern.edu/mcd/McCormickConnect/index.html) and check job availability
		October	**Attend CEE Fall Career Fair**
			Attend Meet-N-Greet, an informal conversation with senior engineers and recent alumni about CEE careers; held in conjunction with Fall CEE Career Fair
		Start in mid-fall	Visit potential employers while home during holiday breaks
		January	**Attend CEE Winter Career Fair**
	Continue co-op programs planning	Continue from Year 2	Meet with an adviser in MCD; register with McCormick Connect (http://www.mccormick.northwestern.edu/mcd/McCormickConnect/index.html) and check job availability
$$$$	Apply for external scholarships sponsored by professional and other organizations	Winter and Spring quarters	Information disseminating through CEE website and NUASCE and NSEE listserv and their websites.
	Apply for fellowships such as Fulbright, Barry Goldwater, and others	If haven't started in Fall quarter, the sooner the better	Go to Office of Fellowships (http://www.northwestern.edu/fellowships/about/index.html)

Academic Time Table

YEAR 4

What		When	How
Fundamental of Engineering (FE) exam	Review	Winter quarter	Take CivEnv 301-2 and borrow the FE review book from CEE Department
	Application	Go to NCEES.org	Register to take the exam
	Exam	all year long	visit NCEES.org for more information; exam is administrated online by NCEES http://ncees.org/exams/examinee-guide/
Getting Ready to Graduate	Apply to Graduate school	Fall quarter	Submit your applications
			Take GRE
		Fall and Winter quarters and spring break	Visit the campus; meet the graduate program coordinator, students and faculty at schools you are interested in
	Explore graduate external fellowships such as NSF Research Fellow, SMART Fellow, etc. for those interested in pursuing Ph.D.	Fall quarter	Check ASEE web sites for deadline; go to Office of Fellowships (http://www.northwestern.edu/fellowships/about/index.html); speak with other Fellows in McCormick
	Explore dual BS/MS program if GPA ≥ 3.50	Within 4 courses from completing BS degree	Discuss with MS program coordinator (http://www.civil.northwestern.edu/undergraduate/BS_MS/index.html); meet with Dr. Bruce Lindvall, Assistant Dean for Graduate Studies in McCormick (Tech L261, b-lindvall@northwestern.edu); get a fee waiver code from Dr. Lindvall and submit the application online through CollegeNet https://www.applyweb.com/nugrad/index.ftl
	Look for full time jobs	Fall quarter	Visit NU ASCE or NSEE websites on job lists; submit resume to IL ASCE resume book; attend IL ASCE or other professional meetings (networking); go to engineering firm open houses.
			Register with McCormick Connect (http://www.mccormick.northwestern.edu/mcd/McCormickConnect/index.html) and check for companies that have hired CEE before or job availability
		October	**attend CEE Fall Career Fair**
			attend Meet-N-Greet, an informal conversation with senior engineers and recent alumni about CEE careers; held in conjunction with Fall CEE Career Fair
		Start in mid-fall	Visit potential employers while home during holiday breaks
		January	**attend CEE Winter Career Fair**
$$$$	Apply for external scholarships for **graduate studies** sponsored by professional and other organizations	Winter and Spring quarters	Information disseminated through CEE website and CEE student organization listserv.

Graduation Celebration: CEE Reception – the day (5 – 8 pm) before University Commencement; e-mails regarding the reception and senior exit surveys are sent out in the spring quarter; watch your e-mails and please respond.

Preface

This handbook is intended to provide you with a comprehensive guide to the Civil and Environmental Engineering programs in the Department of Civil and Environmental Engineering (CEE), McCormick School of Engineering and Applied Science (MEAS), at Northwestern University. We hope this handbook will enhance your learning experience at Northwestern.

The information provided in this handbook is based on the 2017-2018 Northwestern Undergraduate Catalog. Sample curriculum flowcharts for catalog years since 2010-11 are available online http://www.mccormick.northwestern.edu/civil-environmental/current-students/forms-documents.html for Civil Engineering and Environmental Engineering.

This handbook is prepared as a handy reference guide to the degree requirements, programs, policies, and procedures of the Department, School, and University. An Academic Time Table in pages 3-9 is provided to guide you through various milestones during the 4 year program. We hope that you will find the information helpful for both planning and understanding your engineering education.

The Department would also like to emphasize the importance of the social and ethical implications of the engineers' work in the betterment of the society. The CEE Department offers two ABET accredited engineering programs, Bachelor of Science in Civil Engineering (BSCE) and the Bachelor of Science in Environmental Engineering (BSEE). We also offer a minor in Environmental Engineering and a Certificate program in Architectural Engineering and Design (AED).

At Northwestern University, you will have the opportunity to experience professional activities and diverse cultures from student professional organizations and the many ethnic groups among our students and faculty. The CEE Department has two student organizations devoted to professional development and interaction. They are the **N**orthwestern **U**niversity **A**merican **S**ociety of **C**ivil **E**ngineers (NU ASCE) student chapter and NSEE (**N**orthwestern **S**ociety of **E**nvironmental **E**ngineers). You will also have an opportunity to explore outside the U.S. through the Study Abroad Program and many student projects around the globe through the various student organizations such as the Engineers for the Sustainable World and the Global Architectural Brigades. We encourage you to seek out and explore courses and activities that will enrich your learning experience during your time at Northwestern.

Although this handbook embraces the development of an undergraduate engineering education, it does not constitute a complete or definitive statement of the policies of Northwestern University and McCormick School of Engineering and Applied Sciences. The Northwestern Undergraduate Catalog 2017-2018 is the official document of the University for defining academic programs and requirements. The final authority for academic degree requirements of BSCE and BSEE is jointly administered by the faculty of the MEAS, McCormick School Curriculum Committee, and the faculty of the CEE Department. Furthermore, the curricula of both the BSCE and BSEE degrees must be in compliance with the ABET accreditation requirements.

We hope you find this handbook a useful resource as you progress through your years at Northwestern. We wish you much success and welcome your suggestions for improvement of the handbook as well as the programs.

Kimberly Gray, Ph.D.
Professor and Chair
Civil and Environmental Engineering

Responsibility for Meeting Degree Requirements

Ultimately, students are responsible for understanding the degree requirements for their majors and for planning their course of study accordingly. The McCormick School Undergraduate Engineering Office serves as an invaluable resource for information and assistance regarding courses, registration, majors, study abroad, your degree progress, and more. Faculty advisers assigned to you will assist in course selection, but they are not responsible for ensuring that the courses selected meet degree requirements. That is the responsibility of the student.

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Tables and Forms

Introduction

Welcome to the Department of Civil and Environmental Engineering (CEE), McCormick School of Engineering and Applied Science at Northwestern University. The faculty and students at CEE look forward to interact with you so that you can enjoy the maximum learning, social, and cultural experience Northwestern University offers you. This handbook is part of our effort to help you achieve this goal from the academic, professional, and career aspect. In addition to academic requirements, this handbook includes an academic time table of some milestones such as declaration of major, internship, etc., that would guide you through your chosen program(s). **We hope you will thoroughly read this handbook at least once**. We also hope that you will refer to it whenever you have an academic related question. Of course, our faculty and your peers are available to address any issue you may have. Please feel free to contact them.

A new edition of the handbook is published annually to coincide with each academic year and undergraduate catalog. Revisions will be made as needed each quarter. The modifications will be denoted by vertical lines at the left hand margins for easy referencing. First revision is denoted by single vertical line. Second revision is denoted by double vertical lines. Third revision is denoted by double vertical lines with one being a heavy thickness line. Revision number and dates are shown on the cover page. The handbook is also available online http://www.mccormick.northwestern.edu/civil-environmental/current-students/forms-documents.html

To assist us in the continuing effort to improve this document, please send your suggestions and comments to Professor Karen Chou, Assistant Chair & Clinical Professor at karen-chou@northwestern.edu.

Missions

Northwestern University

Northwestern is committed to excellent teaching, innovative research, and the personal and intellectual growth of its students in a diverse academic community.

Department of Civil and Environmental Engineering

We inspire and cultivate innovative leaders and problem solvers prepared to address complex societal-scale challenges in areas of resilient infrastructure, smart and sustainable cities, water and energy security, climate change, mobility of goods and people, and environmental protection. We achieve this mission through:

1. *Education that advances the intellectual development of our students using modern engineering curricula focused on quantitative and predictive methods, academic and professional mentoring, and service-based learning;*
2. *Research that leads to new theories and techniques and transforms our ability to design, construct, and manage society's infrastructure, control material behavior, and sustain natural and engineering systems around the world;*
3. *Cultivation of a diverse community of scholars, who, through motivation to serve society, are prepared to lead management and decision-making both insider and outside of the Civil and Environmental Engineering professions.*

The above mission statements can be found on the websites:
University – http://www.northwestern.edu/provost/about/index.html
Department – http://www.mccormick.northwestern.edu/civil-environmental/about/mission-vision-statement.html

Civil and Environmental Engineering

Civil Engineering Profession

Civil Engineering is an international profession that provides solutions for pressing societal challenges for both the natural and built environment. Civilian infrastructure systems provide safe and efficient transportation systems for people, food, and manufactured goods; safe and energy efficient residential and commercial buildings; support the ecological and human health by protecting the quality of water, air, and land; and support the energy sector with power plants and their support structures.

Civil Engineering bridges science and society, and thus plays a leading role in planning, designing, building, and ensuring a sustainable future. The American Society of Civil Engineers (ASCE) defines **sustainability** as *a set of economic, environmental and social conditions in which all of society has the capacity and opportunity to maintain and improve its quality of life indefinitely, without degrading the quantity, quality or the availability of natural resources and ecosystems*. The civil engineering profession recognizes the reality of limited natural resources, the desire for sustainable practice (including life-cycle analysis and sustainable design techniques), and the need for social equity in the consumption of resources.

Civil Engineers are the stewardess of our natural resources and the built environment that support commerce, recreation, health, and other necessities of modern social economies. They design, construct, and manage these systems as well as the taller, longer, lighter, and more elegant structures at the end nodes, such as airports, sky scrapers, bridges, etc. everywhere on the planet and even in space. Each system has unique characteristics that challenge civil engineers to combine engineering knowledge with initiative and creativity to meet project objectives, protect the well-being of society and our finite natural resources, and meet budget constraints.

In addition to the applications of mathematics, physical, natural, and engineering sciences, Civil Engineers must incorporate excellent communication and people-skills, social, economic, managerial sciences, and collaborate with architects, public officials, owners, contractors, material suppliers and the public during various phases of a project. Their work may extend to materials science to develop new building materials; using advanced sensors and communication devices to monitor performance of bridges, tunnels, buildings in real time, over long distances, and under extreme conditions. Civil engineers have designed infrastructures that stretched the limit of materials, performance, and human desire while preserving our natural resources.

The most unique aspects of civil engineering are: the close interaction with the citizens of a community, influence of political policy, and the ability to execute sustainable designs and constructions that have tremendous impact to the social, economic, and welfare of every member in the world.

At Northwestern, the Civil Engineering curriculum is designed to satisfy students' diverse interest and professional goals. Students develop study plans suited to their unique interest, including extensive options for courses such as Architectural Engineering and Design Certificate, Environmental Engineering Minor within our Department and Kellogg School of Management Certificate program for undergraduates to address the social, physical, and financial challenges of constructing and managing the nation's infrastructure.

While Civil engineering graduates typically work in engineering consulting firms, city and county public works, state departments of transportation, construction companies, various branches of federal government, and engineering material product industries, some of our graduates work in the aerospace industry, Wall Street, medicine, laws, politics, and policy

development. A majority of Northwestern graduates receive at least one advanced degree. About half of these received advanced degrees are in other professional fields such as aerospace, business administration, medicine, and law. Others may work in research and development, and teaching.

Employment

Our recent graduates hold jobs in a wide spectrum of areas such as infrastructure engineering consulting (buildings, bridges, railroads, power plants, environmental treatment plants, etc.), construction, project management, architecture, energy, and finance. Their positions include project engineers, project managers, field engineers, and designers. Some graduates join the business sector as business analysts, technical consultants, and derivative traders. Their employers include Amazon, Boeing, Accenture, ARCADIS, Mass Electric Construction, General Dynamics' Electric Boat Division, and National Forest Service. Others went directly to graduate school. Most mid-career civil engineers hold supervisory or administrative positions such as project engineers.

According to the U.S. Bureau of Labor Statistics, civil engineers held about 287,800[1] jobs as of May 2016. About 50% were employed by firms providing engineering design, consulting and architectural services. Another 20% of the positions were in federal, state, and local government agencies. Construction, utility, transportation, and manufacturing industries accounted for most of the remaining employment.

Job Outlook

Employment of civil engineers is project to grow 8% from 2014 to 2024[2], about as fast as the average for all occupations (7%) and twice as fast as all engineers (4%). As infrastructure continues to age, civil engineers will be needed to manage projects to rebuild bridges, repair roads, and upgrade levees and dams as well as airports and building structure of all types.

A growing population leading to increasing urbanization means that new water systems will be required while, at the same time, aging, existing water systems must be maintained to reduce or eliminate leaks. In addition, more waste treatment plants will be needed to help clean the nation's waterways. Civil engineers will continue to play a key part in all of this work.

The work of civil engineers will be needed for renewable-energy projects. Often, getting permits for many of these projects takes years, and civil engineers play a key part in the process. Thus, as these new projects gain approval, civil engineers will be further involved in overseeing the construction of structures such as wind farms and solar arrays.

Although states continue to face financial challenges and may have difficulty funding all of their projects that need attention, some of the projects that have been delayed will ultimately have to be completed in order to build and maintain critical infrastructure, and to protect the public and the environment.

Earnings

The 2013 salary survey conducted by the American Society of Civil Engineers (ASCE) and American Society of Mechanical Engineers (ASME)[3], tabulated below, reveals that the total compensation for civil engineers with different levels of experience begins in the $50,000 range and will initially increase some 7 to 8% per year and then accelerate.

The May 2016 salary survey conducted by the U.S. Bureau of Labor Statistics[1] is shown on the last line of the table below. The statistics is based on 287,800 employment of all levels and experience in the civil engineering profession.

Experience		Average	10th percentile	25th percentile	Median	75th percentile	90th percentile
2013 ASCE Salary Survey	0+ years	$52,015	$40,000	$46,000	$52,000	$56,000	$67,000
	1+ years	$54,750	$44,000	$49,000	$55,000	$60,000	$69,000
	3+ years	$59,055	$46,300	$51,539	$57,000	$64,740	$80,500
	4+ years	$71,176	$54,600	$61,000	$69,500	$78,000	$98,280
	8+ years	$85,291	$63,323	$72,000	$82,356	$95,238	$121,864
	10+ years	$102,072	$71,240	$85,000	$101,000	$118,327	$146,848
	15+ years	$114,854	$78,500	$90,000	$109,750	$132,000	$182,500
	25+ years	$134,921	$85,000	$105,000	$136,000	$159,970	$208,000
Bureau of Labor (2016)		$89,730	$53,470	$65,330	$83,540	$107,140	$132,880

[1] *Occupational Employment and Wages, 17-2051 Civil Engineers, May 2016*, Bureau of Labor Statistics, https://www.bls.gov/oes/current/oes172051.htm, (visited 1 August 2017)

[2] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Civil Engineers, on the Internet at https://www.bls.gov/ooh/architecture-and-engineering/civil-engineers.htm (visited *August 01, 2017*).

[3] *The Engineering Income and Salary Survey Standard Report*, the Engineering Income and Salary Survey Publishing Group in partnership with ASCE and ASME, 2013.

Environmental Engineering Profession

Is the water safe to drink? Is the air dangerous to breathe? Should we eat the fish we catch or the crops we grow? Do our living and work spaces pose special threats to our health? Environmental Engineers are the technical professionals who identify and design solutions for environmental problems. They provide answers to the above and other questions about the potentially harmful interrelationships between human civilization and the environment. Environmental engineers apply scientific and technological knowledge to eliminate or reduce environmental problems. They seek to shield the environment from the harmful effects of human activity, protect human populations from adverse environmental events such as floods and disease, and restore environmental quality for ecological and human well-being.

Traditionally, environmental engineering includes:

1. The identification and measurement of potentially harmful physical, chemical, and biological agents in the environment,
2. The transport and fate of these agents,
3. The effects of these agents on people and the environment, and
4. The design and operation of engineered systems for the maintenance and improvement of the quality of our environment.

Historically, it was the sanitary and civil engineers who made cities livable for large populations. However, the role of environmental engineering has been expanding in the past few decades. Increasingly, environmental engineers are being called upon to expand the focus of their efforts to address the challenges associated with alternative energy, sustainability, climate change, ecological restoration and emerging public health threats.

Northwestern has developed an interdisciplinary approach to the education of environmental engineers. The four-year curriculum provides the students with a sound fundamental knowledge of environmental engineering principals and an opportunity to integrate other aspects such as basic science, social science, humanities, and public policy to their knowledge. Environmental Engineers stand at the threshold between natural environmental systems and human societies!

Employment

Graduates in environmental engineering will have many career opportunities in a spectrum of business sectors and government agencies. These include engineering consulting firms that offer challenging employment in environmental planning, design, and management. The manufacturing and chemical industries, utilities, the pollution control industry, and others need engineers for the development and management of research and environmental control programs. Engineers in governmental agencies are responsible for planning and assessment of control strategies and measures to assure a clean and healthful environment. Universities and research organizations afford additional avenues of career development.

Our recent graduates hold positions as engineering designers, business analytics, and staff engineers of regulatory agency such as EPA. Many of our graduates continued their education in schools of engineering, law, medicine, public health, and management.

Environmental engineers held about 52,280 jobs in May 2016[1]. About half were employed by firms providing management, scientific, and technical consulting services and other engineering consulting services. About one-quarter of the jobs were in federal, state, and local government agencies.

Job Outlook

According to the *2016-17 Occupational Outlook Handbook*[1] published by the U.S. Bureau of Labor Statistics, employment of environmental engineers was projected to grow 12% from 2014 to 2024, faster than the average for all occupations (7%) and three times as fast as the average for all engineers (4%). State and local governments' concerns about water are leading to efforts to increase the efficiency of water use. Such a focus differs from that of wastewater treatment, for which this occupation is traditionally known. Most employment growth is projected to be in professional, scientific, and technical services, as governments at the state, county, and local levels draw on this industry to help address these water concerns.

The requirement by the federal government to clean up contaminated sites is expected to help sustain demand for these engineers' services. In addition, wastewater treatment is becoming a larger concern in areas of the country where new methods of drilling for shale gas require the use and disposal of massive volumes of water.

Environmental engineers should continue to be needed to help utilities and water treatment plants comply with any new federal or state environmental regulations, such as regulations regarding emissions from coal-fired power plants.

Earnings

The 2013 salary survey conducted by the American Society of Civil Engineers (ASCE) and American Society of Mechanical Engineers (ASME)[3], tabulated below, reveals that the total compensation for environmental engineers with different levels of experience are summarized below.

The May 2016 salary survey conducted by the U.S. Bureau of Labor Statistics[1] is shown on the last line of the table below. The statistics is based on 52,280 employment of all levels and experience in the environmental engineering profession.

Experience		Average	10th percentile	25th percentile	Median	75th percentile	90th percentile
2013 ASCE Salary Survey	0+ years	$50,999	$43,000	$47,250	$50,000	$56,000	$60,000
	1+ years	$49,270	$39,000	$42,000	$47,410	$58,000	$64,000
	3+ years	$57,854	$47,000	$52,000	$55,144	$64,000	$76,000
	4+ years	$68,216	$53,040	$61,000	$68,250	$75,000	$84,000
	8+ years	$90,417	$64,000	$73,320	$89,980	$102,000	$126,110
	10+ years	$107,615	$80,000	$89,925	$106,626	$123,000	$144,000
	15+ years	$128,429	$85,800	$107,000	$126,256	$150,000	$187,000
	25+ years	$145,236	$93,852	$105,000	$140,000	$176,800	$203,000
Bureau of Labor (2015)		$88,530	$49,830	$63,860	$84,890	$107,920	$130,120

[1] *Occupational Employment and Wages, 17-2081 Civil Engineers, May 2016*, Bureau of Labor Statistics, https://www.bls.gov/oes/current/oes172081.htm, (visited 1 August 2017)

[2] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Environmental Engineers, on the Internet at https://www.bls.gov/ooh/architecture-and-engineering/environmental-engineers.htm (visited *August 01, 2017*).

[3] *The Engineering Income and Salary Survey Standard Report*, the Engineering Income and Salary Survey Publishing Group in partnership with ASCE and ASME, 2013.

Student Organizations

The Department of Civil and Environmental Engineering is home to two student professional organizations. They are the **Northwestern University American Society of Civil Engineers** (NUASCE) Student Chapter and the **Northwestern Society of Environmental Engineers** (NSEE). CEE students also participated in other McCormick wide student organizations such as
Engineers for a Sustained World (http://esw.mccormick.northwestern.edu/),
Engineering World Health (http://ewh.mccormick.northwestern.edu/),
Global Architecture Brigades at Northwestern (http://www.empowered.org/Architecture-Brigades-at-Northwestern-University),
Global Water Brigades (https://sites.google.com/site/nuwaterbrigade/),
National Society of Black Engineers (https://northwestern.collegiatelink.net/organization/NSBE),
Society of Hispanic Professional Engineers (https://northwestern.collegiatelink.net/organization/shpe)
Society of Women Engineers (http://swe.mccormick.northwestern.edu/).

Northwestern University American Society of Civil Engineers

Founded in 1852, the American Society of Civil Engineers represents more than 140,000 members of the civil engineering profession worldwide and is America's oldest national engineering society. ASCE's mission is to provide essential value to our members and partners, advance civil engineering, and serve the public good.

The Mission of NUASCE is *to create a more informed and involved Civil Engineering community by providing opportunities to apply and further refine technical skills, increasing student and faculty interactions, and preparing students to enter the professional engineering industry.* Through NUASCE you will have the opportunity to meet other students with similar interests, network with professionals, and participate in exciting design competitions such as **concrete canoe** and **steel bridge**. Most importantly, the student chapter prides itself on creating a strong community of engineers, and they would love for you to join!!! For more information, visit their website: http://asce.mccormick.northwestern.edu.

Northwestern Society of Environmental Engineers

The Mission of NSEE is to bring community to the environmental engineering department, promote collaboration, assist in networking, and provide knowledge of potential career paths. Also by participating in competitions and projects focused on environmental sustainability they aim to give students the opportunity to put classroom skills to practical use. For more information, please contact Loren Ayala at LorenAyala2013@u.northwestern.edu or visit their website: http://enveus.mccormick.northwestern.edu

Internship and Career Development

Through the joint effort of NUASCE and NSEE (formerly EnvEUS), the inaugural **CEE Career Fair** was held in 2013. Since 2014, the Career Fair is organized by the CEE Department. CEE Career Fair focuses on firms that hire civil and environmental engineering graduates for full time engineering positions and for internships. The number of participating companies has gone from six in 2013 to over in 2016-2017 academic year. The Department expanded the Career Fair to have a Fall and Winter Career Fairs starting in the fall of 2016. **The Fall Career Fair is held in October while the Winter one is held in January**. Watch for the announcement of the event and call for registration and submission of resumes. The Department also maintains a web page http://www.mccormick.northwestern.edu/civil-environmental/career-opportunities/career-fair.html where internships and graduate engineer positions are posted when the information becomes available. We suggest you check the site periodically.

Starting in the fall of 2016, the Department organized a **Meet-N-Greet** event in conjunction with the fall career fair. This is an informal conversation with senior engineers, managers, and young alumni. They are happy to share their experience in the CEE profession. Even if you are not looking for a job, it would still be a great visit with these engineers.

McCormick Office of Career Development (MCD) http://www.mccormick.northwestern.edu/career-development/index.html provides career preparation and employment assistance through a variety of work-integrated learning programs including co-op engineering education, internships, research experience, and service learning. Register with McCormickConnect (http://www.mccormick.northwestern.edu/career-development/mccormickconnect.html) to receive information on job postings, resume submissions, interview schedules, career events, or meet with a MCD adviser. MCD is located in Ford Building Room 2.350.

Northwestern Career Advancement (NCA) (http://www.northwestern.edu/careers/) The mission of Northwestern Career Advancement is to foster excellence in career development, preparation, and professional opportunities for undergraduate and graduate students and alumni by providing comprehensive services and programming and by promoting strong partnerships with employers, academic departments, and the university community.

Scholarships

Students from the CEE Department have been successful in executing external scholarships in the past years. The scholarships ranged from $1000 to $7000 per year from Illinois Section ASCE, National ASCE, Tau Beta Pi, AISC, etc. Some students received fellowships, such as Barry Goldwater and Fulbright, for post-BS studies.

Professional organizations offer scholarships to civil and environmental engineering students annually. Deadline on each scholarship is different and is announcement throughout the year as information becomes available. Please check http://www.mccormick.northwestern.edu/civil-environmental/current-students/scholarships-fellowships-competitions.html periodically to see what is available.

Students are also encouraged to apply for national fellowships or scholarships for undergraduate and graduate students. Office of Fellowships http://www.northwestern.edu/fellowships/index.html is extremely helpful in assisting you with the application process. A partial listing of fellowships applicable to our students is listed below. For a complete list and detail information, please visit Office of Fellowships http://www.northwestern.edu/fellowships/fellowships/full-list/index.html.

- Abel Wolman Fellowship
- Alumnae of Northwestern University Graduate Fellowship*
- American Association Of University Women Fellowship*
- American Association of University Women Fellowship (International)
- American Concrete Institute Scholarships
- American Geological Institute Minority Participation Program
- American Institute of Steel Construction Scholarships & Fellowships*
- American Society of Civil Engineers Fellowship*
- American-Scandinavian Foundation Grants & Fellowships
- ARCS Foundation Scholarships
- Barry M. Goldwater Scholarship*
- Benjamin A. Gilman International Scholarship
- Camargo Foundation Fellowship
- Cambridge Junior Research Fellowship
- Dwight David Eisenhower Transportation Fellowship*
- Environmental Protection Agency Science To Achieve Results Fellowships
- Ford Foundation Diversity Fellowships
- Fulbright U.S. Student Program*
- Gates Cambridge Scholarship
- Gem Fellowships For Minorities in Engineering And Science*
- Humboldt Foundation Scholarships & Fellowships
- Institute for Health Metrics and Evaluation (IHME) Post Bachelor Fellowship
- Marshall Scholarship*
- Morris K. Udall Scholarship*
- Multidisciplinary Research Program of the University Research Initiative (MURI)
- NASA Graduate Student Researchers Program
- National Defense Science & Engineering Graduate Fellowship
- National Institute Of Health National Research Service Awards
- National Science Foundation Facilitation Awards For Scientists and Engineers With Disabilities
- National Science Foundation Fellowship*
- Rhodes Scholarship
- Truman Scholarship
- US-UK Fulbright Commission | UK Summer Institutes
- Winston Churchill Foundation Scholarship

Scholarships/Fellowships denoted by an * have been awarded to CEE students within the past 10 years.

Undergraduate Research

Faculty members in the CEE Department hire undergraduate research assistants to work on their research projects. Please contact the faculty members individually to learn about their research and assistantship opportunities.

Academic Advising

Faculty Advising

When entering McCormick School of Engineering and Applied Science (MEAS) as freshmen, the student is assigned to one of the five Freshmen Advisers in McCormick School. During the spring quarter of the freshmen year, this student is assigned a faculty adviser from his/her program of interest. This faculty member will stay with the student until s/he graduates or changes program.

When entering the Civil Engineering or Environmental Engineering program as a transfer, either from the McCormick School, other schools in the Universities, or other universities, the student is assigned a faculty adviser from the student's program area. This faculty adviser will stay with the student until s/he graduates or changes program.

Faculty advisers help students translate their interests into an appropriate course of study, evaluate their curriculum and workload, monitor their progress toward a degree, and help students take advantage of the diverse opportunities available at Northwestern. Students should consult with their faculty advisers when they have questions about the academic requirements of the university, MEAS, and the degree program. Faculty advisers evaluate each quarter's program and progress, approve social science/humanities theme form and petition requests. Faculty adviser's approval is required for course registration each quarter.

Students who wish to petition for an exception to the program requirements should discuss the matter first with their advisers, who must approve any petition before it can be considered. To be effective, a faculty adviser must be aware of a student's academic and personal goals.

Students must consult with their faculty advisers during the preregistration advising period to receive approval of their course selections for the following quarter. Students are responsible for staying in contact with their faculty advisers and ensuring that the advisers are aware of their goals and progress. Academic difficulties may be avoided if the adviser is able to recognize problems early. Students often form strong intellectual bonds with their faculty advisers, and this is more apt to happen if the student takes the initiative. Another benefit of developing a relationship with the faculty adviser (and faculty members in general) is that students may wish to ask the adviser for a letter of recommendation at some point in their career. Such letters are most useful when they come from people who know the student well enough to accurately assess his/her capabilities.

What to Expect from an Adviser

1. ***Curriculum Advice***. Students should use their advisers as resources for planning their academic program and identifying academic and career goals. The adviser will be able to explain degree program requirements, scheduling/registration procedures, and other academic regulations. A faculty adviser may refer a student to other faculty members or offices that are better able to serve the student's needs.
2. ***Assistance***. Advisers can help students explore special programs, such as cooperative education, internships, study abroad, dual-degree, certificate programs, and dual major programs. They may also be helpful in obtaining tutorial assistance or transfer/advanced placement credit, as appropriate. Students often ask their advisers to provide letters of recommendation for scholarships, study abroad, employment, or graduate school.
3. ***Career Development***. While it is not the function of advisers to help students find employment, they should be able to give broad advice on careers in engineering and science and the academic background necessary for such careers. Samples for such advices may include:

a. discuss professional opportunities for BSCE or BSEE graduates and the preparation and course of study needed to meet those positions,
b. remind the students to start searching for internship,
c. discuss the importance of summer internship for those who wish to practice upon graduation,
d. discuss the importance of participating in summer research such as Research Experience for Undergraduates (REU) for those who wish to pursue graduate studies,
e. discuss research opportunities available with CEE faculty during school year for undergraduate students,
f. discuss the availability of professional scholarships and fellowships (see pages 23 and 24),
g. discuss the general procedure in searching for post graduate employment and summer internship, and
h. provide information on post-graduate education and general requirements for admission to graduate programs.

A faculty adviser may refer a student to other faculty members or offices that are better able to serve the student's needs.

4. ***Availability***. Students should expect to have ready access to their advisers. Most advisers set aside several office hours each week and will usually make appointments outside those hours if necessary. Students are suggested to e-mail their advisers to schedule a meeting unless their open office hours are posted.
5. ***Personal Contact***. Students should expect to have personal relationships with their advisers, through which the advisers will become familiar with the students' backgrounds, academic records, and career plans.

What Not to Expect from an Adviser

1. ***Assessment of Effort Required for Specific Courses***. Advisers can determine the appropriateness of a given course in a student's program, but they cannot predict how difficult the course will be or how much effort it will require.
2. ***Help with Personal Problems***. Students should make their advisers aware of problems that interfere with academic progress, but advisers are not trained to provide counseling for personal problems, nor should they be expected to resolve housing or financial issues. However, they will refer students to the appropriate university office or program.
3. ***Job Search Assistance***. While students should be able to discuss career options with their advisers, it is not the adviser's responsibility to provide assistance beyond those presented in item 3 of "What to Expect from an Adviser" in a job search. Students should contact University Career Advancement http://www.northwestern.edu/careers/ or the McCormick Office of Career Development http://www.mccormick.northwestern.edu/mcd/index.html for help in finding employment. And **attend the Department of Civil and Environmental Engineering Career Fair in October and January** (see page 23).
4. ***Tutoring/Study Skills***. Advisers are often able to identify the need for tutoring, remedial course work, or improved study skills but should not be expected to provide the necessary assistance. Students in need of such assistance are generally referred to other resources, such as McCormick Tech Tutoring Program or the CEE Department's tutoring assistance in basic engineering courses.

Student Responsibilities in the Student-Adviser Relationship

1. ***Accept Referrals***. Students should be willing to accept referrals from their advisers and should review the results of such referrals with their advisers after the fact.
2. ***Initiate Contact***. Students are expected to initiate contact with their advisers for scheduling, course changes, and other matters in a timely fashion. Because of teaching commitments, research, and travel obligations, advisers may not be available on short notice. Students are urged to plan ahead and initiate contact with their advisers well in advance of specific deadlines.
3. ***Keep Advisers Informed***. Advisers can provide better advice if they are kept informed of their advisees' academic progress and career goals. Students should feel free to share this information with their advisers and can expect their advisers asking questions and providing appropriate guidance based on the dialogue.
4. ***Work to Develop Rapport***. The rapport necessary for good advising can occur only if both adviser and student make an active effort to develop it. Recognizing that individual advisers have their own styles and personalities, students should respond to the efforts of their advisers to get to know them and their academic interests.

Bachelor of Science in Civil Engineering (BSCE)

The Bachelor of Science in Civil Engineering program at Northwestern University is accredited by the Engineering Accreditation Commission of the ABET, Inc. (http://abet.org)

Program Educational Objectives

The Civil Engineering Program Educational Objectives (PEO) are:

1. Graduates employ their knowledge of science, mathematics, and engineering in civil and environmental engineering practice, research, and management as well as other professional fields such as law, medicine, and finance.
2. Graduates become leaders in organizations that focus on advanced problem solving for complex systems in multidisciplinary settings.
3. Graduates play key roles in the process of constructing and managing local and global civil and environmental engineering infrastructure systems.
4. Graduates are ethically engaged in a wide variety of organizations that require a diversity of thought, creativity, and curiosity to meet the challenges posed by a rapidly changing world.

Student Learning Outcomes

The student learning outcomes of the BSCE program at Northwestern University are the same as the outcomes (a) through (k) in the ABET accreditation criteria. These outcomes are:

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The student learning outcomes support the program educational objectives given above. The relationship of student outcomes to program educational objectives showing how the PEO are attained is given in Table CE.1 and posted on the department web site http://www.mccormick.northwestern.edu/civil-environmental/undergraduate/civil-engineering/abet-objectives-outcomes.html. In this Table, PEO A, *Graduates employ their knowledge of science, mathematics, and engineering in civil and environmental engineering practice, research, and management as well as other professional fields such as law, medicine, finance, and management*, is attained through outcomes (a), (b), (e) and (k). Similarly, PEO B is attained through outcomes (c), (d), (e), (g), (h), and (k); PEO C is attained through outcomes (d), (f), (g), (h), and (j); and PEO D is attained through outcomes (d), (f), (g), (h), (i), and (j).

Table CE.1 Mapping of BSCE Program Educational Objectives and Student Learning Outcomes

BSCE Program Educational Objectives	BSCE Student Learning Outcomes
A. Graduates employ their knowledge of science, mathematics, and engineering in civil and environmental engineering practice, research, and management as well as other professional fields such as law, medicine, and finance.	(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. (e) Ability to identify, formulate, and solve engineering problems. (k) Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
B. Graduates become leaders in organizations that focus on advanced problem solving for complex systems in multidisciplinary settings.	(c) Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. (d) Ability to function on multidisciplinary teams. (e) Ability to identify, formulate, and solve engineering problems (g) Ability to communicate effectively. (h) Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. (k) Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
C. Graduates play key roles in the process of constructing and managing local and global civil and environmental infrastructure systems	(d) Ability to function on multidisciplinary teams. (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, economic, environmental and societal context. (j) Knowledge of contemporary issues.
D. Graduates are ethically engaged in a wide variety of organizations that require a diversity of thought, creativity, and curiosity to meet the challenges posed by a rapidly changing world.	(d) Ability to function on multidisciplinary teams. (f) An 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, economic, environmental and societal context. (i) Recognition of the need for, and an ability to engage in lifelong learning. (j) A knowledge of contemporary issues

Program Requirements

The minimum number of units required for the BSCE degree is 48 units. Among them are:

McCormick core course (32 units)

- Mathematics (4 units)
- Engineering Analysis and Computer Proficiency (4 units)
- Design and Communications (3 units)
- Basic Engineering (5 units)
- Basic Sciences (4 units)
- Social Sciences and Humanities (7 units)
- Unrestricted Electives (5 units)

Civil Engineering Major (16 units)

- Civil Engineering Core Courses (7 units)
- Mathematical Techniques and Science (2 units)
- Design and Synthesis (2 units)
- Technical Electives (5 units)
- Professional Development (0.34 unit)

The 48 units of courses must also meet the following criteria:

1. A ***minimum of 18 units of "Engineering Topics" (ET) and a minimum of 12 units of "Math/ Science" (MTS) from the 48 units are required for the BSCE degree***. Note that NOT every course from every department in McCormick is classified as an engineering topic. Please consult with your adviser and McCormick partition list[1] for ET and MTS partitioning of courses offered by McCormick.
2. The cumulative GPA of the 16 units of Civil Engineering major courses must be 2.00 or higher.
3. NO P/N option course is permitted among the 16 units of Civil Engineering major courses. GEN_ENG 220-1,2 which has only a P/N optional is exempted from this requirement. Courses taken abroad for a grade, but recorded by the Northwestern University Registrar as P/N, may be exempted from this requirement.
4. A maximum of two (2) courses among the 16 Civil Engineering major courses may have a grade of D.
5. The only courses in the BSCE degree requirements that are eligible for P/N option are the seven (7) social science/humanities and five (5) unrestricted elective courses. Only four (4) 100- or 200-level courses may be taken P/N to satisfy the 7-unit requirement in the social science/humanities. Courses taken abroad for a grade, but recorded by the Northwestern University Registrar as P/N, may be exempted from this requirement.
6. A maximum of eight (8) P/N option units are permitted among 48 units required in satisfying the graduation requirement.
7. Only 1 unit per quarter may be taken P/N during freshman and sophomore years.
8. A GPA of NO less than 2.0 is required for all units presented for the BSCE degree.
9. The partial units from CHEM and Physics lab and professional development may be applied to unrestricted elective.

Detailed Program Requirements

[1] McCormick partition list is available on the web, http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php. These partitions are valid only for the academic year the course is taken.

A. McCormick School Core Courses (32 Units)

The McCormick School (MEAS) Core Courses has 7 subgroups: *Basic Sciences* (4 units), *Engineering Analysis* (4 units), *Mathematics and Sciences* (4 units), *Design and Communications* (3 units), *Basic Engineering* (5 units), *Social Sciences/Humanities* (7 units), and *unrestricted electives* (5 units). **Bold face courses represent required courses**.

1. Basic Sciences (4 units)

- **i. CHEM 131, 151, or 171 – General Chemistry**
- **ii. PHYSICS 135-2 – General Physics 2**
- iii. choose one course from Biological Sciences or Earth and Planetary Sciences
  - a. BIOL_SCI 215 – Genetics and Molecular Biology
  - b. BIOL_SCI 217 – Physiology
  - c. BIOL_SCI 219 – Cell biology
  - d. EARTH 201 – Earth Systems Revealed
  - e. EARTH 202 – Earth's Interior
- iv. Chemistry, Physics, Biological Sciences, or EARTH 201 or 202 listed in this group (see *Undergraduate Catalog 2017-18*)

Notes:

(1) CHEM 131, 151, and 171 have a companion lab CHEM 132, 152, and 181, respectively.

(2) If no placement in Chemistry, CHEM 110 must be taken prior to CHEM 131. Only CHEM 131 is used to meet the basic sciences requirement. CHEM 110 may use to meet the unrestricted elective.

(3) PHYSICS 135-2 has a companion lab PHYSICS 136-2.

(4) Each of the BIOL_SCI 215, 217, and 219 has a companion lab (BIOL_SCI 220 for 215, and 221 for 219) that carries 0.34 units each. The companion labs are not required to meet this 4th unit of Basic Science requirement for BSCE.

(5) 300 level and above Earth and Planetary Science courses may be petitioned to meet the non-chemistry/physics basic science requirement if the faculty teaching or the department offering the course would confirm, in writing, the course is a science course.

2. *Engineering Analysis (4 units)*

- **i. GEN_ENG 205-1 – Engineering Analysis I (introduction to linear algebra and Matlab)**
- **ii. GEN_ENG 205-2 – Engineering Analysis II (introduction to vector mechanics, statics, dynamics, mechanics of materials)**
- **iii. GEN_ENG 205-3 – Engineering Analysis III (dynamics behavior of the elements)**
- **iv. GEN_ENG 205-4 – Engineering Analysis IV (solution methods for ordinary differential equations)**

Note: GEN_ENG 206-1,2,3,4 may replace GEN_ENG 205-1,2,3,4.

3. *Mathematics (4 units)*

- **i. MATH 220 – Differential Calculus of One-Variable Functions**
- **ii. MATH 224 – Integral Calculus of One-Variable Functions**
- **iii. MATH 230 – Differential Calculus of Multivariable Functions**
- **iv. MATH 234 – Multiple Integration and Vector Calculus**

4. ***Design and Communications (3 units)***
    - **i. DSGN 106-1,2 (0.5 unit each) – Design Thinking and Communication**
    - **ii. ENG 106-1,2 (0.5 unit each) – Writing in Special Contexts, must be taken concurrently with DSGN 106-1,2.**
    - iii. choose one from:
        a. COMM ST 102 – Public Speaking
        b. PERF ST 103 – Analysis and Performance of Literature
        c. PERF ST 203 – Performance, Culture, and Communication

5. ***Basic Engineering (5 units)***
    - i. *Electrical Science (1 unit)* – choose one from below
        a. MECH_ENG 233 – Electronics Design (*offer fall quarter only*)
        b. EECS 202 – Introduction to Electrical Engineering
        c. EECS 270 – Applications of Electronics and Devices (*offer infrequently*)
    - *ii. Fluids and Solids (2 units)*
        a. CIV_ENV 216 – Mechanics of Materials I
        b. MECH_ENG 241 – Fluid Mechanics I (offered spring quarter only)
    - iii. *Thermodynamics (1 unit)* – choose one from below
        a. MECH_ENG 222 – Thermodynamics & Statistical Mechanics I (*offer winter quarter only*)
        b. BMD_ENG 250 – Thermodynamics (*offer winter quarter only*)
        c. CHEM_ENG 211 – Thermodynamics (*offer fall and winter quarters*)
    - iv. Choose one course from the areas of *material science and engineering*, *system engineering and analysis*, *computer architecture and numerical methods*, and *computer programming* (1 unit)
        a. CivEnv 205 – Economics and Finance for Engineers (***Recommended***) (*offer fall and spring quarters*)
        b. MAT_SCI 201 – Introduction to Materials
        c. MAT_SCI 301 – Materials Science Principles
        d. CHEM_ENG 210 – Analysis of Chemical Process Systems
        e. CIV_ENV 304 – Civil and Environmental Engineering System Analysis (0.5 unit ET, 0.5 unit MTS) (*offer spring quarter only*)
        f. IEMS 310 – Operations Research
        g. IEMS 313 – Deterministic Models and Optimization
        h. EECS 203 – Introduction to Computer Engineering
        i. EECS 205 – Fundamentals of Computer System Software
        j. EECS 328 – Numerical Methods for Engineers
        k. ES_APPM – 346 – Modeling and Computation in Science and Engineering (0.8 unit MTS, 0.2 unit ET)
        l. EECS 211 – Object-Oriented Programming in C++
        m. EECS 317 – Data Management and Information Processing
        n. EECS 230 – Programming for Computer Engineers
        o. EECS 231 – Advanced Programming for Computer Engineers

6. ***Social Science and Humanities (7 units)***

Seven courses are required to satisfy the requirements of this subgroup. The seven courses must meet the following criteria.

- Maximum of 5 units from either social science or humanities category
- At least 3 units must be thematically related
- No more than 3 units of 100-level courses
- AP credits allowed

Foreign language study can be incorporated into the program, but should be started as early as possible, preferably in the freshman year.

Courses taken for a student's Social Science/Humanities requirement must be approved in advance by the McCormick Humanities Panel. Complete requirement information is at the McCormick Undergraduate Engineering Office web site, http://www.mccormick.northwestern.edu/students/undergraduate/social-science-humanities-theme/index.html. You must submit your theme form via McCormick Advising System (MAS). A sample of the screen shot is provided on page 63.

7. ***Unrestricted Electives (5 units)***

Unrestricted electives allow the students to take any course offered for credit by any school in the University so long as they have the prerequisites for it. Civil Engineering students have five unrestricted electives as part of the McCormick School Core Courses. Many students use these units to broaden their education by concentrating them in a particular areas (such as economics or a foreign language or music), while others take additional technical electives in their major or related fields.

B. Civil Engineering Major (16 Units)

Additional 16 units beyond the McCormick Core Courses are required for the Civil Engineering major. The units are distributed among four categories: *core courses* (7 units), *mathematical techniques and science* (2 units), *design and synthesis* (2 units), and *technical electives* (5 units). No P/N grade option is permitted among these 16 courses. Maximum of one CIV_ENV 399 course is permitted among these 16 courses.

1. ***Civil Engineering Core Courses (7units)***

The Civil Engineering core courses provide the students with the fundamentals in at least four major areas in civil engineering: environmental, geotechnical, structural, and transportation engineering; and in construction management. The list of core courses is:

i. **CIV ENV 221 – Theory of Structures I**
ii. **CIV ENV 250 – Soil Mechanics**
iii. **CIV ENV 260 – Fundamental of Environmental Engineering**
iv. **CIV ENV 325 – Reinforced Concrete Design**
v. **CIV ENV 330 – Construction Management**
vi. **CIV ENV 340 – Fluid Mechanics II**
vii. choose one of the following,
   a. CIV ENV 371 – Transportation Planning and Analysis
   b. CIV ENV 376 - Transportation System Operations

In compliance with ABET accreditation criteria, the following courses must be taken in sequence: 205-2→216→221→325; 205-2→ME 241→250; ME 241→340; and **(221, 250, 260, 325, 330, 371/376, co-req. 340) → 382**

2. ***Mathematical Techniques and Science (2 units)***
   - **i. CIV ENV 306 – Uncertainty Analysis in Civil Engineering (0.5 unit MTS, 0.5 unit ET)**
   - ii. One course may be from the list below, *no 399 course is allowed*.
     a. CIV ENV 304 – Civil and Environmental Engineering System Analysis (0.5 unit ET, 0.5 unit MTS)
     b. Any course 300 level or above from the Mathematics Department.
     c. Any course 200 level or above in Biological Sciences, Chemistry, Geological Sciences (Earth and Planetary Science), or Physics; plus CHEM 132, 152, 172 or PHYSICS 135-3
     d. Any course 300 level or above from Engineering Sciences and Applied Mathematics (ES APPM)

3. ***Design and Synthesis (2 units)***

   The design and synthesis elective is intended to provide the students with design experience beyond the core courses. *Note: You must meet pre-requisite requirements to be in compliance with ABET accreditation criteria.*
   - **i. CIV ENV 382 – Capstone Design (pre-req. 221, 250, 260, 325, 330, 371/376, co-req. 340)**
   - ii. choose one from,
     a. CIV ENV 323 – Structural Steel Design (pre-req. 221, *offer spring quarter even year*)
     b. CIV ENV 336 – Project Scheduling (pre-req. 330)
     c. CIV ENV 352 – Foundation Engineering (pre-req. 250, *offer winter quarter odd year*)
     d. CIV ENV 395 – Special Topics (must be design class)
     e. CIV ENV 399 – Projects (must be design project approved by ABET Coordinator, *one 399 is allowed*)

   ***Note**: Design project – for a course to meet the intent of design synthesis and ABET's interpretation of design, the deliverable must be a detailed description of a process or a product to achieve a client's (community's) goal that meets local, regional, or national standards/codes/regulations. The design must require knowledge acquired from several areas of the Civil Engineering core courses. In Civil Engineering, a design project, when done in the real world, is one that would require a registered Professional Engineer's signature.*

4. ***Technical Electives (5 units)***

   Technical electives provide the students the opportunity to focus on a specialty area within civil engineering or to combine engineering with management or other fields. While the choices for technical electives are broad, there are still some restrictions. Selection of technical electives must meet the following:
   - i. A minimum of 18 units of "Engineering Topics" from the 48 units is required for the BSCE degree. Note that NOT every course from every department in McCormick is classified as an engineering topic. Student should consult his/her adviser on courses classified as engineering topics. The course partitioning among mathematics and basic science, engineering topics, and general education for all the courses offered in McCormick School is available at http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php. These partitions are valid only for the academic year the course is taken.

ii. Must select from an approved list of courses (see page 38 and http://www.mccormick.northwestern.edu/civil-environmental/current-students/forms-documents.html), and that 18 units of Engineering Topics are met.

iii. A comprehensive list of "Suggested electives for BSCE Specialty Concentration for Jr/Sr 2017-2018", is provided in Table CE.2 and can be downloaded from the Department web site, http://cee.northwestern.edu/undergraduate/civil_engineering/civil_curriculum.html

iv. CIV ENV 395, 398, 399 may be acceptable through petition. Only 1 unit of 399 may be used to meet the 16 units of Civil Engineering major. For students completing the honor thesis where 2 units of 399 is required, only one (1) unit is used to meet the 16 units of Civil Engineering major. The second unit of 399 may be applied to unrestricted elective. A 399 project application form is required in order to receive a registration permission number.

v. GEN ENG 220-1, 2 (a total of 1 credit) **or** DSGN 245/246 (a total of 1 credit) may be applied to one of five TE courses.

5. Professional Development (0.34 unit)

CIV ENV 301-1 – Professional Development Seminar I

The 0.34 unit may be applied to unrestrictive electives.

6. Summer Internship Preparation – Freshmen & Sophomores

All freshmen and sophomores are **highly** recommended to take CivEnv 195 (Introduction to Civil and Environmental Engineering), a zero-credit course and Gen_Eng 220-1, 2 for a total of 1 course unit. **The courses introduce the civil and environmental engineering professions and skills necessary for students to attain an engineering summer internship as early as the summer after the freshmen year.** *All students are encouraged to attend the Department Career Fair in October and January and to chat with engineers and young alumni at Meet-N-Greet, part of the Fall Career Fair program***.**

7. Professional Licensure (Registration)

All seniors are encouraged and **highly** recommended to take CIV_ENV 301-2 – Professional Development Seminar II. This is a no credit, no tuition course series on the review for Fundamental of Engineering (FE) Exam, first step in obtaining Profession Engineer (PE) registration.

C. Tables, Charts, and Forms for BSCE

The Department has developed a number of tables, charts, and forms that you may need or find them useful in helping you plan and keep track of your course of studies. Some are also available on the CEE website, http://www.mccormick.northwestern.edu/civil-environmental/current-students/forms-documents.html. These tables, charts, and forms are:

Table CE.2 – Sample BSCE Curriculum Flow Chart (*available online*)

Table CE.3 – Approved BSCE Technical Electives (*available online*)

Table CE.4 – Suggested Electives for BSCE Specialty Areas 2017-2018 (*available in the online UG Handbook*)

4a Architectural Engineering and Design

4b Construction Management

4c Environmental Engineering

4d Geotechnical Engineering
4e Structural Engineering
4f Transportation Analysis and Planning

Table CE.5 – Summary of MTS and ET Topics Units in BSCE (*available in the online UG Handbook*)

Table CE.2 shows a flow chart for a typical BSCE curriculum by quarters. This flow chart, also displays the pre-requisite requirements, is intended to be a guide for program planning. Almost all of the students entering Northwestern University have earned Advanced Placement (AP) credits. Many students also interested in pursuing a dual major, minor, certificate program, etc. Each student's program flow chart is likely to be different.

Table CE.3 shows an approved list of technical electives. Courses not appeared on the list but meet the general guidelines listed here *may be* accepted by petition. Generally, acceptable technical electives are any course, 300 level or above in Engineering, Biological Science, Chemistry, Geological Science (EARTH courses), Physics, Mathematics (including ES_APPM), or other areas supporting the student's field of specialty (in civil engineering) such as Economics (for transportation area).

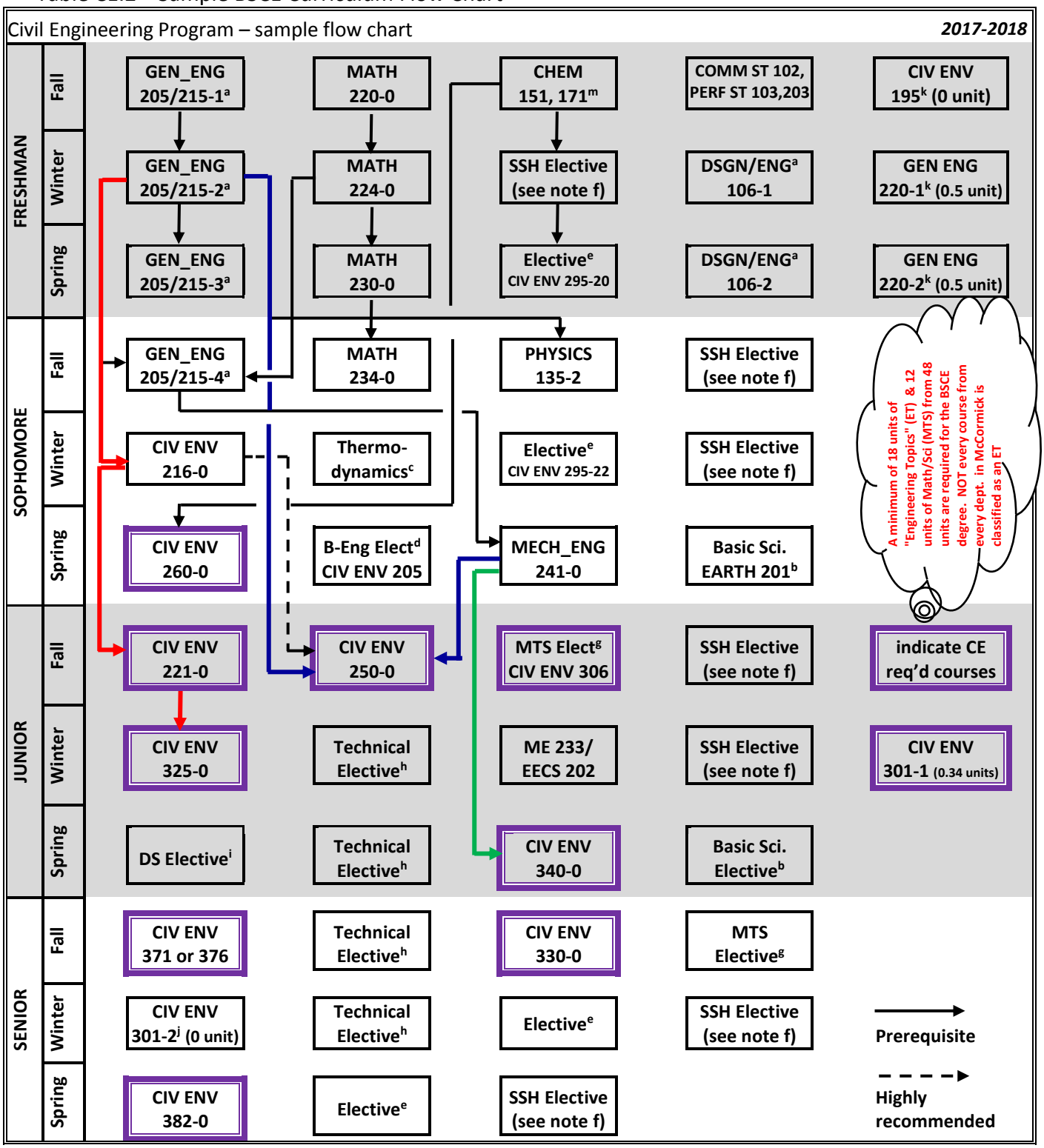
Table CE.4 lists the suggested technical electives courses, currently available, grouped by specialty area to help the students select the courses that match their interest. Students interested is pursuing interest in research, projects not available in courses offered by the department, McCormick School, or the University may register for CIV_ENV 399 – Project Application for an Independent Study. This independent study course carries one course unit and can be used to meet the technical elective requirement or design synthesis if there is sufficient design content. Students interested in registering for CIV_ENV 399 **must** submit a petition form, available at the end of this handbook and online, **signed by both the project adviser and the ABET coordinator**.

In order to be in compliance with ABET accreditation requirements that any ABET accredited engineering program must consist of a minimum of 12 units of math/science (MTS) and 18 units of engineering topics (ET), Table CE.5, also available at the end of this handbook, shows a summary of MTS and ET unit distribution of all the required and elective courses in your program that consist of any of the MTS and ET distribution. The MTS and ET distribution of all courses offered in McCormick can be found on the McCormick web site http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php. **These partitions are valid only for the academic year the course is taken. It is recommended you keep a record of ET/MTS distribution of the elective courses you look up at the McCormick web site.**

D. McCormick Advising System (MAS https://mas.mccormick.northwestern.edu/)

The McCormick's Advising System allows you 24/7 access to monitor your academic information, comments your adviser writes during your advising session, and your progress in meeting your degree requirements. Please keep in mind that MAS is a monitoring system, not your electronic adviser. Please visit with your adviser for academic, professional, and some personal consultation.

Table CE.2 Sample BSCE Curriculum Flow Chart



Please see notes on the page followed.

Table CE.2 (*continued*) Sample BSCE Curriculum Flow Chart

Notes for the sample curriculum flowchart:

a. Must register both courses concurrently.
b. At least ONE MUST from BIO SCI or EARTH 201, 202; the other can be any course except ASTRON and EARTH 203 listed in Basic Sciences.
c. May choose among MECH_ENG 222 (*offers in winter quarter only*), BMD_ENG 250 (*offers in winter quarter only*), and CHEM_ENG 211 (*offers in winter and spring quarters only*).
d. CivEnv 205 recommended or choose from *material science and engineering*, *system engineering and analysis*, *computer architecture and numerical methods*, and *computer programming.*
e. May choose from any course offered for credit by the University. CivEnv 295-20, 21, 22 (*offers in spring, fall, and winter quarters, respectively*) recommended
f. Courses must be selected to meet the Social Science-Humanities theme requirement.
g. Choose courses from the approved list. One must be CivEnv 306 (50% MTS), plus 1 (must have at least 50% MTS) from (i) 300-level and above in MATH or ES_APPM; (ii) CIV_ENV 304 (0.5 MTS); (iii) 200-level or above in Biological Science, Chemistry, or Physics plus CHEM 132, 152, 172 or PHYSICS 135-3, or appropriate EARTH courses except EARTH 203. No 399 is allowed.
h. MUST choose from an APPROVED list. A ***minimum of 12 units of Math/Science and 18 units of Engineering Topics (ET) from the 48 units are required for BSCE***. Consult with your academic adviser and the partitioning table at http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php
i. Choose from Civ_Env 323, 336, 352, 395 (must be design class), 399 (must be design project approved by ABET Coordinator)
j. Fundamental of Engineering Exam Review –highly recommended for seniors.
k. ***CivEnv 195 and Gen_Eng 220-1,2 are HIGHLY recommended for freshmen and sophomores. Skills acquired from these courses are necessary for summer internship in civil and environmental engineering profession.***
m. If no placement in Chemistry, then take CHEM 110 &131 sequence.

In compliance with ABET criteria, the following courses must be taken in sequence: **205-2→216→221→325** (red path in the flow chart); **205-2→ME 241→250** (blue path in the flow chart); **ME 241→340** (green path in the flow chart); and **(221, 250, 260, 325, 330, 371/376, co-req. 340) → 382**

Table CE.3 Approved BSCE Technical Electives

Course No.	Course Title	Prerequisites	Quarter Offered	Units		
				Design	MTS	ET
CivEnv 302	Engineering Law	Jr/sr	Sp	0.25		1.0
CivEnv 304	Civil & Environ Engrg Systems Analysis	MATH 224	Sp	0	0.5	0.5
CivEnv 306	Uncertainty analysis in Civil Engineering	MATH 230	F	0	0.5	0.5
CivEnv 319	Theory of Structures II	CivEnv 221	W			1.0
CivEnv 320	Structural Analysis – Dynamics	CivEnv 221	F	0.5		1.0
CivEnv 321	Properties of Concrete		W			1.0
CivEnv 323	Structural Steel Design	CivEnv 216, 221	Sp (E)	1.0		1.0
CivEnv 327	Finite Element Methods in Mechanics	CivEnv 216	F	0.125		1.0
CivEnv 332	Building Construction Estimating	CivEnv 330	Sp	0.25		1.0
CivEnv 336	Project Scheduling	CivEnv 330	W	1.0		1.0
CivEnv 346	Meteorology and Hydrology	ME 241				1.0
CivEnv 349	Environmental Management	Sr standing				1.0
CivEnv 352	Foundation Engineering	CivEnv 250	W(O)	1.0		1.0
CivEnv 355	Engineering Aspects of Groundwater Flow	ME 241	F			1.0
CivEnv 361-1	Environmental Microbiology					1.0
CivEnv 361-2	Public and Environmental Health	CivEnv 361-1				1.0
CivEnv 363	Environ Engrg Applications I: Air & Land	Jr standing	F	0.5		1.0
CivEnv 364	Environ Engineering Applications II: Water	CivEnv 260, ME 241, CivEnv 340 recomm	W	0.5		1.0
CivEnv 365	Environmental Laboratory	CivEnv 367		0.125		1.0
CivEnv 367	Aquatic Chemistry	BMD Eng 250		0.125		1.0
CivEnv 368	Sustainability: The City		F			1.0
CivEnv 370	Environmental Organic Chemistry	CHEM 210-1				1.0
CivEnv 371	Intro to Transp Planning & Analysis	Jr standing	F			1.0
CivEnv 376	Transportation System Operations	Calculus, Statistics	F	0		1.0
CivEnv 385-1	AE&D I: Fundamentals of Design	Jr in engineering	F			1.0
CivEnv 385-2	AE&D II: Intermediate Studio	CivEnv 385-1	W			1.0
CivEnv 385-3	AE&D III: Advanced Studio	CivEnv 385-2	Sp			1.0
CivEnv 395	Special Topics in Civil Engineering	varies	F,W,Sp	varies		1.0
CivEnv 398-1,2	Community-Based Design	jr/sr BSEE or BSCE	F,W,Sp	1.0, 1.0		1.0
CivEnv 399	Projects	approved by ABET coord.	F,W,Sp	varies		1.0
CivEnv 400-level except 499 if permitted by instructors, permission number required				varies		1.0
ES APPM 311-1,2	Methods of Applied Mathematics	GenEng 205-4			0.9	0.1
ES APPM 311-3	Methods of Applied Mathematics	GenEng 205-4			1.0	0
ES APPM 322	Applied Dynamical System	EA APPM 311-1,2				
ES APPM 346	Modeling and Computation in Science and Engineering	AMTH 234, 240, GenEng 205-4, PHYSICS 135-1,2			0.8	0.2
ES APPM 370	Introduction to Computational Neuroscience					
EARTH 320	Global Tectonics	EARTH 202, PHYSICS 135-2			1.0	
EARTH 323	Seismology and Earth Structure	EARTH 202, MATH 250, PHYSICS 135-2			1.0	
EARTH 324	Earthquakes and Tectonics	EARTH 202, MATH 250, PHYSICS 135-2			1.0	
EARTH 328	Tectonics and Structural Geology	EARTH 201, MATH 240, PHYSICS 135-1				
EARTH 330	Sedimentary Geology	EARTH 201				
ECON 310-1	Microeconomics I	ECON 201, 202, MATH 220		0	0	0
ECON 354	Issues in Urban and Regional Economics	ECON 281, 310-1,2		0	0	0

Table CE.3 Approved BSCE Technical Electives (*continued*)

Course No.	Course Title	Prerequisites	Quarter Offered	Units		
				Design	MTS	ET
ECON 355	Transportation Economics and Public Policy	ECON 281, 310-1,2		0	0	0
ECON 381-1	Econometrics I	STAT 210, ECON 310-1, 311		0	0	0
ECON 381-2	Econometrics II	ECON 381-1		0	0	0
GEN ENG 220-1,2 **or** DSGN 245/246	Analytic and Computer Graphics Intro to Computer Aided Design					1.0
IEMS 304	Statistical Methods for Data Mining	IEMS 303		0		1.0
IEMS 305	Statistical Methods for Quality Improvement	IEMS 201, 303				1.0
IEMS 306	Decision Analysis	IEMS 202				1.0
IEMS 307	Quality Improvement by Experimental Design	IEMS 201, 303				1.0
IEMS 313	Deterministic Models and Optimization	GenEng 205-1, MATH 230				1.0
IEMS 315	Stochastic Models and Simulation	IEMS 202, GenEng 205-1, co-req. IEMS 303				1.0
MAT SCI 316-1,2	Microstructural Dynamics	MAT SCI 315				1.0
MAT SCI 318	Materials Selection	MAT SCI 201				1.0
MAT SCI 332	Mechanical Behavior of Solids	MAT SCI 316-1,2				1.0
MATH 310-1,2,3	Probability and Stochastic Processes	MATH 234; 240			1.0	
MATH 314	Probability and Statistics for Econometrics	MATH 234			1.0	
MATH 325	Complex Analysis	MATH 234, 240			1.0	
MATH 336-1,2	Introduction to the Theory of Numbers	MATH 234; MATH 336-1			1.0	
MATH 342	Introduction to Differential Geometry	MATH 234, 240			1.0	
MATH 351	Fourier Analysis and Boundary Value Problems	MATH 250			1.0	
MECH ENG 314	Theory of Machines – Dynamics	ME 202				1.0
MECH ENG 315	Theory of Machines – Design of Elements	MAT SCI 201, CivEnv 216				1.0
MECH ENG 316	Mechanical Systems Design	ME 315				1.0
MECH ENG 317	Molecular Modeling and the Interface to Micromechanics					1.0
MECH ENG 341	Computational Methods for Engineering Design	senior standing				1.0
MECH ENG 358	Experimental Engineering II					1.0
MECH ENG 359	Reliability Engineering	GenENg 205-4				1.0
MECH ENG 360	Mechanics of Sports					1.0
MECH ENG 316	Mechanical vibration	ME 202, GenEng 205-4				1.0
MECH ENG 373	Engineering Fluid Mechanics	ME 222, 241				1.0

NOTE: F = fall quarter, W = winter quarter, Sp = spring quarter; O = odd year, E = even year
All CivEnv 400 level courses requires instructor permission AND permission number from CEE office.
All 399 courses require submission of a course proposal and approval from ABET Coordinator.

IMPORTANT NOTICE: A minimum of 18 units of "Engineering Topics" from the 48 units is required for the BSCE degree. NOT every course from every department in McCormick is classified as an engineering topic. Before registering please consult with your adviser and http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php **for course partitioning of math/science and engineering topics.**

Suggested Technical Electives for BSCE by Concentration

Table CE.4a Suggested Electives for BSCE Architectural Engineering Concentration 2017-2018

Course No.	Course Title	Prerequisites	Quarter	Design Units
CivEnv 304	Civil & Environ Engrg Systems Analysis	MATH 224	Sp	0
CivEnv 306	Uncertainty analysis in Civil Engineering	MATH 230	F	0
CivEnv 385-1	AE&D I: Fundamentals of Design	Co-req CivEnv 221	F	
CivEnv 385-2	AE&D II: Intermediate Studio	Co-req CivEnv 325	W	
CivEnv 385-3	AE&D III: Advanced Studio	Co-req CivEnv 325	Sp	
CivEnv 323	Structural Steel Design	CivEnv 221	Sp	1.0
CivEnv 352	Foundation Engineering	CivEnv 250	W(O)	1.0
CivEnv 395	Special Topics in Civil Engineering	varies	F,W,Sp	varies
CivEnv 398-1,2	Community-Based Design	jr/sr BSEE or BSCE	F,W,Sp	1.0, 1.0
CivEnv 399	Projects	approved by ABET coord.	F,W,Sp	varies

NOTE: F = fall quarter, W = winter quarter, Sp = spring quarter; O = odd year, E = even year
All CivEnv 400 level courses requires instructor permission AND permission number from CEE office.
All 399 courses require submission of a course proposal and approval from ABET Coordinator.

IMPORTANT NOTICE: A minimum of 18 units of "Engineering Topics" from the 48 units is required for the BSCE degree. NOT every course from every department in McCormick is classified as an engineering topic. Before registering please consult with your adviser and http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php **for course partitioning of math/science and engineering topics.**

Table CE.4b Suggested Electives for BSCE Construction Management Concentration 2017-2018

Course No.	Course Title	Prerequisites	Quarter	Design Units
CivEnv 304	Civil & Environ Engrg Systems Analysis	MATH 224	Sp	0
CivEnv 306	Uncertainty analysis in Civil Engineering	MATH 230	F	0
CivEnv 320	Structural Analysis – Dynamics	CivEnv 221	F	0.5
CivEnv 323	Structural Steel Design	CivEnv 221	Sp	1.0
CivEnv 332	Construction Estimating	CivEnv 330	Sp	0.25
CivEnv 336	Project Scheduling	CivEnv 330	W	1.0
CivEnv 352	Foundation Engineering	CivEnv 250	W(O)	1.0
CivEnv 395	Special Topics in Civil Engineering	varies	F,W,Sp	varies
CivEnv 399	Projects	approved by ABET coord.	F,W,Sp	varies
CivEnv 421	Prestressed Concrete	CivEnv 325		1.0
CivEnv 451	Engineering Properties of Soils	CivEnv 250, or inst per		0.5

NOTE: F = fall quarter, W = winter quarter, Sp = spring quarter; O = odd year, E = even year;
All CivEnv 400 level courses requires instructor permission AND permission number from CEE office.
All 399 courses require submission of a course proposal and approval from ABET Coordinator.

IMPORTANT NOTICE: A minimum of 18 units of "Engineering Topics" from the 48 units is required for the BSCE degree. NOT every course from every department in McCormick is classified as an engineering topic. Before registering please consult with your adviser and http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php **for course partitioning of math/science and engineering topics.**

Table CE.4c Suggested Electives for BSCE Environmental Engineering Concentration 2017-2018

Course No.	Course Title	Prerequisites	Quarter	Design Units
CivEnv 302	Engineering Law	Jr/sr	Sp	0.25
CivEnv 304	Civil & Environ Engrg Systems Analysis	MATH 224	Sp	0
CivEnv 306	Uncertainty analysis in Civil Engineering	MATH 230	F	0
CivEnv 323	Structural Steel Design	CivEnv 221	Sp	1.0
CivEnv 361-1	Environmental Microbiology			
CivEnv 361-2	Public and Environmental Health	CivEnv 361-1		
CivEnv 363	Environ Engineering Applications I: Air & Land	Jr		0.5
CivEnv 364	Environ Engineering Applications II: Water	MECH_ENG 241, CivEnv 340 recomm		0.5
CivEnv 365	Environmental Laboratory	jr		0.125
CivEnv 367	Aquatic Chemistry	CHEM 103 or inst. per		0.125
CivEnv 368	Sustainability: The City			
CivEnv 370	Environmental Organic Chemistry	CHEM 210-1 or inst. per		
CivEnv 395	Special Topics in Civil Engineering	varies	F,W,Sp	varies
CivEnv 398-1,2	Community-Based Design	jr/sr BSEE or BSCE	F,W,Sp	1.0, 1.0
CivEnv 399	Projects	approved by ABET coord.	F,W,Sp	varies
CivEnv 440	Environmental Transport Processes	PHYS 135-2; MECH_ENG 241 or equiv		0.25
CivEnv 441	Methods of Microbial Complexity	CivEnv 367		0.125
CivEnv 444	Physical/Chemical Processes in Environmental Control	CivEnv 367, CivEnv 440 or equiv, or inst per		

NOTE: F = fall quarter, W = winter quarter, Sp = spring quarter; O = odd year, E = even year
All CivEnv 400 level courses requires instructor permission AND permission number from CEE office.
All 399 courses require submission of a course proposal and approval from ABET Coordinator.

IMPORTANT NOTICE: A minimum of 18 units of "Engineering Topics" from the 48 units is required for the BSCE degree. NOT every course from every department in McCormick is classified as an engineering topic. Before registering please consult with your adviser and http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php **for course partitioning of math/science and engineering topics.**

Table CE.4d Suggested Electives for BSCE Geotechnical Engineering Concentration 2017-2018

Course No.	Course Title	Prerequisites	Quarter	Design Units
CivEnv 302	Engineering Law	Jr/sr	Sp	0.25
CivEnv 304	Civil & Environ Engrg Systems Analysis	MATH 224	Sp	0
CivEnv 306	Uncertainty analysis in Civil Engineering	MATH 230	F	0
CivEnv 323	Structural Steel Design	CivEnv 221	Sp	1.0
CivEnv 327	Finite Element Methods in Mechanics	MECH_ENG 262, MATH 215 or CivEnv 216	F	0.125
CivEnv 332	Construction Estimating	CivEnv 330 & inst per	Sp	0.25
CivEnv 336	Project Scheduling	CivEnv 330 or inst per	W	1.0
CivEnv 352	Foundation Engineering	CivEnv 250	W(O)	1.0
CivEnv 395	Special Topics in Civil Engineering	varies	F,W,Sp	varies
CivEnv 398-1,2	Community-Based Design	jr/sr BSEE or BSCE	F,W,Sp	1.0, 1.0
CivEnv 399	Projects	approved by ABET coord.	F,W,Sp	varies
CivEnv 417-1	Mechanics of Continua I	GEN_ENG 205-2,3, MATH 240		0
CivEnv 417-2	Mechanics of Continua II	CivEnv 417-1		
CivEnv 451	Engineering Properties of Soils	CivEnv 250		0.5

NOTE: F = fall quarter, W = winter quarter, Sp = spring quarter; O = odd year, E = even year
All CivEnv 400 level courses requires instructor permission AND permission number from CEE office.
All 399 courses require submission of a course proposal and approval from ABET Coordinator.

IMPORTANT NOTICE: A minimum of 18 units of "Engineering Topics" from the 48 units is required for the BSCE degree. NOT every course from every department in McCormick is classified as an engineering topic. Before registering please consult with your adviser and http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php **for course partitioning of math/science and engineering topics.**

Table CE.4e Suggested Electives for BSCE Structural Engineering Concentration 2017-2018

Course No.	Course Title	Prerequisites	Quarter	Design Units
CivEnv 302	Engineering Law	Jr/sr	Sp	0.25
CivEnv 304	Civil & Environ Engrg Systems Analysis	MATH 224	Sp	0
CivEnv 306	Uncertainty analysis in Civil Engineering	MATH 230	F	0
CivEnv 319	Theory of Structures II	CivEnv 221	W	
CivEnv 320	Structural Analysis – Dynamics	CivEnv 221	F	0.5
CivEnv 323	Structural Steel Design	CivEnv 221	Sp	1.0
CivEnv 327	Finite Element Methods in Mechanics	MECH_ENG 262, MATH 215 or CivEnv 216	F	0.125
CivEnv 332	Construction Estimating	CivEnv 330	Sp	0.25
CivEnv 336	Project Scheduling	CivEnv 330	W	1.0
CivEnv 352	Foundation Engineering	CivEnv 250	W(O)	1.0
CivEnv 395	Special Topics in Civil Engineering	varies	F,W,Sp	varies
CivEnv 399	Projects	approved by ABET coord.	F,W,Sp	varies
CivEnv 417-1	Mechanics of Continua I	GEN_ENG 205-2,3; MATH 240		0
CivEnv 417-2	Mechanics of Continua II	CivEnv 417-1		
CivEnv 421	Prestressed Concrete	CivEnv 325		1.0
CivEnv 451	Engineering Properties of Soils	CivEnv 250		0.5

NOTE: F = fall quarter, W = winter quarter, Sp = spring quarter; O = odd year, E = even year; inst per = instructor permission; equiv = equivalent
All CivEnv 400 level courses requires instructor permission AND permission number from CEE office.
All 399 courses require submission of a course proposal and approval from ABET Coordinator.

IMPORTANT NOTICE: A minimum of 18 units of "Engineering Topics" from the 48 units is required for the BSCE degree. NOT every course from every department in McCormick is classified as an engineering topic. Before registering please consult with your adviser and http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php **for course partitioning of math/science and engineering topics.**

Table CE.4f Suggested Electives for BSCE Transportation Systems Analysis and Planning Concentration 2017-2018

Course No.	Course Title	Prerequisites	Quarter	Design Units
CivEnv 304	Civil & Environ Engrg Systems Analysis	MATH 224	Sp	0
CivEnv 306	Uncertainty analysis in Civil Engineering	MATH 230	F	0
CivEnv 323	Structural Steel Design	CivEnv 221	Sp	1.0
CivEnv 352	Foundation Engineering	CivEnv 250	W(O)	1.0
CivEnv 376	Transportation System Operations	Calculus, Statistics	F	0
CivEnv 395	Special Topics in Civil Engineering	varies	F,W,Sp	varies
CivEnv 398-1,2	Community-Based Design	jr/sr BSEE or BSCE	F,W,Sp	1.0, 1.0
CivEnv 399	Projects	approved by ABET coord.	F,W,Sp	varies
IEMS 304	Statistical Methods for Data Mining	IEMS 303 or equiv		0
ECON 310-1	Microeconomics I	ECON 201, 202, MATH 220		0, ET = 0
ECON 354	Issues in Urban and Regional Economics	ECON 281, 310-1,2		0, ET = 0
ECON 355	Transportation Economics and Public Policy	ECON 281, 310-1,2		0, ET = 0
ECON 381-1	Econometrics I	STAT 210 or equiv, ECON 310-1, 311		0, ET = 0
ECON 381-2	Econometrics II	ECON 381-1		0, ET = 0

NOTE: F = fall quarter, W = winter quarter, Sp = spring quarter; O = odd year, E = even year; inst per = instructor permission; equiv = equivalent
All CivEnv 400 level courses requires instructor permission AND permission number from CEE office.
All 399 courses require submission of a course proposal and approval from ABET Coordinator.

IMPORTANT NOTICE: A minimum of 18 units of "Engineering Topics" from the 48 units is required for the BSCE degree. NOT every course from every department in McCormick is classified as an engineering topic. Before registering please consult with your adviser and http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php **for course partitioning of math/science and engineering topics.**

Table CE.5 Summary of MTS and ET Topic Units in BSCE

Student Name: **Student ID:**

Unit Count	Category	Courses with **Math/Science** Topics	Quarter	Grade	Units
1	Math	Math 220 – Differential Calculus of 1 Variable Function			1.0
2		Math 224 – Integral Calculus of 1 Variable Function			1.0
3		Math 230 – Differential Calculus of Multi-variable Function			1.0
4		Math 234 – Multiple Variable Integration & Vector Calculus			1.0
5-7	Engrg Anal & Computer	Gen_Eng 205-1 – Engineering Analysis I			0.8
		Gen_Eng 205-2 – Engineering Analysis II			0.5
		Gen_Eng 205-3 – Engineering Analysis III			0.8
		Gen_Eng 205-4 – Engineering Analysis IV			0.9
8	Basic Science	Chem 131, 151, 171 – General Chemistry			1.34
9		Physics 135-2 – General Physics			1.34
10		Biological Science or Earth 201, 202			1.0
11		Bio. Sci., Earth 201, 202, Chem 132, 152, 172, Physics 135-3			≥1.0
12	MTS electives	Civ_Env 306 – Uncertainty Analysis			0.5
13		*Elective must have at least 0.5 MTS unit*			x1
				Total Math/Science units (*minimum of 12***) =11.68+0.5+x1**	

Unit Count	Category	Courses with **Engineering Topics**	Quarter	Grade	Units
1	Design	DSGN 106-1 – Engineering Design/Communication			0.5
		DSGN 106-2 – Engineering Design/Communication			0.5
2	Engrg Anal & Computer	Gen_Eng 205-1 – Engineering Analysis I			0.2
		Gen_Eng 205-2 – Engineering Analysis II			0.5
		Gen_Eng 205-3 – Engineering Analysis III			0.2
		Gen_Eng 205-4 – Engineering Analysis IV			0.1
3	Basic Engrg	Civ_Env 216 – Mechanics of Materials			1.0
4		Thermodynamics			1.0
5		Mech_Eng 241 – Fluid Mechanics I			1.0
6		Electrical Science			1.0
7		*elective courses are in italic fonts (CivEnv 205 recomm.)*			x3
8	Major Courses	Civ_Env 221 – Theory of Structures I			1.0
9		Civ_Env 250 – Intro to Soil Mechanics			1.0
10		Civ_Env 260 – Fund Environ Engineering			1.0
10.34		Civ_Env 301 – Professional Development Seminar I			0.34
11.34		Civ_Env 325 – Reinforced Concrete			1.0
12.34		Civ_Env 330 – Construction Management			1.0
13.34		Civ_Env 340 – Fluid Mechanics II			1.0
14.34		Civ_Env 371 or 376 – Transportation Plan/Analysis or Transportation System Operations			1.0
15.34	Design Synthesis	Civ_Env 382 – Capstone Design			1.0
16.34		*Must be design*			1.0
17.84	*MTS Electives*	Civ_Env 306 – Uncertainty Analysis			0.5
		Elective must have at least 0.5 MTS unit			x2
	Technical Electives	*GenEng 220-1,2 recommended*			x4
		elective courses are in italic fonts			x5
		elective courses are in italic fonts			x6
		elective courses are in italic fonts			x7
		elective courses are in italic fonts			x8
				Total Engineering Topic units (*minimum 18 units***) = 17.84+x2+x3+x4+x5+x6+x7+x8**	

Bachelor of Science in Environmental Engineering (BSEE)

The Bachelor of Science in Environmental Engineering at Northwestern University is accredited by the Engineering Accreditation Commission of the ABET, Inc. (http://www.abet.org/)

Program Educational Objectives

The Environmental Engineering Program Educational Objectives (PEO) are:

1. Graduates excel in the engineering practice, research and management associated with the protection and conservation of ecological and human health.
2. Graduates play key roles in the analysis of the behavior of complex natural and engineered environmental systems and design infrastructure in a sustainable way to meet societal needs.
3. Graduates apply their broad environmental engineering training to excel and become leaders in a diverse range of professions including engineering consulting, industry, medicine, law, government, communication, and education.
4. Graduates think critically, behave ethically and consider the technical and social consequences of their work, especially as it affects the health, safety and environment of both ecological and human communities.
5. Graduates apply their knowledge creatively and innovatively throughout their careers to meet the challenges posed by a rapidly changing world.

Student Learning Outcomes

The student learning outcomes (a) through (k) of the BSEE program at Northwestern University are those required in ABET criterion 3. Outcome (l) is specified by the American Academy of Environmental Engineers (AAEE). These outcomes are:

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
(l) Understanding of concepts of professional practice and the roles and responsibilities of public institutions and private organizations pertaining to environmental engineering.

The student learning outcomes support the program educational objectives given above. The relationship of student outcomes to program educational objectives showing how the PEO are attained is given in Table EE.1 and posted on the department web site http://www.mccormick.northwestern.edu/civil-environmental/undergraduate/environmental-engineering/abet-objectives-outcomes.html. In this Table, PEO A, *Excel in the engineering practice,*

research and management associated with the protection and conservation of ecological and human health, is attained through outcomes (a), (e), (k) and (l). Similarly, PEO B is attained through outcomes (c), (d), (f), (h), (j), and (k); PEO C is attained through outcomes (c), (e), (f), (g), (h), (i) and (k); PEO D is attained through outcomes (f), (h), (i), (j), and (k); and PEO E is attained through outcomes (a), (b), (d), (e), (g), and (i).

Table EE.1 Mapping of BSEE Program Educational Objectives and Student Learning Outcomes

BSEE Program Educational Objectives	**BSEE Student Learning Outcomes**
1. Excel in the engineering practice, research and management associated with the protection and conservation of ecological and human health.	(a) Ability to apply knowledge of mathematics, science, and engineering. (e) Ability to identify, formulate and solve engineering problems. (k) Ability to use the techniques, skills, and modern engineering tools necessary for professional engineering practice. (l) Understanding of concepts of professional practice and the roles and responsibilities of public institutions and private organizations pertaining to environmental engineering.
2. Play key roles in the analysis of the behavior of complex natural and engineered environmental systems and design infrastructure in a sustainable way to meet societal needs.	(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. (h) Broad education necessary to understand the impact of engineering solutions in a global and societal context. (j) Knowledge of contemporary issues. (k) Ability to use the techniques, skills, and modern engineering tools necessary for professional engineering practice.
3. Apply their broad environmental engineering training to excel and become leaders in a diverse range of professions including engineering consulting, industry, medicine, law, government, communication, and education.	(c) Ability to design a system, component, or process to meet desired needs. (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 and societal context. (i) Recognition of the need for, and an ability to engage in life-long learning. (k) Ability to use the techniques, skills, and modern engineering tools necessary for professional engineering practice.
4. Think critically, behave ethically and consider the technical and social consequences of their work, especially as it affects the health, safety and environment of both ecological and human communities.	(f) Understanding of professional and ethical responsibility. (h) Broad education necessary to understand the impact of engineering solutions in a global and societal context. (i) Recognition of the need for, and an ability to engage in life-long learning. (j) Knowledge of contemporary issues. (k) Ability to use the techniques, skills, and modern engineering tools necessary for professional engineering practice.
5. Apply their knowledge creatively and innovatively throughout their careers to meet the challenges posed by a rapidly changing world.	(a) Ability to apply knowledge of mathematics, science, and engineering. (b) Ability to design and conduct experiments, as well as to critically analyze and interpret data *in more than one major environmental engineering focus area*. (d) Ability to function on multidisciplinary teams. (e) Ability to identify, formulate and solve engineering problems (g) Ability to communicate effectively. (i) Recognition of the need for, and ability to engage in life-long learning.

Program Requirements

The minimum number of units required for the BSCE degree is 48 units. Among them are:

McCormick core course (32 units)

- Mathematics (4 units)
- Engineering Analysis and Computer Proficiency (4 units)
- Design and Communications (3 units)
- Basic Engineering (5 units)
- Basic Sciences (4 units) – Physics and Chemistry
- Social Sciences and Humanities (7 units)
- Unrestricted Electives (5 units)

Environmental Engineering Major (16 units)

- Environmental Engineering Core Courses (12 units)
- Technical Electives (4 units)

The 48 units of courses must also meet the following criteria

1. Minimum of 3 units of Environmental Engineering technical electives must carry 100% of Engineering Topic.
2. The only courses in the BSEE Core Courses that are eligible for P/N option are the seven (7) social science/humanities and five (5) unrestricted elective courses. Only four (4) 100- or 200-level courses may be taken P/N to satisfy the 7-unit requirement in the social science/ humanities. Courses taken abroad for a grade, but recorded by the Northwestern University Registrar as P/N, may be exempted from this requirement.
3. A maximum of eight (8) P/N option units are permitted among 48 units required in satisfying the graduation requirement.
4. Only 1 unit per quarter may be taken P/N during freshman and sophomore years.
5. A ***minimum of 18 units of "Engineering Topics" from the 48 units is required for the BSEE degree***. Note that NOT every course from every department in McCormick is classified as engineering topic. Please consult with your adviser and McCormick partition list[2] on courses classified as engineering topics.
6. A GPA of NOT less than 2.0 is required for all units presented for the BSEE degree.

Detailed Program Requirements

A. McCormick School Core Courses (32 Units)

The McCormick School (MEAS) Core Courses has 7 subgroups: *Basic Sciences* (4 units), *Engineering Analysis* (4 units), *Mathematics and Sciences* (4 units), *Design and Communications* (3 units), *Basic Engineering* (5 units), *Social Sciences/Humanities* (7 units), and *unrestricted electives* (5 units). This group of courses is largely "menu-driven" in that options are provided to permit different engineering disciplines to select specific courses in several of these categories (and further sub-categories) from a fixed set of courses so as to focus on the needs of the particular discipline. If the discipline elects not to specify courses to be taken for that discipline, the student is free to choose from the list of courses offered for each sub-group. These options apply mainly to the sub-groups of Basic Sciences, Basic Engineering, and to a limited extent, the communications portion of Design and Communications (1 elective course). Considerable

[2] McCormick partition list is available on the web, http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php. These partitions are valid only for the academic year the course is taken.

latitude is afforded in the selection of courses in the Social Science/Humanities sub-group. Unrestricted electives permit a student to take any course offered for credit by the University (so long as applicable pre-requisites are satisfied). **Bold face courses represent required courses**.

1. ***Basic Sciences (4 units)***
   - **i. CHEM 131, 151, 171 – General Chemistry**
   - **ii. CHEM 132, 152, 172 – General Physical Chemistry**
   - **iii. PHYSICS 135-2 – General Physics 2**

   Note: Each Chemistry and Physics course includes mandatory companion lab that carries 0.34 units. Lectures and labs combined yield 4 units of basic sciences.

2. ***Engineering Analysis (4 units)***
   - **i. GEN_ENG 205-1 – Engineering Analysis I (introduction to linear algebra and Matlab)**
   - **ii. GEN_ENG 205-2 – Engineering Analysis II (introduction to vector mechanics, statics, dynamics, mechanics of materials)**
   - **iii. GEN_ENG 205-3 – Engineering Analysis III (dynamics behavior of the elements)**
   - **iv. GEN_ENG 205-4 – Engineering Analysis IV (solution methods for ordinary differential equations)**

   Note: GEN_ENG 206-1,2,3,4 may replace GEN_ENG 205-1,2,3,4

3. ***Mathematics (4 units)***
   - **i. MATH 220 – Differential Calculus of One-Variable Functions**
   - **ii. MATH 224 – Integral Calculus of One-Variable Functions**
   - **iii. MATH 230 – Differential Calculus of Multivariable Functions**
   - **iv. MATH 234 – Multiple Integration and Vector Calculus**

4. ***Design and Communications (3 units)***
   - **i. DSGN 106-1,2 (0.5 unit each) – Engineering Design and Communication**
   - **ii. ENG 106-1,2 (0.5 unit each) – Writing in Special Contexts, must be taken concurrently with DSGN 106-1,2.**
   - iii. choose one from:
     a. COMM ST 102 – Public Speaking
     b. PERF ST 103 – Analysis and Performance of Literature
     c. PERF ST 203 – Performance, Culture, and Communication

5. ***Basic Engineering (5 units)***
   - i. *Systems Engineering and Analysis (1 unit)* – choose one from below
     a. CIV ENV 304 – Civil and Environmental engineering Systems analysis (*recommended, 0.5 unit MTS, 0.5 unit ET*)
     b. CIV ENV 205 – Economics and Finance for Engineers
   - *ii. Fluids and Solids (1 unit)*
     a. MECH ENG 241 – Fluid Mechanics I
   - iii. *Thermodynamics (1 unit)* – choose one from below
     a. BMD ENG 250 – Thermodynamics I
     b. CHEM ENG 211 – Kinetics and Statistical Thermodynamics
     c. MAT SCI 314 – Thermodynamics of Materials

iv. *Probability, Statistics, and Quality Control (1 unit)* – choose one from below
   a. CIV ENV 306 – Uncertainty Analysis (*recommended*)
v. *Computer Architecture and Numerical Methods* (1 unit) – Choose one from below
   a. EECS 328 – Numerical Methods for Engineers
   b. ES APPM 346 – Modeling and Computation in Science and Engineering
   c. A MAT_SCI course

6. Social Science and Humanities (7 units)

Seven courses are required to satisfy the requirements of this subgroup. The seven courses must meet the following criteria.

- Maximum of 5 units from either social science or humanities category
- At least 3 units must be thematically related
- No more than 3 units of 100-level courses
- AP credits allowed

Foreign language study can be incorporated into the program, but should be started as early as possible, preferably in the freshman year.

Courses taken for a student's Social Science/Humanities requirement must be approved in advance by the McCormick Humanities Panel. Complete requirement information is at the McCormick Undergraduate Engineering Office web site, http://www.mccormick.northwestern.edu/students/undergraduate/social-science-humanities-theme/index.html. You must submit your theme form via McCormick Advising System (MAS). A sample of the screen shot is provided on page 63.

7. Unrestricted Electives (5 units)

Unrestricted electives allow the students to take any course offered for credit by any school in the University so long as they have the prerequisites for it. Civil Engineering students have five unrestricted electives as part of the McCormick School Core Courses. Many students use these to broaden their education by concentrating them in a particular areas (such as economics or a foreign language or music), while others take additional technical electives in their major or related fields.

B. Environmental Engineering Major (16 Units)

Additional 16 units beyond the McCormick Core Courses are required for the Environmental Engineering major. The units are distributed between core courses (12 units) and technical electives (4 units).

1. ***Environmental Engineering Core Courses (12 Units)***

The core courses provide the students with the necessary complements in Biology and Chemistry taught in an engineering context as well as Earth Science fundamentals and specialized engineering courses. This suite of classes leads to the senior Capstone Design course (CIV_ENV 382) that brings together students from Civil and Environmental degrees, working in teams. The Environmental Engineering builds on a suite of gateway courses – that are now cross listed with Environmental Science courses – to more advanced courses that are shared with beginning graduate students entering our MS and PhD programs. The program offers some flexibility, dear to Northwestern students that have wide academic interests.

i. **CHEM 201 – Organic Chemistry I**
ii. **ENV SCI 201 – Earth: a Habitable Planet**
iii. **ENV SCI 202 – Health of the Biosphere**
iv. **CIV_ENV 203 – Energy and the Environment**
v. **CIV_ENV 260 – Fundamentals of Environmental Engineering**
vi. **CIV_ENV 340 – Fluid Mechanics II**
vii. **CIV_ENV 361-1 – Environmental Microbiology**
viii. **CIV_ENV 363 – Environmental Applications I: Air and Land**
ix. **CIV_ENV 364 – Environmental Applications II: Water**
x. **CIV_ENV 365 – Environmental Laboratory**
xi. **CIV_ENV 367 – Aquatic Chemistry**
xii. **CIV_ENV 382 – Capstone Design**

2. ***Technical Electives***

Technical electives provide the students the opportunity to tailor their interests to specific aspects of Environmental Engineering. While there is, to some extent, a broad range of options, there is however one restriction: **At least** two (2) courses must be taken from the following list (400-level courses required instruction permission and a permission number from the CEE Office); **at least** three (3) of the four (4) courses selected must be 100% engineering topic (ET) courses; **only one** (1) CIV ENV 399 can be counted towards a technical elective. This restriction effectively enforces the minimum requirement of 18 credits of ET courses. The student has to consult her/his adviser in order to select the specific courses since not all courses taught in the McCormick School of Engineering carry full ET credits. The course partitioning among mathematics and basic science, engineering topics, and general education for all the courses offered in McCormick School is available online[3].

i. CIV_ENV 303 – Environmental Law (*100% general topic course*)
ii. CIV_ENV 314 – Organic Geochemistry (*100% science course*)
iii. CIV_ENV 317 – Biogeochemistry (*not classified as engineering topic course*)
iv. CIV_ENV 355 – Engineering Aspects of Groundwater Flow
v. CIV_ENV 361-2 – Public and Environmental Health
vi. CIV_ENV 368 – Sustainability: The City
vii. CIV_ENV 370 – Environmental Organic Chemistry
viii. CIV_ENV 395 – Undergraduate Experimental Courses Selected Topics (by petition)
ix. CIV_ENV 398-1 – Community Based Design I
x. CIV_ENV 398-2 – Community Based Design II
xi. CIV_ENV 399 – Projects (limit to 1 unit only)
xii. CIV_ENV 440 – Environmental Transport Processes
xiii. CIV_ENV 442 – Processes in Environmental Biotechnology
xiv. CIV_ENV 444 – Physical/Chemical Processes in Environmental Control
xv. CIV_ENV 468 – Chemical Speciation
xvi. CHEM 210-2 – Organic Chemistry II (*100% science course*)
xvii. BIOL_SCI 215 – Genetics and Molecular Biology (*100% science course*)
xviii. BIOL_SCI 219 – Cell Biology (*100% science course*)

[3] McCormick partition list is available on the web, http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php. These partitions are valid only for the academic year the course is taken.

xix. CHEM_ENG 367 or MECH ENG 367 – Quantitative Methods in Life Cycle Assessment

The remaining courses (up to two) **may be** from any 200-level or higher engineering, math, or science courses not in curriculum requirement. A minimum of 18 units of ET course must be met.

C. Tables, Charts, and Forms for BSCE

The Department has developed a number of tables, charts, and forms that you may need or find them useful in helping you plan and keep track of your course of studies. These tables, charts, and forms are provided at the end of this handbook for easy access. They are also available on the CEE website, http://www.mccormick.northwestern.edu/civil-environmental/current-students/forms-documents.html. These tables, charts, and forms are:

Table EE.2 – Sample BSEE Curriculum Flow Chart (*available online*)
Table EE.3 – Summary of MTS and ET Topics Units in BSEE (*available in the online UG Handbook*)

Table EE.2 shows a flow chart for a typical BSEE curriculum by quarters. This flow chart, also displays the pre-requisite requirements, is intended to be a guide for program planning. Almost all of the students entering Northwestern University have accepted Advanced Placement (AP) credits. Many students also interested in pursuing a dual major, minor, certificate program, etc. Each student's program flow chart is likely to be different.

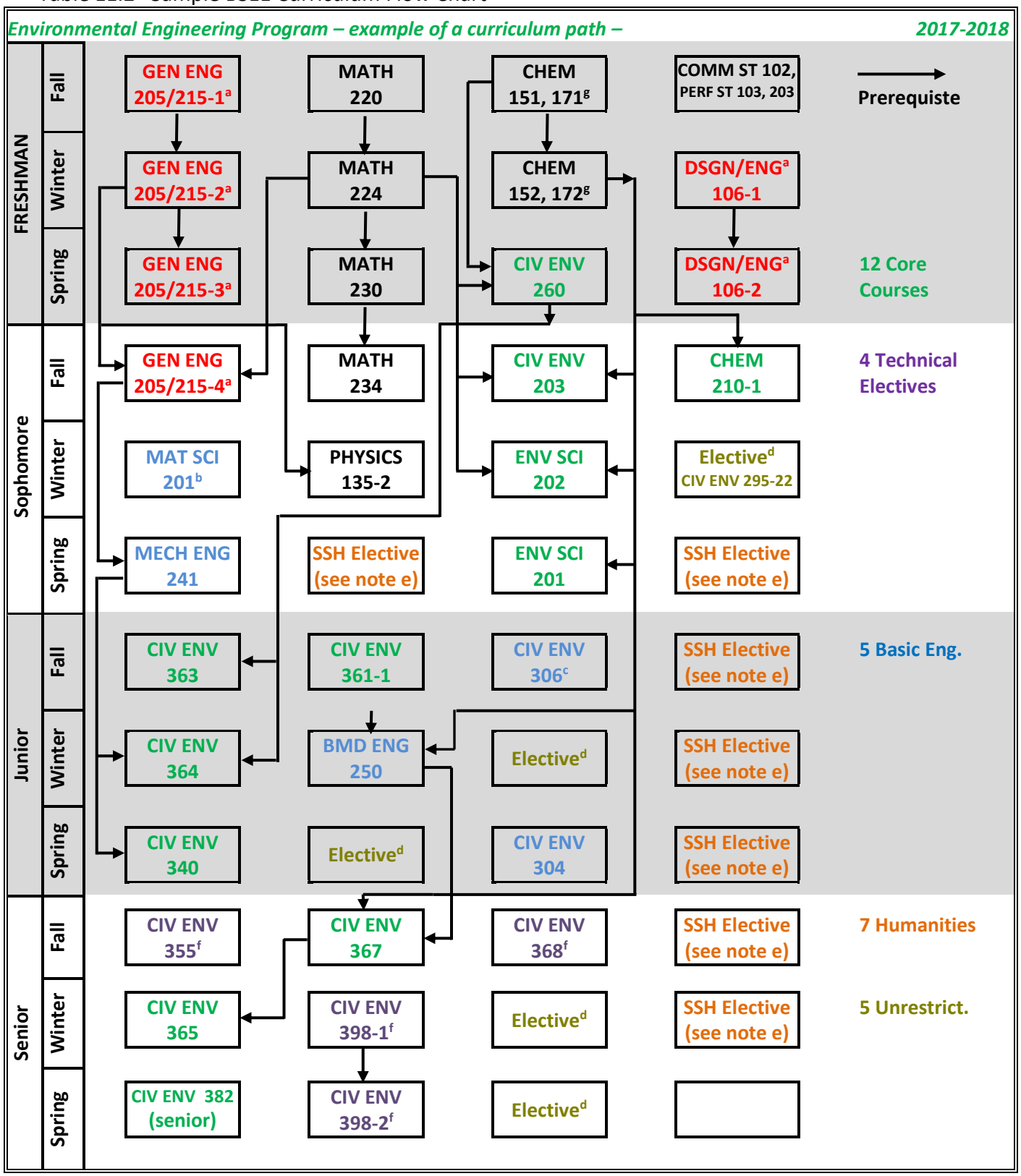
Students interested is pursuing interest in research, projects not available in courses offered by the department, McCormick School, or the University may register for CIV_ENV 399 – Project Application for an Independent Study. This independent study course carries one course unit and can be used to meet the technical elective requirement or design synthesis if there is sufficient design content. Students interested in registering for CIV_ENV 399 **must** submit a petition form, available at the end of this handbook, signed by both the project adviser and the ABET coordinator.

In order to be in compliance with ABET accreditation requirements that any ABET accredited engineering program must consist of a minimum of 12 units of math/science (MTS) and 18 units of engineering topics (ET). Table EE.3, also available at the end of this handbook, shows a summary of MTS and ET unit distribution of all the required and elective courses in your program that consist of any of the MTS and ET distribution. The MTS and ET distribution of all courses offered in McCormick can be found on the McCormick web site http://www.mccormick.northwestern.edu/academics/undergraduate/abet/course-partitioning.php. These partitions are valid only for the academic year the course is taken.

D. McCormick Advising System (MAS)

Starting in the fall of 2013, McCormick's Advising System (MAS) https://mas.mccormick.northwestern.edu/ was launched. The McCormick's Advising System allows you 24/7 access to monitor your academic information, comments your adviser writes during your advising session, and your progress in meeting your degree requirements.

Table EE.2 Sample BSEE Curriculum Flow Chart



Notes:

a. Must register both courses concurrently.
b. May be substituted by MAT SCI 301.
c. May choose from Basic Engineering Probability, Statistics, and Quality Control list.
d. May choose from any course offered for credit by the University.
e. Courses must be selected to meet the Social Science-Humanities requirement.
f. Choose courses from the approved list: at least 3 must carry 100% engineering topics; CIV ENV 368 and 370 are recommended.
g. Must take the companion lab courses; if no placement in Chemistry, then take CHEM 110-131/141-132/142 in first year and CIV ENV 260 in second year spring

Table EE.3 Summary of MTS and ET Units in BSEE

Student Name: Student ID:

Unit Count	Category	Courses with **Math/Science** Topics	Quarter	Grade	Units
1	Math	Math 220 – Differential Calculus of 1 Variable Function			1.0
2		Math 224 – Integral Calculus of 1 Variable Function			1.0
3		Math 230 – Differential Calculus of Multi-variable Function			1.0
4		Math 234 – Multiple Variable Integration & Vector Calculus			1.0
5-7	Engrg Anal & Computer	Gen_Eng 205-1 – Engineering Analysis I			0.8
		Gen_Eng 205-2 – Engineering Analysis II			0.5
		Gen_Eng 205-3 – Engineering Analysis III			0.8
		Gen_Eng 205-4 – Engineering Analysis IV			0.9
8.34	Basic Science	Chem 131, 151, 171 – General Chemistry			1.34
9.68		Chem 132, 152, 172 – General Physical Chemistry			1.34
11.02		Physics 135-2 – General Physics			1.34
	Basic Engrg	*System Engineering and Analysis elective*			X1
		Probability, Statistics, and Quality Control elective			X2
12.02	Major Courses	Env_Sci 201 – Earth, A Habitable Planet			1.0
13.02		Env_Sci 202 – Health of Biosphere			1.0
14.02		Chem 210-1 – Organic Chem			1.0
	Technical Electives	*Elective course is in italic fonts*			X3
				Total Math/Science units = 14.02+X1+X2+X3	

Unit Count	Category	Courses with **Engineering Topics**	Quarter	Grade	Units
1	Design	IDEA 106-1 – Engineering Design/Comm			0.5
		IDEA 106-2 – Engineering Design/Comm			0.5
2	Engrg Anal & Computer	Gen_Eng 205-1 – Engineering Analysis I			0.2
		Gen_Eng 205-2 – Engineering Analysis II			0.5
		Gen_Eng 205-3 – Engineering Analysis III			0.2
		Gen_Eng 205-4 – Engineering Analysis IV			0.1
3	Basic Engrg	Mech_Eng 241 – Fluid Mech I			1.0
4		Thermodynamics elective			1.0
		Systems Engineering and Analysis elective			X4
		Probability, Statistics, and Quality Control elective			X5
5		*EECS 328; MAT_SCI 201 or 301*			1.0
6		Civ_Env 203 – Energy and the Environment			1.0
7	Major Courses	Civ_Env 260 – Fund Environ Engineering			1.0
8		Civ_Env 340 – Fluid Mechanics II			1.0
9		Civ_Env 361-1 – Envir Microbiology			1.0
10		Civ_Env 363 – Envir Engineering App I: Air & Land			1.0
11		Civ_Env 364 – Envir Engineering App II: Water			1.0
12		Civ_Env 365 – Envir Engrg Lab			1.0
13		Civ_Env 367 – Aquatic Chem			1.0
14		Civ_Env 382 – Capstone Design			1.0
15	*Technical Electives*	*Elective course must have 100% engineering topic*			1.0
16		*Elective course must have 100% engineering topic*			1.0
17		*Elective course must have 100% engineering topic*			1.0
		Elective course			X6
				Total Engineering Topic units = 17.0+X4+X5+X6	

Minor in Environmental Engineering

Minor Requirements (8 units)

Core courses (6 units)

ENV_SCI 201 – Earth: a Habitable Planet
ENV_SCI 202 – Health of Biosphere
CIV_ENV 203 – Energy and the Environment
CIV_ENV 260 – Fundamentals of Environmental Engineering
CIV_ENV 355 – Engineering Aspects of Groundwater Flow
CIV_ENV 364 – Environmental Applications II: Water

Electives (2 units)

Choose 2 courses from below:

i. CIV_ENV 340 – Fluid Mechanics II
ii. CIV_ENV 361-1 – Environmental Microbiology
iii. CIV_ENV 362-2 – Public and Environmental Health
iv. CIV_ENV 367 – Aquatic Chemistry
v. CIV_ENV 368 – Sustainability: The City
vi. CIV_ENV 398-1 – Community Based Design I
vii. CIV_ENV 398-2 – Community Based Design II
viii. CIV_ENV 399 – Independent Study (*limit to 1 unit*)
ix. Any CIV_ENV 400 level course by permission

Additional Information

1. No more than 4 courses may be used to fulfill requirements in the major program.
2. A grade of at least C– is required in each course for the minor.
3. Students should discuss with the minor coordinator how best to satisfy prerequisites for required courses.
4. A completed **Intent to Pursue the Environmental Engineering Minor** must be submitted to McCormick Academic Office 3 quarters before the beginning of the final undergraduate quarter.
5. A completed **Declaration for the Environmental Engineering Minor** (page 78) must be submitted to the McCormick Academic Services Office 2 weeks before the beginning of the final undergraduate quarter.

Architectural Engineering and Design Certificate Program

The Architectural Engineering and Design Certificate Program requires a mixture of design imagination, knowledge of materials and systems, and a variety of analytic and management tools. Architects, who traditionally have led the design effort, are best known for the aesthetic element of their products. It is the integration of architecture and engineering perspectives that leads to buildings that are path-breaking in functionality, aesthetics, economy, and sustainability. This certificate prepares students for further pursuit of architecture-related careers.

Required Courses for all Engineers

1. CIV_ENV 385-1 – Design Studio I: Fundamentals – Self-referential design problem. *Junior or senior standing*.
2. CIV_ENV 385-2 – Design Studio II: Intermediate – Contextual design problem. *Prerequisite: CIV_ENV 385-1.*
3. CIV_ENV 385-3 – Design Studio III: Advanced – Complex design problem. *Prerequisite: CIV_ENV 385-2.*
4. GEN_ENG 220 – Analytic and Computer graphics (CAD)
5. Choose one course from:
    i. CIV_ENV 323 – Structural Steel Design
    ii. CIV_ENV 352 – Foundation Engineering
6. ART HIST 232 – Introduction to the History of Architecture and Design; may substitute ART HIST 378 – Architecture & Urbanism of the World City in the 20th Century for ART HIST 232 by petition

Additional courses for students not majoring in civil engineering. (These are already in the basic civil engineering program)

1. CIV_ENV 221 Theory of Structures 1 (pre-requisite: CIV_ENV 216 or equivalent)
2. CIV_ENV 325 Reinforced Concrete (pre-requisite: CIV_ENV 221)

Limits to Double Counting Courses

No more than two courses needed for the Certificate in Architectural Engineering and Design may also be used to fulfill the requirements in the major program of your BS degree as described in the undergraduate catalog.

Recommended Technical or Unrestricted Electives for Certificate Program

1. PROJ_MGT 441 – Sustainability in Construction (0.5 course unit)
2. PROJ_MGT 455 – Computer-Integrated Project Delivery (0.5 course unit)
3. CIV_ENV 302 – Engineering Law
4. CIV_ENV 304 – Civil and Environmental Engineering Systems Analysis
5. CIV_ENV 336 – Project Scheduling
6. DSGN 370 – Engineering Portfolio
7. DSGN courses

Recommended Unrestricted Electives for Certificate Program (Could be used as components of theme requirements)

1. ART HIST 370 1, 2 Modern Architecture and Design
2. Art Theory and Practice (select one course)
    i. ART 120 – Basic Painting or
    ii. ART 125 – Basic Drawing or
    iii. ART 140 – Basic Sculpture
    iv. Advanced courses in Art Theory and Practice
3. History and/or Sociology
    i. HISTORY 322-1, 2 – Development of the Modern American City
    ii. SOCIOL 207 – Problems of Cities
    iii. SOCIOL 301 – The City: Urbanization and Urbanism

Recommended Internships for Certificate Program

1. Summer experiences related to architecture and/or building design or construction, or
2. Participation in Co-operative engineering program
3. Summer international workshop as available

Additional Conditions for Awarding Certificate in Architectural Engineering and Design

1. Completion of all requirements for McCormick B.S. degree.
2. Maintenance of GPA of 2.0 or above in courses required for this Certificate
3. Courses with grades lower than a "C" will not be accepted
4. Submit a complete an **Intent to Pursue the Certificate in Architectural Engineering and Design** form (available online at http://www.mccormick.northwestern.edu/civil-environmental/current-students/forms-documents.html) to Academic Coordinator, Tech A236, at least three (3) quarters in advance of completing the BS degree (e.g., at the start of fall quarter 20xx for those planning to graduate in spring 20xx+1.)
5. Complete the **Declaration of Petition to Receive the Certificate in Architectural Engineering and Design** form available online http://www.mccormick.northwestern.edu/civil-environmental/current-students/forms-documents.html or at the end of this handbook.
6. The **Declaration** form must be completed two weeks before the beginning of the final undergraduate quarter.

Undergraduate (Departmental) Honors Program
Civil and Environmental Engineering

The accelerated, intensive study through McCormick's Honors Programs isn't for everyone. However, if you're up to the challenge, we encourage you to apply for honors in your area of study ***during your junior or pre-senior year***, **at least three full quarters before completing your degree requirements**.

A student with a strong academic record may be admitted to McCormick's Honors Program any time during their junior or pre-senior year.

Qualifications

- At the time of admission to the program, the student must have a cumulative grade point average (GPA) of 3.50 or higher.
- Students must file their application with the **Office of Undergraduate Engineering** at least three full quarters before completing their degree requirements.

Application

Admission to the Honors Program will be confirmed by filing an ***Honors Program Application*** **Form** with the ***Office of Undergraduate Engineering*** in Tech L269. This form must be signed by the appropriate advisers.

Requirements

- Complete at least three (3) units of approved advanced study with a B average or better. This could be done by taking courses normally accepted at the graduate level. Courses taken would only apply to the undergraduate degree.
- Complete an extended independent study program (at least two quarters of CivEnv 399) on the same topic leading to an acceptable report. *Note: only one quarter of CivEnv 399 may be used to meet the Technical Elective requirement, the other CivEnv 399 unit may be used to meet the Unrestricted Elective requirement.*

Honors Program Advisers

Each department chair arranges for a person or group within the department to administer and advise its honors program. The person or group defines units of approved advanced study and independent study. They also evaluate the performance of each honors student at the end of the project to determine if the definition of success is met.

Recognition

Successful completion of the Honors Program will be entered on the student's transcript. Recognition will also be given in the Commencement Program. In evaluating each student's performance, if it is not judged to meet the standards of success, the student will receive course grades and credits as earned.

Departmental Honors Contacts

Civil Engineering: Professor David Corr (d-Corr@northwestern.edu)
Environmental Engineering: Professor Jean-François Gaillard (jf-gaillard@northwestern.edu)

Combined BS/MS Program

While you are an undergraduate student, careful coordination of your class schedule may allow you to complete either a bachelor of science in civil engineering or a bachelor of science in environmental engineering and a Master of Science degree from the McCormick School of Engineering and Applied Science. Sometimes, though, additional quarters are needed. There are many compelling reasons to consider earning a master's degree, including:

- Increased starting salary
- Enhanced job opportunities
- Greater potential for job advancement
- Familiarity with McCormick programs and faculty
- Greater convenience prior to starting employment

Students can pursue a master's degree in the same department as their BS, or in a different department. For the greatest success, students considering the BS/MS program should discuss their plans by the end of their junior year.

Application Procedures

Here are the steps to be considered for admission to the BS/MS program in the Department of Civil and Environmental Engineering:

- Meet with the appropriate MS program director to develop the MS study plan necessary for application to The Graduate School.
- Submit the application forms and documents listed below to your undergraduate adviser, your MS adviser-to-be (if different from the MS program director), and to the director of graduate studies for their signatures.

MS Program Directors

All of these faculty members in the Department of Civil and Environmental Engineering may discuss with you your application package:

- Environmental engineering science: **Jean-Francois Gaillard**
- Geotechnical engineering: **Richard Finno**
- Structural engineering: **Karen Chou**
- Transportation engineering: **Yu (Marco) Nie**

Undergraduate Students with 3.50 GPA or Above

- Get a fee waiver code from Dr. Bruce Lindvall, Assistant Dean for Graduate Study
- Submit application online through College Net.

Undergraduate Students with GPA Below 3.50

- If you have a combined GPA near 3.5, and have demonstrated that you are in good standing in the courses that are of direct relevance to the MS program that you are considering, you need to meet with the MS program director to discuss your application. Two **recommendation forms** are then needed to support your application to The Graduate School.
- The other option is to apply to The Graduate School for admission as an MS student through the general **application process**.

Deadline

Please consult The Graduate School website for application submission deadline in each quarter. The deadlines are usually at least one month prior to the start of the new quarter.

Tables and Forms

Undergraduate Curriculum Plan Worksheet

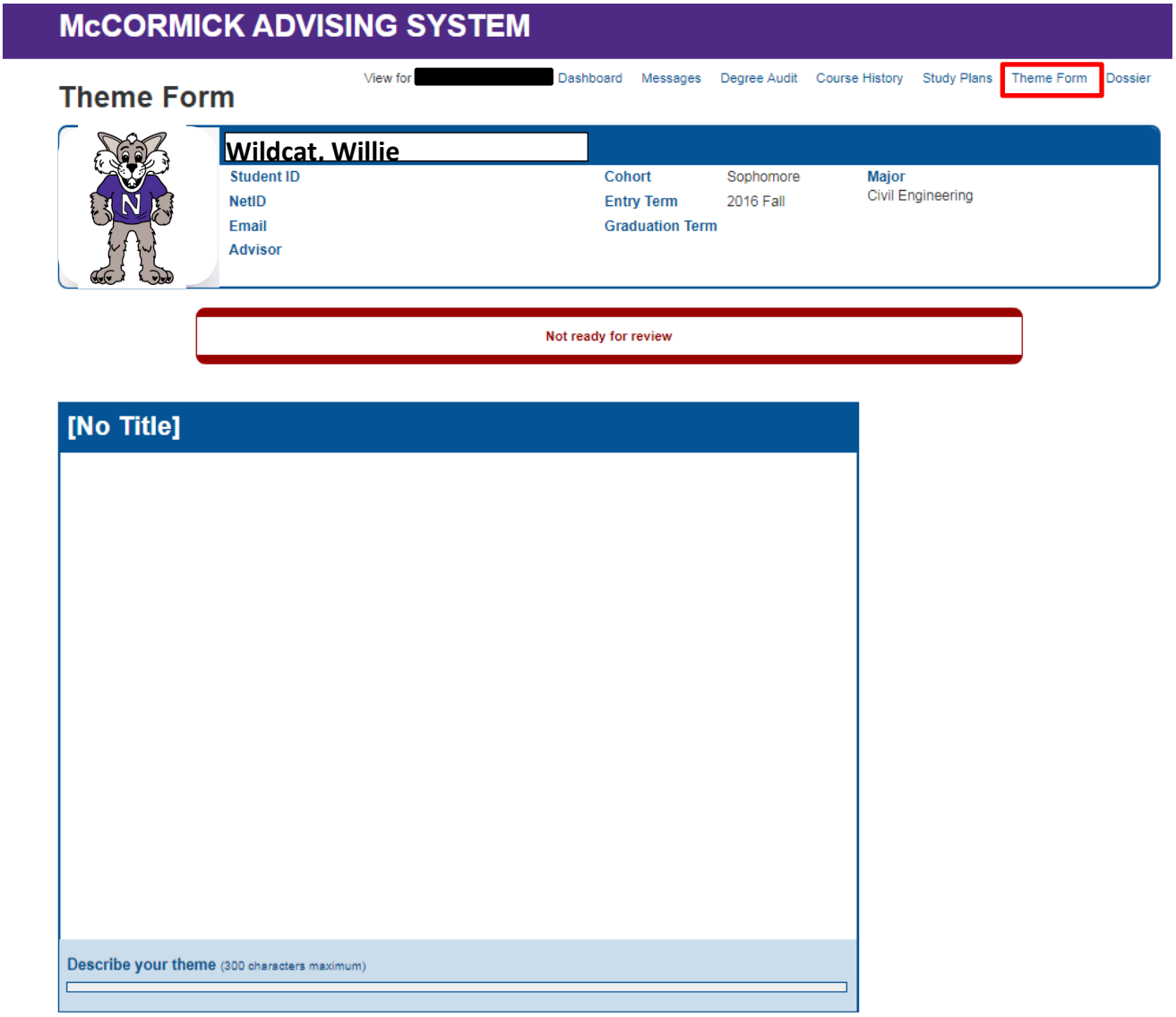
Undergraduate Curriculum Plan **Catalog Year: 2017-2018**

Name: **Student ID:**

Year	Fall Quarter	Winter Quarter	Spring Quarter
2017-2018			
2018-2019			
2019-2020			
2020-2021			
2021-2022			

Sample 5 year Plan for BSCE and BS in Music of a BSCE student

	Fall	Winter	Spring
Freshman	Chem 151	Basic Science elective	COMM ST or PERF ST
	CEE 195 (FR CEE seminar)	GE 220-1	GE 220-2
	Spanish (Lang)	Math 230	Earth 201
	Fresh Sem 1 (Val Distro 1)	Intro to Psych (BS Distro 1)	Fresh SEm 2 (Mus Elec)
	Music Comp 111-1 (Mus Elec)	Music Comp 111-2 (Mus Elec)	Music History 213
	Marching Band (0.5 Mus Elec)	Concert Band	
Sophomore	EA 1	EA 2	EA 3
	Physics 135-2	DSGN/ENG 106-1	DSGN/ENG 106-2
	TE 2	Math 234	Civ_Env 260
	Music Theory 111-1	Music Theory 111-2	Music Theory 111-3
	Marching Band (0.5 Mus Elec)	Music AS 126-2	Music AS 126-3
			ICD 301
Junior	EA 4	Music Theory 211-2	Music Theory 211-3
	CEE 330	Thermo (MechE 222)	Fluids I (MechE 241)
	Civ_Env 371	Fluids/Solids 1 (CEE 216)	MTS 2
	Music Theory 211-1	Music History	Mus Hist 216
	Marching Band (0.5 Mus Elec)		
Senior	Marching Band (0.5 Mus Elec)	CEE 325	CE 340
	CEE 250	TE 4	TE 5 (Econ)
	CEE 221	Lit/history/values distro	Anal Perf
	Mus Hist 214	Music	Lit/history/values distro
	EECS 202		
Senior 2	CEE 205	Design Synthesis 2	CE 382
	CEE 306 (MTS 1)	Lit/history/values distro	Lit/history/values distro
	CEE 385-1	CE 385-2	CE 385-3
	Instrumentation	Orchestration	Adv orchestration



Screen Capture of MAS Theme Form page.

CIV_ENV 399 Project Application for an Independent Study

1) Your Topic

a. Scope

b. List of project tasks/goals and a tentative weekly schedule

c. References

2) Deliverables

a. Type of product (paper, model, computer program, device, etc)

b. Product details (anticipated length of paper, complexity of model, lines of computer code and extent of documentation, components of devices, etc.)

c. Work involved in product (hours of writing, interviewing, number of laboratory observations, etc.)

3) How does this independent study support your curriculum

a. Courses that led to this one

b. How does this 399 enhance your learning in your civil or environmental engineering degree?

4) Interaction with professor

a. How often will you meet?

b. Basis of evaluation (give itemized evaluation, example—weekly reports 15%, scholarly/technical component 50%, written report 20%, oral presentation 15%)

5) Describe how this is to be entered in your grade audit

a. Engineering Topic, Unrestricted Elective, Math Technique or Science (MTS), etc
b. Please describe the characteristics that will contribute to this designation

c. If this is for lab work, it must involve a significant lab report at the end of the quarter. If the student simply wishes to work in the lab, they still must complete the form. If there is to be no evaluation instrument (graded quizzes or significant report) then such work experience should comprise 0.33 credit.

6) Signatures by sponsoring independent study Professor, ABET Coordinator (Prof Dowding for BSCE; Prof Gaillard for BSEE), and student signature verifying that this 399 is to be the one allowed for a Letter Grade (not a "K" for continuing)—unless this is part of the CEE Honors Program.

7) Honors 399s require these additional considerations:

a. Product must meet an Honors Thesis standard, i.e., 399 should include some measure of creativity
c. Two 399s can be combined to produce one Honors Thesis. Only 1 unit may be used to meet the 16 units of CE or EE major requirements.
d. Submit this application <u>with</u> the CEE departmental honors program application.

Student Signature_____Date_____

Verifying that this is to be the one allowed 399 for a Letter Grade (not a "K" for continuing)—unless this is part of the CEE Honors Program

PRINT NAME _____

* * *

Sponsoring/Honor Project Adviser Signature _____Date_____

PRINT NAME _____

* * *

ABET Coordinator Signature _____Date_____

PRINT NAME _____

Please secure all the signatures before submitting to the Academic Coordinator in Tech A236 for a permission number. Fillable pdf form is available at http://www.mccormick.northwestern.edu/civil-environmental/current-students/forms-documents.html

McCormick School of Engineering
UNDERGRADUATE (Departmental) HONOR PROGRAMS

I. QUALIFICATIONS

Student with good scholastic records may apply to the Undergraduate Honors Program any time during their junior or pre-senior years. **Students must file their Undergraduate Honors program application form with the Academic Services Office at least three full quarters before completing their degree requirements.** At the time of admission to the program, the student must have a cumulative grade point average of 3.50 or higher. Admission to the program will be confirmed by filing of an HONORS PROGRAM FORM in the Records Office. This form is to be signed by the appropriate advisers.

II. REQUIREMENTS

A student must:

1. Complete at least three (3) units of approved advanced study with a B-average or better. This could be done by taking courses normally accepted at the graduate level. **Courses taken would apply only to the undergraduate degree.**
2. Complete an extended independent study program (at least two quarters) on the same topic leading to an acceptable report.

III. HONORS PROGRAM ADVISER

Each department chairman is responsible for arranging for some person or group within the department to administer the honors program. The person or group defines units of approved advanced study and independent study as well as evaluating the performance of each student at the end of the project and for determining if the definition of success is met.

IV. RECOGNITION

Successful completion of the Departmental Honors Program will be entered on the student's transcript. Recognition will also be given in the Commencement Program. In evaluating each student's performance, if it is not judged to meet the standards of success, the student will receive course grades and credits as earned.

V. DEPARTMENTAL AND PROGRAM ARRANGEMENTS

Applied Mathematics - See Professor Silber.

Biomedical Engineering – See Professor Olds.

Chemical Engineering - See Professor Smurr.

Civil Engineering - See Professor Corr

Computer Science - See Professor Berry.

Computer Engineering - See Professor Berry.

Electrical Engineering - See Professor Berry.

Environmental Engineering - See Professor Gaillard.

Industrial Engineering - See Professor Wilson.

Manufacturing and Design Engineering - See Professor Gatchell.

Materials Science and Engineering – See Dr. K. Stair.

Mechanical Engineering - See Professor Rudnicki

Combined Studies - The student should consult her/his adviser.

9/23/11

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/undergraduate-honors-program-application.pdf

NORTHWESTERN UNIVERSITY
McCORMICK SCHOOL OF ENGINEERING AND APPLIED SCIENCE
Undergraduate (Department) Honors Program Application

Students must file their Undergraduate Honors program application form with the Academic Services Office **at least three full quarters before completing their degree requirements. Student must be at the junior or pre-senior level.** At the time of admission to this Honors Program, the applicant must have a cumulative grade point average of 3.5 or better. **Courses taken would apply only to the undergraduate degree. Please Print Clearly.**

Your name_____Student ID_____Today's Date_____

Campus Address_____

_____

Catalog Year_____Expected Graduation Date_____Current GPA_____

Major of Undergraduate Honors Program _____ Class (circle): Junior Pre-Senior Senior

Course work is to include 3 advanced courses plus 2 quarters of independent course work. Please list the proposed advanced level courses (must be completed with a B-average or better)

1) Dept Name_____Course _____ Grade received_____ Qtr/year Taken _____
2) Dept Name_____Course _____ Grade received_____ Qtr/year Taken _____
3) Dept Name_____Course _____ Grade received_____ Qtr/year Taken _____

In which quarters do you plan to take these two units of independent course work? (They must be on the same topic, and the work must be presented in an acceptable report.)

1) Dept Name _____Course _____ Grade received _____ Qtr/year Taken _____
2) Dept Name _____Course _____ Grade received _____ Qtr/year Taken _____

Honors Adviser Name _____
Print Name

_____Date _____
Signature

Proposed Honors Project Adviser_____
Print Name

_____Date_____
Signature

Do not write below this line ----------

Undergraduate Engineering Office Action: Grant _____ Deny_____ Current GPA_____

Signature of Engineering Registrar: _____ Date_____

cc: Academic Services Office
Dean's Office
Department Office
Student

9/23/11

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/undergraduate-honors-program-application.pdf

Northwestern | McCORMICK SCHOOL OF ENGINEERING

GRADUATION APPLICATION

(The form should be completed by winter quarter of junior year)

Student ID: _____ Request Date: _____

The name below will appear EXACTLY on your DIPLOMA – PLEASE PRINT YOUR NAME CLEARLY

First Name: _____

Middle Initial or Middle Name: _____

Last Name: _____

☐ By checking this box I affirm my understanding that my degree will be sent to the permanent address listed on CAESAR if I am a fall, winter, or summer graduate.

Indicate Your Graduation Term and Degree(s) Below:

Fall (December) 20 ___ ___ Winter (March) 20 ___ ___ Spring (June) 20 ___ ___ Summer (Aug/Sept) 20 ___ ___

- Applied Mathematics
- Biomedical Engineering *(see below for HPME)*
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Computer Science
- Electrical Engineering
- Environmental Engineering
- Industrial Engineering
- Manufacturing and Design Engineering
- Materials Science and Engineering
- McCormick Integrated Engineering Studies (MIES)
- Mechanical Engineering
- Honors Program in Medical Education (HPME)
  - Anticipated Walk Date - _____
  - Anticipated Grad Date_____

Write out any certificates here:

_____

☐ **By checking this box, I affirm my understanding that if I intend to pursue another degree, major, minor, or a certificate outside the School of Engineering, I must fill out a separate application with the Office of the Registrar.** http://www.registrar.northwestern.edu/graduation

Return this form to the School of Engineering, Tech L269

Revised: 5/28/2017

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/BS_Degree_Application_rev05282017.pdf

McCormick School of Engineering and Applied Science
Petition for Dual Degree in McCormick
For Students Following EA/DTC Requirements

Six additional courses above the required 48 must be completed for each degree. PLEASE TYPE OR PRINT FORM.

Name: _____ STUDENT ID: _____ Date: _____
Major: _____
Catalog year you are following for this major _____

Name: _____
Major: _____
Catalog year you are following for this major _____

	Course	Grade	Qtr		Course	Grade	Qtr
Mathematics (4 courses)				Mathematics (4 courses)			
Basic Science (4 courses)				Basic Science (4 courses)			
Basic Engineering (5 courses)				Basic Engineering (5 courses)			
Major Courses (16 courses)				Major Courses (16 courses)			
Engineering Analysis & Computer Proficiency (4 courses)				Engineering Analysis & Computer Proficiency (4 courses)			

complete page 2

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/dual-degree-with-ea-dtc.pdf

	Course	Grade	Qtr		Course	Grade	Qtr
Design & Communications (3 courses)				Design & Communications (3 courses)			
Theme (7 courses)				Theme (7 courses)			
Unrestricted Electives (5 courses)				Unrestricted Electives (5 courses)			
6 additional courses (total courses 54)				6 additional Courses (total course 54)			

Advisor Signature _____ Date _____ Advisor Signature _____ Date _____

Program Chair Signature _____ Date _____ Program Chair Signature _____ Date _____

(Do not write below this line.)

Dean's Office _____ Date: _____

Approved: _____ Denied: _____ revised 11/06

Return Form to the Academic Services Office – Room # L269

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/dual-degree-with-ea-dtc.pdf

McCormick School of Engineering and Applied Science
Course Listing for Multiple Engineering Degrees
For Students Exempted From EA Requirements

This form must be attached to a curriculum petition requesting approval for multiple engineering degrees. Six additional courses above the required 48 must be completed for each degree. PLEASE TYPE OR PRINT FORM.

Name: _____ STUDENT ID: _____ Date: _____
Major: _____
Catalog year you are following for this major _____

Name: _____
Major: _____
Catalog year you are following for this major _____

	Course	Grade	Qtr		Course	Grade	Qtr
Mathematics (6 courses)				Mathematics (6 courses)			
Basic Science (5 courses)				Basic Science (5 courses)			
Basic Engineering (6 courses)				Basic Engineering (6 courses)			
Computer				Computer			
Major Courses (16 courses)				Major Courses (16 courses)			

Complete page 2

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/dual-degree-without-ea-dtc.pdf

	Course	Grade	Qtr		Course	Grade	Qtr
Design & Communication (3 Courses)				Design & Communication (3 Courses)			
Theme (7 courses)				Theme (7 courses)			
Unrestricted Electives (4 courses)				Unrestricted Electives (4 courses)			
Other Courses				Other Courses			

Advisor Signature _____ Date _____ Advisor Signature _____ Date _____

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/dual-degree-without-ea-dtc.pdf

Northwestern | McCORMICK SCHOOL OF ENGINEERING

Request to Participate in McCormick's Graduation Convocation

POLICY

- 4 or fewer courses are remaining to fulfill your degree requirements
- These courses must be completed by the END of the fall quarter following spring graduation.
- A degree application must be on file.

Name _____ Student ID_____

My degree will be a B.S. in _____

I have already submitted a degree application for this graduation period (fill in the blanks):

Fall 20____ Winter 20___ Spring 20__ Summer 20___

At the end of the current spring quarter the courses remaining to fulfill my degree requirements will be:

Course:	Fulfills the requirement:	Take when:
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____

STUDENT SIGNATURE_____ Date_____

Approved _____ Denied _____

Wesley R. Burghardt, Associate Dean Date

09/2016

http://www.mccormick.northwestern.edu/students/undergraduate/forms.html#graduation

Northwestern | McCORMICK SCHOOL OF ENGINEERING

Guidelines regarding request to participate in McCormick's Graduation Convocation event

Return the form to Dean Burghardt in in Tech L268. Once the request has been approved by Dean Burghardt, you will be notified by e-mail.

Information about University Commencement, including how to order cap/gown: http://www.northwestern.edu/commencement/. Information about McCormick Convocation will be emailed.

Your name will not be in the commencement book this year. It will be in the book for the following June commencement.

You are eligible for Latin honors, but they will be determined only for the quarter when you graduate.

The only email your family will receive regarding graduation will be from Undergraduate Engineering Office.

http://www.mccormick.northwestern.edu/students/undergraduate/forms.html#graduation

Northwestern University
McCormick School of Engineering and Applied Science

FRESHMAN DECLARATION OR CHANGE OF MAJOR FORM

This form requires no signature

Last Name First Name Middle Initial

NU Student ID Number

Former Major

New Major

Today's Date

PLEASE RETURN THIS FORM TO THE ACADEMIC SERVICES OFFICE, L269 TECH.

August 2001

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/freshman-declaration-or-change-of-major-form.pdf

Northwestern | McCORMICK SCHOOL OF ENGINEERING

Change of Major/Change of Catalog Year Form

This form is for students in the sophomore year or later –
First-year students should use the Declaration of Major Form.

This form cannot be used for BME Majors.

Name: _____ **Date:** _____

Student ID: _____

E-Mail Address: _____

Note about Part B, Change of Catalog Year: Degree requirements may change from year to year. Your catalog year determines the specific requirements you need to complete in order to earn your engineering degree. The default is the academic year you first entered McCormick, though you are able to change to any later catalog year. By changing catalog years, you must meet those requirements completely. Most changes on a year-to-year basis are minor, however, changing your catalog year may have major implications for completing your degree and you should know exactly how this would impact you before making the change.

Part A - Change of Major and/or Advisor

Old Major: _____ New Major: _____

Old Major Catalog Year: _____ New Major Catalog Year: _____

_____ _____
Signature of Old Major Advisor Signature of New Major Advisor

_____ _____
Printed Name of Old Major Advisor Printed Name of New Major Advisor

Advisor listings can be found in the Undergraduate Engineering Office

---

Part B - Change of Catalog Year Only

Major: _____

Old Catalog Year: _____ New Catalog Year: _____

_____
Signature of Advisor

_____
Printed Name of Advisor

Return Completed Form (with necessary signatures) to the Undergraduate Engineering Office, Tech L269

April 25, 2017

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/change-major-or-catalog-year.pdf

NORTHWESTERN
UNIVERSITY

Office of the Registrar

REGISTRATION TIME CONFLICT PERMISSION FORM

****PLEASE PRINT****

NAME		STUDENT ID#	TERM	YEAR	PHONE#
Last	First				

Per the instructor signature below, this student has been granted permission to enroll in the course(s) that conflicts with his/her schedule. An additional signature/permission number is required if the class is closed.

ADD CLASS:

Five Digit Class #	Subject	Catalog # (i.e., 101-1)	Section number (s)	Instructor's Name

Permission to add if class is **CLOSED** (signature/permission #) _____

Permission to Override **TIME CONFLICT** (instructor signature) _____

CONFLICTS with CLASS :

Five Digit Class #	Subject	Catalog # (i.e., 101-1)	Section number (s)	Instructor's Name

Permission to add if class is **CLOSED** (signature/permission #) _____

Permission to Override **TIME CONFLICT** (instructor signature) _____

ADD CLASS:

Five Digit Class #	Subject	Catalog # (i.e., 101-1)	Section number (s)	Instructor's Name

Permission to add if class is **CLOSED** (signature/permission #) _____

Permission to Override **TIME CONFLICT** (instructor signature) _____

CONFLICTS with CLASS :

Five Digit Class #	Subject	Catalog # (i.e., 101-1)	Section number (s)	Instructor's Name

Permission to add if class is **CLOSED** (signature/permission #) _____

Permission to Override **TIME CONFLICT** (instructor signature) _____

OFFICE USE

RO _____

Date _____

http://www.registrar.northwestern.edu/forms/registration_forms/reg_time_conflict_form.pdf

Northwestern | McCORMICK SCHOOL OF ENGINEERING

CURRICULUM PETITION

Name_____ Major. _____

Expected Graduation Date_____ (month) (year) E-mail_____ STUDENT ID_____

1) REQUEST FOR COURSE SUBSTITUTION:

Substitute_____ (Subject course #) with_____ (Subject course #) taken in_____ (QTR/YR) and count it towards_____ (Requirement Area (Write in one from below)

Substitute_____ (Subject course #) with_____ (Subject course #) taken in_____ (QTR/YR) and count it towards_____ (Requirement Area (Write in one from below)

Substitute_____ (Subject course #) with_____ (Subject course #) taken in_____ (QTR/YR) and count it towards_____ (Requirement Area (Write in one from below)

Substitute_____ (Subject course #) with_____ (Subject course #) taken in_____ (QTR/YR) and count it towards_____ (Requirement Area (Write in one from below)

Substitute_____ (Subject course #) with_____ (Subject course #) taken in_____ (QTR/YR) and count it towards_____ (Requirement Area (Write in one from below)

2) REQUEST TO COUNT A COURSE TOWARDS SPECIFIC REQUIREMENT:

Use_____ (Subject course #) taken in_____ (QTR/YR) towards the_____ (Requirement Area) requirement

Use_____ (Subject course #) taken in_____ (QTR/YR) towards the_____ (Requirement Area) requirement

Use_____ (Subject course #) taken in_____ (QTR/YR) towards the_____ (Requirement Area) requirement

Use_____ (Subject course #) taken in_____ (QTR/YR) towards the_____ (Requirement Area) requirement

Use_____ (Subject course #) taken in_____ (QTR/YR) towards the_____ (Requirement Area) requirement

REASON FOR REQUEST (REQUIRED):

Requirement Areas
Math Requirement
EA Requirement
DTC Requirement
Speech Requirement
Basic Science Requirement
Basic Engineering (Specify area)
Major Courses
Technical Electives
Specialization
(Specify Specialization)

Student Signature:_____ Date_____

Adviser Name:_____ (Adviser Signature) &_____ Date_____

Undergrad Program or Assist Chair Name:_____ (Undergrad Program or Assistant Chair Signature) &_____ Date_____

Department Action: Grant: ☐ Deny: ☐

Office Use Only

Dean's Office_____ Date:_____

Approved: ☐ Denied: ☐

Log-In ___/___/___ #_____
Decision Log ___/___/___

Email MAS

Return Form to the School of Engineering – Room # L269

Revised 11/16

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/petition-non-study-abroad.pdf

Log-In ___/___/___ #_____
Decision Log __/___/__
Email __ MAS

Northwestern | McCORMICK SCHOOL OF ENGINEERING

PETITION FOR TRANSFER OF STUDY ABROAD CREDIT

This form is to be used for equivalency verification for credits taken by Engineering undergraduates on study abroad programs. Syllabi written in English must be provided for courses to be reviewed for equivalency. **Submit forms to the Academic Services Office – Tech L269.**

Name_____ Major_____ Date _____

NU Email _____@u.northwestern.edu Phone _____

Expected Graduation Date (Quarter)_____ (Year)_____ Student ID_____

Student Signature _____

Approval of Course Transfer and Application to Degree Requirements
To be completed by adviser and departmental undergraduate chair

Adviser: Signature _____ Adviser: Printed Name _____ Date _____

Dept Chair: Signature _____ Dept Chair: Printed Name _____ Date _____

Department Action: Grant _____ Deny _____

Dean's Office _____ Date_____ ☐ Approve ☐ Deny

University Name _____ Taken When?_____

CREDIT 1: Verification of Equivalency: To be approved by the instructor of the course being requested or the departmental undergraduate chair

Proposed Course
Course # _____ Course Title _____
NU Equivalent
Course # _____ Course Title _____
Transfer Equivalency Verification: The above listed courses are equivalent.

_____ _____ _____ _____
(Printed Name of Course Instructor or Undergrad Chair) (Signature of Course Instructor or Undergrad Chair) (Department) (Date)

CREDIT 1: Application to Degree Requirements: To be completed by student and approved by adviser and undergraduate chair

☐Math ☐EA ☐DTC ☐Public Speaking ☐Basic Science ☐Theme ☐Unrestricted Electives ☐Major Courses

☐Basic Engineering (Area _____) ☐Tech Electives ☐Specialization (Specify _____)

CREDIT 2: Verification of Equivalency: To be completed by the instructor of the course being requested or the departmental undergraduate chair

Proposed Course
Course # _____ Course Title _____
NU Equivalent
Course # _____ Course Title _____
Transfer Equivalency Verification: The above listed courses are equivalent.

_____ _____ _____ _____
(Printed Name of Course Instructor or Undergrad Chair) (Signature of Course Instructor or Undergrad Chair) (Department) (Date)

CREDIT 2: Application to Degree Requirements: To be completed by student and approved by adviser and undergraduate chair

☐Math ☐EA ☐DTC ☐Public Speaking ☐Basic Science ☐Theme ☐Unrestricted Electives ☐Major Courses

☐Basic Engineering (Area _____) ☐Tech Electives ☐Specialization (Specify _____)

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/petition-study-abroad.pdf

CREDIT 3: Verification of Equivalency: To be approved by the instructor of the course being requested or the departmental undergraduate chair

Proposed Course

Course # _____ Course Title _____

NU Equivalent

Course # _____ Course Title _____

Transfer Equivalency Verification: The above listed courses are equivalent.

_____	_____	_____	_____
(Printed Name of Course Instructor or Undergrad Chair)	(Signature of Course Instructor or Undergrad Chair)	(Department)	(Date)

CREDIT 3: Application to Degree Requirements: To be completed by student and approved by adviser and undergraduate chair

☐Math ☐EA ☐DTC ☐Public Speaking ☐Basic Science ☐Theme ☐Unrestricted Electives ☐Major Courses

☐Basic Engineering (Area _____) ☐Tech Electives ☐Specialization (Specify _____)

CREDIT 4: Verification of Equivalency: To be approved by the instructor of the course being requested or the departmental undergraduate chair

Proposed Course

Course # _____ Course Title _____

NU Equivalent

Course # _____ Course Title _____

Transfer Equivalency Verification: The above listed courses are equivalent.

_____	_____	_____	_____
(Printed Name of Course Instructor or Undergrad Chair)	(Signature of Course Instructor or Undergrad Chair)	(Department)	(Date)

CREDIT 4: Application to Degree Requirements: To be completed by student and approved by adviser and undergraduate chair

☐Math ☐EA ☐DTC ☐Public Speaking ☐Basic Science ☐Theme ☐Unrestricted Electives ☐Major Courses

☐Basic Engineering (Area _____) ☐Tech Electives ☐Specialization (Specify _____)

CREDIT 5: Verification of Equivalency: To be approved by the instructor of the course being requested or the departmental undergraduate chair

Proposed Course

Course # _____ Course Title _____

NU Equivalent

Course # _____ Course Title _____

Transfer Equivalency Verification: The above listed courses are equivalent.

_____	_____	_____	_____
(Printed Name of Course Instructor or Undergrad Chair)	(Signature of Course Instructor or Undergrad Chair)	(Department)	(Date)

CREDIT 5: Application to Degree Requirements: To be completed by student and approved by adviser and undergraduate chair

☐Math ☐EA ☐DTC ☐Public Speaking ☐Basic Science ☐Theme ☐Unrestricted Electives ☐Major Courses

☐Basic Engineering (Area _____) ☐Tech Electives ☐Specialization (Specify _____)

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/petition-study-abroad.pdf

NORTHWESTERN
UNIVERSITY

Office of the Registrar

Application for Northwestern University Credit for College-Level Course Work Completed Prior to Graduation from High School

Part I – To be completed by the student:

Student's name _____

Title of course _____

College where taken _____

Part II – to be completed by the high school registrar, principal, or counselor:

I certify that the above college-level course was not part of the student's high school program and that credit for the course was not applied to fulfill any requirements for the high school diploma.

Signature _____

Title _____

High School _____

Date _____

Part III – To be completed by the registrar or dean of the college where the course was taken:

I certify that the above course was a course for duly matriculated college students (i.e., high school graduates). Please note that courses taken through dual enrollment programs offered by a college for high school students do not fit this criterion and are not eligible for transfer credit at Northwestern.

Signature _____

Please submit the completed application to:

Northwestern University
Office of the Registrar
633 Clark Street
Evanston, Illinois 60208

Fillable PDF form is available at
http://www.registrar.northwestern.edu/forms/grad_forms/140929_high_schooL_college_credit_form.pdf

Northwestern University
McCormick School of Engineering and Applied Science

COURSE WORK AT OTHER SCHOOLS

Students wishing to take courses at another institution, domestic or abroad, must submit a Curriculum Petition (available in the Undergraduate Engineering Student Services Office, Tech Room# L269, or on the web) to their adviser indicating the course to be taken and the name of the school at which it is to be taken. Courses must be taken at an accredited institution, must be a bona fide college course, and must be an appropriate course for Northwestern University (i.e. similar to a course that might be offered at Northwestern). Petitions to take course work elsewhere should be processed prior to taking the course at another school.

Courses in mathematics, science, or engineering must have special approval in writing from the department at Northwestern offering the equivalent course. Usually, students can get approval via the following steps: obtaining a description of the proposed courses; showing it to a representative from the appropriate Northwestern department; and having that representative approve the course equivalence on the petition form before the student receives approval from his or her advisor. Transfer credit evaluators and their respective departments are listed below.

Once the course work has been completed an official transcript must be forwarded to the University Registrar, Northwestern University, 633 Clark Street, Evanston, IL 60208-3102.

The course work taken must be a bona fide college course offered by a college or university and enrolled primarily by high school graduates. Students should also review the Northwestern University Registrar's regulations http://www.registrar.northwestern.edu/graduation/transferring_non-NU_Courses.html to make sure that they comply with the university-wide guidelines for transfer credit.

REMEMBER: In taking any courses elsewhere, students should take into account the term- pricing agreement under which they entered the University (consult University Catalog).

POLICIES

1. The student's school at Northwestern must grant prior approval for the course.
2. Work must be in a curricular area generally recognized for credit at Northwestern.
3. One unit of Northwestern credit will be granted for a course that carries two or three semester hours or three or four quarter hours of credit at the sponsoring institution.
4. The maximum number of Northwestern units that can be earned in a summer session is two units for any four or five-week session, three units for any six-week session, and four units for any eight- or ten-week session.

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/transfer-credit-policy.pdf

5. **Limits on credit earned elsewhere after matriculation at Northwestern University.** The Undergraduate Registration Requirement (URR) specifies the minimum number of units of credit a student must earn at Northwestern; it thus limits the amount of non- Northwestern credit that may be counted toward a Northwestern degree. For example, a student entering as a freshman in a four-year degree program must be registered at Northwestern for at least 9 quarters and complete courses worth at least 32 units of credit at the University. (For purposes of the URR, being "registered at Northwestern" for a quarter means that the student is registered for and completes Northwestern course work worth at least two units of credit during that quarter and that the course work is under the supervision of the Northwestern faculty. More details on the URR can be found on the Registrar's website.)

SCHOOL-SPECIFIC POLICIES

Two-year or community college credit:
Northwestern University's colleges and schools have specific policies on granting credit for courses taken at a two-year or community college after matriculation at Northwestern:

- **Bienen, Communication, and McCormick** - Credit accepted with approval

September 2015

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/transfer-credit-policy.pdf

Area/Evaluator	
Mathematics:	Prof. Michael Stein (email to evaluate credit or for appointment) mike@math.northwestern.edu Phone: 847-491-5524 - Office #: Lunt 228

Note: Provide the following documentation via email or set up an appointment via email and bring documentation for all of the math courses you wish to have evaluated.

Documentation Needed: either the text that was used or a copy of the table of contents from the text that was used for the course in addition to, or in place of, the syllabus for the course.

Physics:	Prof. Deborah Brown (email for appointment) d-brown4@northwestern.edu Phone: 847-467-5789 - Office #: F220, Tech

Note: The physics requirement in the engineering school requires calculus-based physics with a lab.

Documentation Needed: Bring petition form and documentation for all the physics courses you wish to have evaluated, either the text that was used or a copy of the table of contents from text that was used in addition to, or in place of, the syllabus for the course (FOR BOTH LECTURE AND LAB).

Chemistry:	Prof. Fred Northrup (email to evaluate credit or for appointment) northrup@northwestern.edu Phone: 847 491 7910 - Office #: GG40, Tech

Note: Provide the following documentation via email or set up an appointment via email and bring documentation for all of the chemistry courses you wish to have evaluated. Make sure to include information for both Lecture and Lab.

Documentation Needed: either the text that was used or a copy of the table of contents from text that was used in addition to, or in place of, the syllabus for the course (FOR BOTH LECTURE AND LAB).

Biology *Email for appointment*	Prof. Gary Galbreath	gjg853@northwestern.edu Office #: 2144 Hogan Hall 2153 N. Campus Drive Phone: 847-491-8775
Applied Math *Email for appointment*	Prof. Alvin Bayliss	a-bayliss@northwestern.edu Office #: M466, Tech Phone: 847-491-7221
Biomedical Engineering *Email for appointment*	Prof. Timothy Carroll	t-carroll@northwestern.edu Office #: E310, Tech Phone: 312-926-1723

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/transfer-credit-policy.pdf

Chemical Engineering *Email for appointment*	Prof. Jennifer Cole	Jennifer-cole@northwestern.edu Office #: E178, Tech Phone: 847-467-5712
Civil Engineering *Email for appointment*	Prof. Karen Chou	karen-chou@northwestern.edu Office #: A218, Tech Phone: 847-491-4997
Computer Engineering *Email for appointment*	Prof. Russ Joseph	rjoseph@eecs.northwestern.edu Office #: L467, Tech Phone: 847-491-3061
Computer Science *Email for appointment*	Prof. Robby Findler	robby@eecs.northwestern.edu Office #: L454, Tech Phone: 847-467-0962
Electrical Engineering *Email for appointment*	Prof. Randall Berry	rberry@eecs.northwestern.edu Office #: M318, Tech Phone: 847-491-7074
Environmental Engineering *Email for appointment*	Prof. J. F. Gaillard	jf-gaillard@northwestern.edu Office #: A324, Tech Phone: 847-467-1376
Industrial Engineering: *Email for appointment*	Prof. Jill Wilson	Jill.wilson@northwestern.edu Office #: C120, Tech Phone: 847-467-1551
Manufacturing & Design Engineering *Email for appointment*	Prof. David Gatchell	d-gatchell@northwestern.edu Office #: E380, Ford Phone: 847-491-6761
Materials Science *Email for appointment*	Prof. Kathleen Stair	kstair@northwestern.edu Office #: 2002, Cook Hall Phone: 847-491-7827
Mechanical Engineering *Email for appointment*	Prof. Mitra Hartmann	m-artmann@northwestern.edu Office #: B284, Tech Phone: 847-467-4633
All Other Technical Credits: *Sign-up in L268 for appointment*	Dean Joe Holtgreive	jjh@northwestern.edu Office #: L268, Tech Phone: 847-491-3332

http://www.mccormick.northwestern.edu/documents/students/undergraduate/forms/transfer-credit-policy.pdf

Petition for Credit for a Non-Northwestern Course

This form is for Northwestern students planning to take a course at another institution. Please read the document on Procedures and Policies for Courses Taken at Other Institutions after Matriculation at Northwestern before completing the form.

Submit this petition prior to taking a potential transfer course. All fields are required, unless otherwise indicated.

Date: 2016-07-22

Student ID Number (seven-digit number found on WildCard)

First Name: Jane

Middle Initial:

Last Name: Doe

Email: janedoe2019@u.northwestern.edu

Home School at Northwestern: McCormick School of Engineering a

Name of Adviser in Home School (if known)

When did you enter Northwestern?

Quarter: Year:

Expected Graduation

Quarter: Year:

I am a student with a F1 or J1 visa planning to study outside of the U.S. in my country of permanent residence/citizenship (or have obtained a visa exemption from the Study Abroad Office)

- ◯ Yes
- ◯ No

College or University Offering Course

Four-year School?

- ◯ Yes
- ◯ No

(see Procedures and Policies for relevant rules)

Is this course held in a classroom or online?

- ◯ Classroom
- ◯ Online

Course Title

Course Number (of offering school)

Credits Granted (by school offering course)

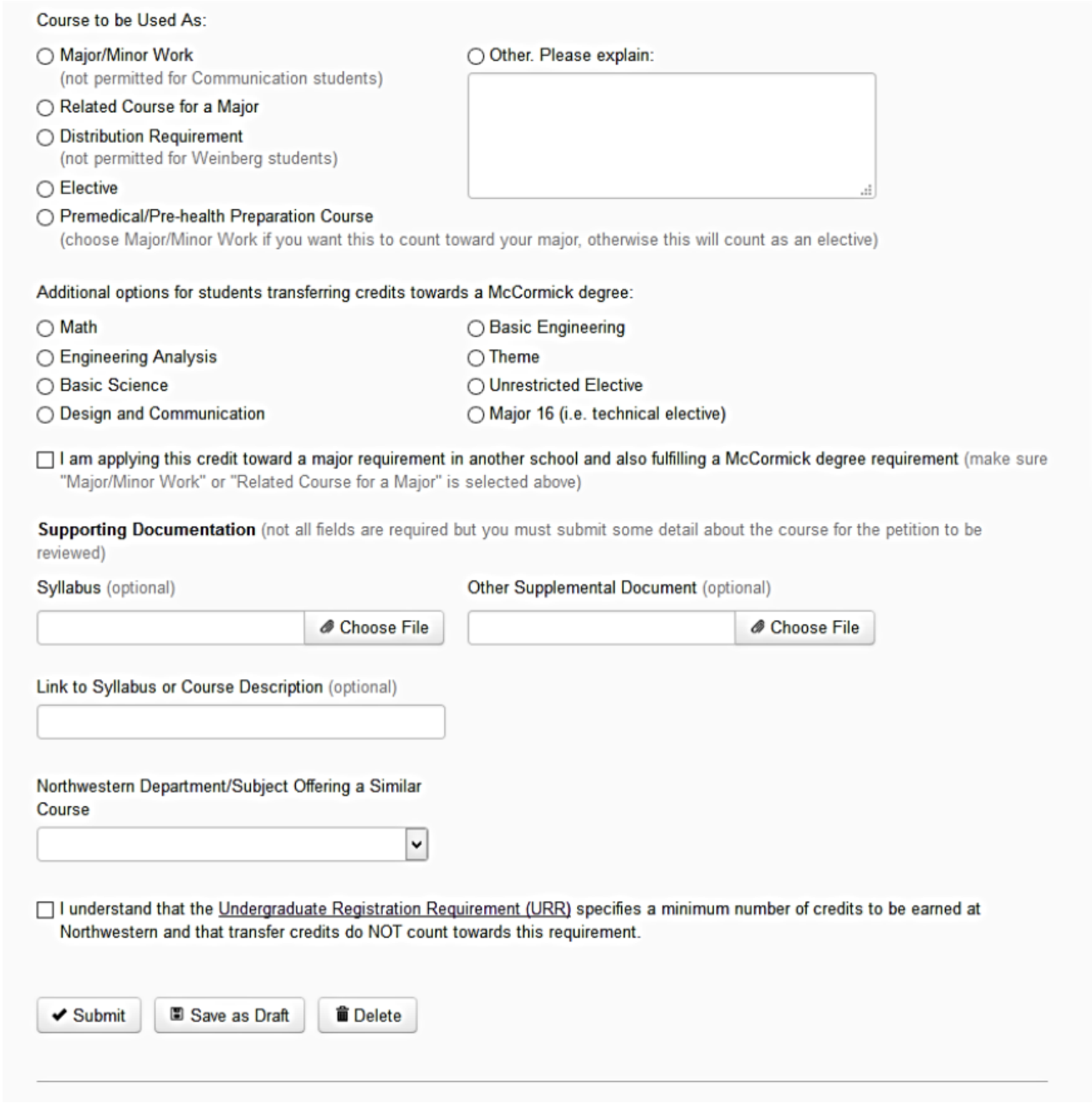
Credit Type

Term Course Will be Offered

Quarter/Semester: Year: Start Date: End Date:

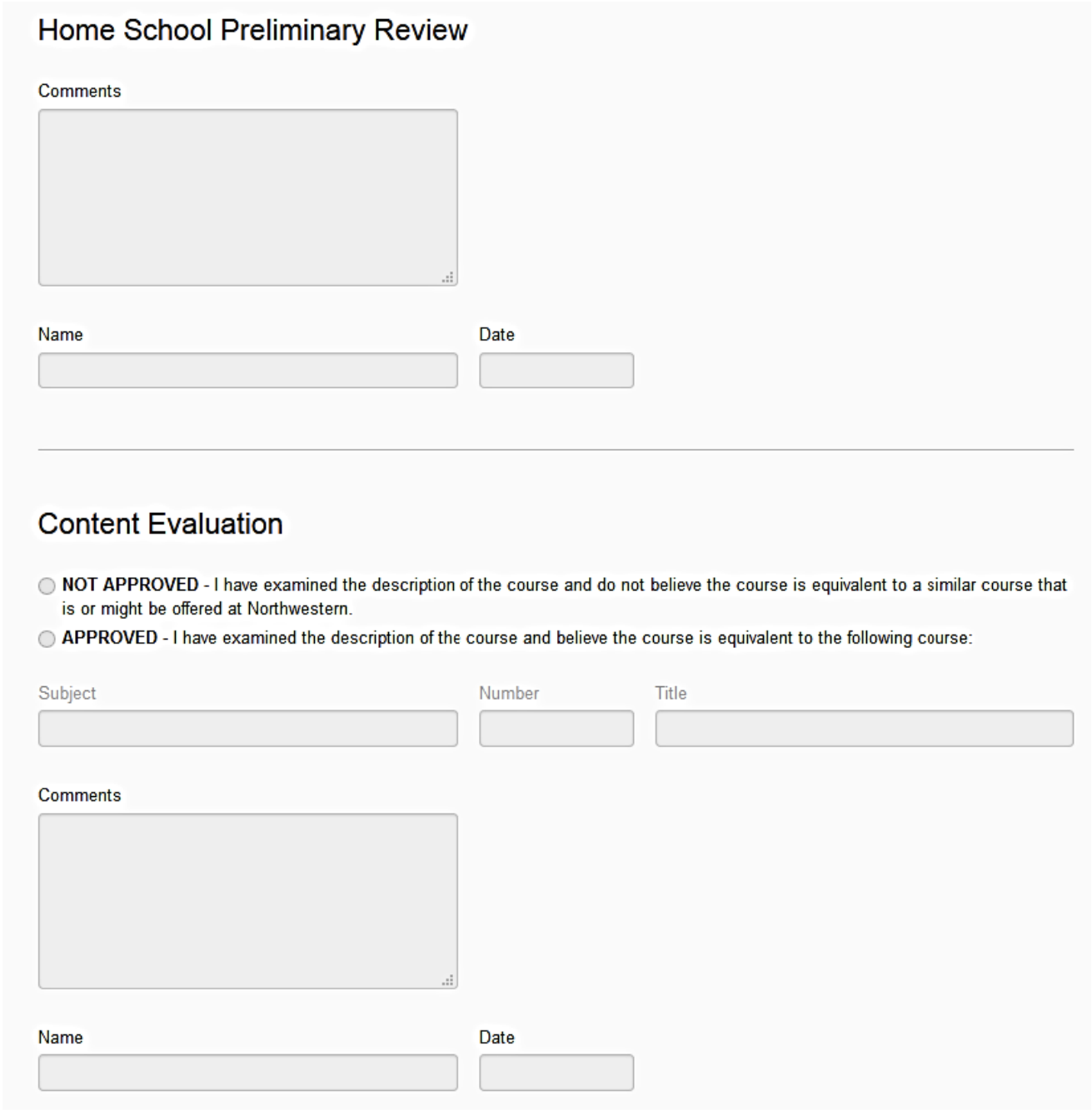
http://www.mccormick.northwestern.edu/students/undergraduate/forms.html

must submit petition online, netid and password required



http://www.mccormick.northwestern.edu/students/undergraduate/forms.html

must submit petition online, netid and password required



Home School Preliminary Review

Comments

Name

Date

Content Evaluation

- **NOT APPROVED** - I have examined the description of the course and do not believe the course is equivalent to a similar course that is or might be offered at Northwestern.
- **APPROVED** - I have examined the description of the course and believe the course is equivalent to the following course:

Subject

Number

Title

Comments

Name

Date

http://www.mccormick.northwestern.edu/students/undergraduate/forms.html

must submit petition online, netid and password required

Student Review of Proposed Articulation

Before submitting this petition to your home school, please review the articulation proposed by the content evaluators above. Your home school will make the final determination and approval of how the credit will be articulated. You will receive an email alert to review that articulation once your home school signs the form.

Once you have reviewed the proposed articulation, confirm and sign below. If you wish to withdraw your petition, choose "Withdraw Petition" below.

- [ ] I have reviewed the proposed articulation.
- [ ] I met with departmental adviser(s) regarding this petition.

Name | Date

Home School Approval

- ○ **APPROVED** - This petition meets the requirements of the content evaluators.
- ○ **APPROVED** - This petition was not approved by content evaluators but our school will articulate the course as a general credit.
- ○ **NOT APPROVED** - This petition was not approved by content evaluators and is therefore being rejected.
- ○ **NOT APPROVED** - This petition does not adhere to the policies of our school and is therefore being rejected (regardless of the decision of the content evaluators).

Northwestern Articulation

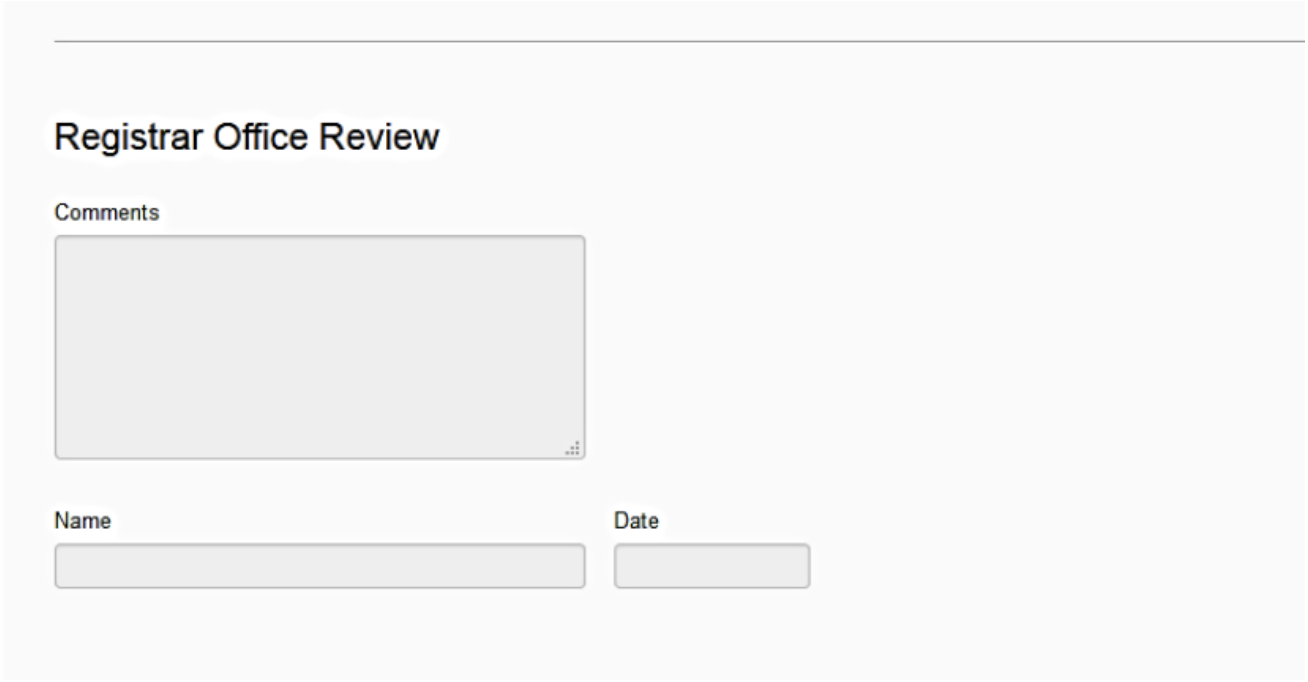
Subject | Number | Title

Comments

Name | Date

http://www.mccormick.northwestern.edu/students/undergraduate/forms.html

must submit petition online, netid and password required



http://www.mccormick.northwestern.edu/students/undergraduate/forms.html

must submit petition online, netid and password required

NORTHWESTERN UNIVERSITY

OFFICE OF THE REGISTRAR

McCORMICK STUDENT GRADUATION PETITION FORM FOR MAJORS/MINORS PURSUED OUTSIDE OF McCORMICK

Print Form

All McCormick students must file a separate graduation petition form, one calendar year prior to their intended graduation date, for additional major(s), minor(s) pursued outside of McCormick.
We recommend that you complete most of the form sections online and then print it as well as a copy of your academic advisement report and take both forms with you when you meet with your adviser(s).

Student ID#: _____ NU Email: _____

First Name: Middle Name(s): Last Name(s):

Name to appear on diploma: *Must match student record and/or legal name* _____

I plan to complete my degree requirements in: ☐ Fall ☐ Winter* ☐ Spring ☐ Summer **Year:** _____

** If you are working on a WCAS thesis and would like to be considered for departmental honors, please note that your graduation quarter must be Spring*

☐ I have reviewed my academic advisement report in CAESAR http://www.northwestern.edu/caesar/

☐ I have reviewed the University course double-counting rules http://www.registrar.northwestern.edu/graduation/index.html#double_counting

Major and additional major(s), minor(s), and certificate(s)
I plan to complete the following major(s)/minor(s)/certificate(s); list programs **both within and outside** McCormick:
(Please also notate if you are dropping any majors or minors (outside of McCormick) from your record)

Major(s)	Minor(s)	Certificate(s)

You must meet with a department/program adviser in each major and minor you list above. List requirements still to be completed on the reverse side of this form and obtain the signature of the relevant adviser for each major/minor. These advisers should also indicate substitutions, waivers, themes or related courses requiring approval, etc. (attach additional pages, if needed).

Dual Bachelor's Degree Students: DO NOT USE THIS FORM. Please use the standard graduation forms for each of your home schools.

A confirmation email will be sent to the student's Northwestern email address once the petition has been processed by your degree auditor.

**** COMPLETED FORMS SHOULD BE SUBMITTED TO THE OFFICE OF THE REGISTRAR****

Revised 9/15 1/2 *OFFICE OF THE REGISTRAR· 633 CLARK STREET EVANSTON, IL 60208*

http://www.registrar.northwestern.edu/forms/grad_forms/151105_tech_petition.pdf
This form is available in fillable pdf format

Name: Student ID #:

☐ Other Major *or*	☐ Minor *or* ☐ Certificate *(skip section if not relevant)*	List other major, minor, or certificate here:	Concentration *(if relevant)*:

1) Indicate the **undergraduate catalog year** of the requirements that you are following for this major/minor (*this is typically the year you started at NU, e.g., 2015-2016 for Fall quarter 2015*).
2) List the requirements **not yet completed** for this major/minor- both courses in progress and courses still to be taken to complete the requirements. Indicate the term and year in which you are taking or expect to take each course.
3) For a major, list all approved "**related courses**" completed and not yet completed. (Some majors do not require related courses.) You can omit any already listed as "related courses" in your academic advisement report.
4) Your department/program adviser for this major/minor must sign this form. The adviser should also indicate any substitutions, waivers, themes or related courses requiring approval, etc. Attach additional pages, if needed.
5) Note that you may be able to complete some of this page before meeting with your adviser, but you may choose to leave some areas blank (e.g., courses to be taken and/or catalog edition) until **you discuss your options with your adviser**. These areas will then be manually filled out by you and your adviser.
Please print additional copies of this page for additional majors or minors.

I am following the requirements in the undergraduate catalog *(typically the academic year you started at NU)*:

Dept/Pgm	Course# *(or category, e.g., "300-level")*	FALL *Select year below*	WINTER *Select year below*	SPRING *Select year below*	SUMMER *Select year below*	*Adviser Approvals (i.e., substitutions, waivers, themes etc...): Attach marked-up copy of academic advisement report, if needed.*

RELATED COURSES Indicate dept/pgm	Course# *(or category, e.g., "300-level")*	FALL *Select year below*	WINTER *Select year below*	SPRING *Select year below*	SUMMER *Select year below*

Print Name of Adviser:		Signature of Adviser:		Date:	

Student ink signature:		Date:	

Revised 9/15 *2/2* *OFFICE OF THE REGISTRAR· 633 CLARK STREET EVANSTON, IL 60208*

http://www.registrar.northwestern.edu/forms/grad_forms/151105_tech_petition.pdf
This form is available in fillable pdf format

Application for Undergraduate Inter-School Transfer (IST)

Policies

- Approval of an inter-school transfer (IST) is contingent upon satisfactory performance in the current school. If a student is on academic probation at the end of the term, probation may continue in the new school.
- The inter-school transfer is not in effect until final grades are posted and any pending charges of academic dishonesty have been resolved.
- Approved inter-school transfers take effect at the beginning of the following quarter.
- Students may initiate an inter-school transfer in the first week of a Fall, Winter or Spring term to be effective the following term; steps 1, 2 and 3 of the "Procedures" listed below must be completed by the Wednesday of the fifth week of the term. Quarter-specific deadlines are listed below. Students will be notified of a decision in time to plan for registration for the upcoming term.

Visit Office of the Registrar web site for more information and application.
http://www.registrar.northwestern.edu/forms/interschool_transfer.html

Summary of MTS and ET Topics Units in BSCE

Student Name: **Student ID:**

Unit Count	Category	Courses with **Math/Science** Topics	Quarter	Grade	Units
1	Math	Math 220 – Differential Calculus of 1 Variable Function			1.0
2		Math 224 – Integral Calculus of 1 Variable Function			1.0
3		Math 230 – Differential Calculus of Multi-variable Function			1.0
4		Math 234 – Multiple Variable Integration & Vector Calculus			1.0
5-7	Engrg Anal & Computer	Gen_Eng 205-1 – Engineering Analysis I			0.8
		Gen_Eng 205-2 – Engineering Analysis II			0.5
		Gen_Eng 205-3 – Engineering Analysis III			0.8
		Gen_Eng 205-4 – Engineering Analysis IV			0.9
8	Basic Science	Chem 131, 151, 171 – General Chemistry			1.34
9		Physics 135-2 – General Physics			1.34
10		Biological Science or Earth 201, 202			1.0
11		Bio. Sci., Earth 201, 202, Chem 132, 152, 172, Physics 135-3			≥1.0
12	MTS electives	Civ_Env 306 – Uncertainty Analysis			0.5
13		*Elective must have at least 0.5 MTS unit*			x1
				Total Math/Science units (*minimum of 12***) =11.68+0.5+x1**	

Unit Count	Category	Courses with **Engineering Topics**	Quarter	Grade	Units
1	Design	DSGN 106-1 – Engineering Design/Communication			0.5
		DSGN 106-2 – Engineering Design/Communication			0.5
2	Engrg Anal & Computer	Gen_Eng 205-1 – Engineering Analysis I			0.2
		Gen_Eng 205-2 – Engineering Analysis II			0.5
		Gen_Eng 205-3 – Engineering Analysis III			0.2
		Gen_Eng 205-4 – Engineering Analysis IV			0.1
3	Basic Engrg	Civ_Env 216 – Mechanics of Materials			1.0
4		Thermodynamics			1.0
5		Mech_Eng 241 – Fluid Mechanics I			1.0
6		Electrical Science			1.0
7		*elective courses are in italic fonts (CivEnv 205 recomm.)*			x3
8	Major Courses	Civ_Env 221 – Theory of Structures I			1.0
9		Civ_Env 250 – Intro to Soil Mechanics			1.0
10		Civ_Env 260 – Fund Environ Engineering			1.0
11		Civ_Env 325 – Reinforced Concrete			1.0
12		Civ_Env 330 – Construction Management			1.0
13		Civ_Env 340 – Fluid Mechanics II			1.0
14		Civ_Env 371 or 376 – Transportation Plan/Analysis or Transportation System Operations			1.0
15	Design Synthesis	Civ_Env 382 – Capstone Design			1.0
16		*Must be design*			1.0
17.	*MTS Electives*	Civ_Env 306 – Uncertainty Analysis			0.5
18		*Elective must have at least 0.5 MTS unit*			x2
19	Technical Electives	*GenEng 220-1,2 recommended*			x4
20		*elective courses are in italic fonts*			x5
21		*elective courses are in italic fonts*			x6
22		*elective courses are in italic fonts*			x7
23		*elective courses are in italic fonts*			x8
24					
25					
26					
27					
				Total Engineering Topic units (*minimum 18 units***) = 15.5+x2+x3+x4+x5+x6+x7+x8**	

Summary of MTS and ET Units in BSEE

Student Name: Student ID:

Unit Count	Category	Courses with **Math/Science** Topics	Quarter	Grade	Units
1	Math	Math 220 – Differential Calculus of 1 Variable Function			1.0
2		Math 224 – Integral Calculus of 1 Variable Function			1.0
3		Math 230 – Differential Calculus of Multi-variable Function			1.0
4		Math 234 – Multiple Variable Integration & Vector Calculus			1.0
5-7	Engrg Anal & Computer	Gen_Eng 205-1 – Engineering Analysis I			0.8
		Gen_Eng 205-2 – Engineering Analysis II			0.5
		Gen_Eng 205-3 – Engineering Analysis III			0.8
		Gen_Eng 205-4 – Engineering Analysis IV			0.9
8.34	Basic Science	Chem 131, 151, 171 – General Chemistry			1.34
9.68		Chem 132, 152, 172 – General Physical Chemistry			1.34
11.02		Physics 135-2 – General Physics			1.34
	Basic Engrg	*System Engineering and Analysis elective*			X1
		Probability, Statistics, and Quality Control elective			X2
12.02	Major Courses	Env_Sci 201 – Earth, A Habitable Planet			1.0
13.02		Env_Sci 202 – Health of Biosphere			1.0
14.02		Chem 210-1 – Organic Chem			1.0
	Technical Electives	*Elective course is in italic fonts*			X3
					Total Math/Science units = 14.02+X1+X2+X3

Unit Count	Category	Courses with **Engineering Topics**	Quarter	Grade	Units
1	Design	IDEA 106-1 – Engineering Design/Comm			0.5
		IDEA 106-2 – Engineering Design/Comm			0.5
2	Engrg Anal & Computer	Gen_Eng 205-1 – Engineering Analysis I			0.2
		Gen_Eng 205-2 – Engineering Analysis II			0.5
		Gen_Eng 205-3 – Engineering Analysis III			0.2
		Gen_Eng 205-4 – Engineering Analysis IV			0.1
3	Basic Engrg	Mech_Eng 241 – Fluid Mech I			1.0
4		Thermodynamics elective			1.0
		Systems Engineering and Analysis elective			X4
		Probability, Statistics, and Quality Control elective			X5
5		*EECS 328; MAT_SCI 201 or 301*			1.0
6		Civ_Env 203 – Energy and the Environment:The Automobile			1.0
7	Major Courses	Civ_Env 260 – Fund Environ Engineering			1.0
8		Civ_Env 340 – Fluid Mechanics II			1.0
9		Civ_Env 361-1 – Envir Microbiology			1.0
10		Civ_Env 363 – Envir Engineering App I: Air & Land			1.0
11		Civ_Env 364 – Envir Engineering App II: Water			1.0
12		Civ_Env 365 – Envir Engrg Lab			1.0
13		Civ_Env 367 – Aquatic Chem			1.0
14		Civ_Env 382 – Capstone Design			1.0
15	*Technical Electives*	*Elective course must have 100% engineering topic*			1.0
16		*Elective course must have 100% engineering topic*			1.0
17		*Elective course must have 100% engineering topic*			1.0
		Elective course			X6
					Total Engineering Topic units = 17.0+X4+X5+X6

Declaration Form: Minor in Environmental Engineering
McCormick School of Engineering and Applied Science

Name _____EMPLID _____Major_____

Email _____Planned degree date_____

Part I: Signatures and Declaration of Intent to Pursue Minor
I **intend** to complete the requirements for the Minor in Environmental Engineering in the McCormick School of Engineering and Applied Science. My academic adviser is aware of this plan, and I have discussed the program requirements with the minor coordinator (Professor Jean-François Gaillard) in the Department of Civil and Environmental Engineering.

Student:_____ Date: _____

Academic Adviser:_____ Date: _____

Minor Coordinator:_____ Date: _____

Part II: General Requirements
Similar to McCormick Curriculum Requirements:
3 units of MATH (220, 224, 230), and 3 units of EA (GEN_ENG 205-1,2,3; or 206-1,2,3).

Part III: Core Requirements
Same as some of the Core requirements of the BSEE Major

Course	Quarter taken	Grade	Comments
1. ENV SCI 201	_____	_____	_____
2. ENV SCI 202	_____	_____	_____
3. CIV ENV 203	_____	_____	_____
4. CIV ENV 260	_____	_____	_____
5. CIV ENV 363	_____	_____	_____
6. CIV ENV 364	_____	_____	_____

Part IV: Electives
Two CIV ENV courses that can be used either to define a specialization area - such as Environmental Chemistry, Microbiology, or Transport Processes - or that can be across these disciplines to show breath in the program: CIV ENV 340, 361-1,2, 367, 368, 398-1,2, 399, or a 400-level course by permission; only 1 CIV ENV 399 unit may be counted toward the minor.

Course	Quarter taken	Grade	Specialization Area
7. _____	_____	_____	_____
8. _____	_____	_____	_____

Certificate course requirements satisfied _____ _____
(EE Minor Coordinator) (date)

Final McCormick Approval _____ _____
(McCormick Associate Dean) (date)

Students must submit an intent to pursue Environmental Engineering Minor form to Academic Coordinator, Tech A236 at least 3 quarters before completion of BS degree. http://www.mccormick.northwestern.edu/civil-environmental/current-students/forms-documents.html

Northwestern University
Department of Civil and Environmental Engineering
Intent to Pursue Undergraduate Certificate in Architectural Engineering and Design

*This form is required of all students interested in pursuing an undergraduate Certificate in Architectural Engineering and Design (AED). This form **must be completed and submitted to Academic Coordinator**, in the Department of Civil & Environmental Engineering at least three (3) quarters in advance of completing the BS degree (e.g., at the start of fall quarter 20xx for those planning to graduate in spring of 20xx+1). Please note that no more than two of the courses needed for the Certificate in AED may also be used to fulfill the 16 courses required for a BS in x-engineering.*

Name: _____ Student ID: _____

Major(s): _____ Catalog year: _____

Email: _____ Academic Adviser: _____

I plan to complete my degree requirements in: ☐ December ☐ March ☐ June ☐ August Year: 20___

Certificate in AED Requirements

	Courses	Quarter/yr taken/take
1*	Gen_Env 220-1,2 – Computer Graphics	
2	CivEnv 385-1 – AED I	
3	CivEnv 385-2 – AED II	
4	CivEnv 385-3 – AED III	
5*	CivEnv 323 or 352 – Structural Steel Design or Foundation Engineering	
6	Art Hist 232/378 – History of Architecture & Design/Architecture & Urbanism of the World City in the 20th Century	
7H	CivEnv 221 – Theory of Structures I	
8H	CivEnv 325 – Reinforced Concrete	

BS__E Technical Electives

	Courses	Quarter/yr taken/take
1*	Gen_Env 220-1,2 – Computer Graphics	
2*	CivEnv 323 or 352	
3		
4		
5		

* the course may be double-counted for both BSCE major requirements and Certificate in AED requirements; the course may or may not meet the student's major requirements outside of Civil Engineering.
H these courses are required for engineering students outside of Civil Engineering

Student signature _____ Date: _____

Academic Adviser signature _____ Date: _____

AED Manager signature _____ Date: _____

Date received by CEE: _____

Please return the completed form to Academic Coordinator, Tech A236
At least three (3) quarters in advance of completing the BS degree
http://www.mccormick.northwestern.edu/civil-environmental/current-students/forms-documents.html

Northwestern University
Department of Civil and Environmental Engineering
Declaration of Petition to Receive Certificate in Architectural Engineering and Design

Name: _____ Student ID: _____

Major(s): _____ Catalog year: _____

Email: _____ Academic Adviser: _____

I will complete my degree requirements in: ☐ December ☐ March ☐ June ☐ August Year: 20___

*Complete the course information in the table below keeping in mind that **no more than two of the courses needed for the Certificate in Architectural Engineering and Design (AED) may also be used to fulfill the requirements in the 16-course major program of your BS degree as described in the undergraduate catalog**. Courses with grades lower than a "C" or taken P/N will not be accepted. You will be notified if your petition is approved or denied. The certificate will be included with your diploma and will appear on your transcript.*

Certificate in AED Requirements		
	Courses	Quarter taken/grade
1*	Gen_Env 220-1,2 – Computer Graphics	
2	CivEnv 385-1 – AED I	
3	CivEnv 385-2 – AED II	
4	CivEnv 385-3 – AED III	
5*	CivEnv 323 or 352 – Structural Steel Design or Foundation Engineering	
6	Art Hist 232/378 – History of Architecture & Design/ Architecture & Urbanism of the World City in the 20th Century	
7H	CivEnv 221 – Theory of Structures I	
8H	CivEnv 325 – Reinforced Concrete	

BS__E Technical Electives		
	Courses	Quarter taken/grade
1*	Gen_Env 220-1,2 – Computer Graphics	
2*	CivEnv 323 or 352	
3		
4		
5		

* the course may be double-counted for both BSCE major requirements and Certificate in AED requirements; the course may or may not meet the student's major requirements outside of Civil Engineering.
H these courses are required for engineering students outside of Civil Engineering

Student signature _____ Date: _____

Students: DO NOT COMPLETE BELOW THIS LINE

Signatures:

McCormick Registrar	date	AED Manager	date	Associate Dean	date

Please return the completed form to McCormick Office of Student Services, Tech L269
No later than the two weeks prior to the beginning of the quarter of receiving the BS degree
http://www.mccormick.northwestern.edu/civil-environmental/current-students/forms-documents.html

Department of Civil and Environmental Faculty

Jan Achenbach (Emeritus Professor) Mechanics, Materials, and Structures	Ange-Therese Akono Mechanics, Materials, and Structures
Arantzazu (Aranchra) Alarcon-Fleming Mechanics, Materials, and Structures	Oluwaseyi Balogun Mechanics, Materials, and Structures
Zdeněk Bažant Mechanics, Materials, and Structures	Neil Blair Environmental Engineering & Science
Larry Booth Architectural Engineering & Design	Giuseppe Buscarnera Geotechnical Engineering
Karen Chou Mechanics, Materials, and Structures	Mark Clark Environmental Engineering & Science
David Corr Mechanics, Materials, and Structures	Gianluca Cusatis Mechanics, Materials, and Structures
Isaac Daniel Mechanics, Materials, and Structures	Charles Dowding (ABET Coordinator) Geotechnical Engineering
Pablo Durango-Cohen Transportation Systems Analysis & Planning	Richard Finno Geotechnical Engineering
Jean-François Gaillard (BSEE ABET Coordinator) Environmental Engineering & Science	Kimberly Gray (Department Chair) Environmental Engineering & Science
Ahmad Hadavi Project Management	James Hambleton Geotechnical Engineering
Erica Hartmann Environment Engineering & Science	Yonggang Huang Mechanics, Materials, and Structures
Leon Keer (Emeritus Professor) Mechanics, Materials, and Structures	Sinan Keten Mechanics, Materials, and Structures
Raymond Krizek Geotechnical Engineering; Project Management	Luisa Marcelino (Research Professor) Environmental Engineering & Science
Hani Mahmassani Transportation Systems Analysis & Planning	Yu (Marco) Nie Transportation Systems Analysis & Planning
Kevin Olson (Adjunct Professor) Surveying/GPS	Aaron Packman Environmental Engineering & Science
Joe Rossabi (Adjunct Professor) Environmental Engineering & Science	John Rudnicki Mechanics, Materials, and Structures
Kelsey Rydland (adjunct Professor) GIS	Joseph Schofer Transportation Systems Analysis & Planning
Surendra Shah (Emeritus Professor) Mechanics, Materials, and Structures	Amanda Stathopoulos Transportation System Analysis & Planning
Rich Tilghman (Adjunct Professor) Project Management	George Wells Environmental Engineering & Science

For Questions on Curriculum, petition approval, please see

Professor Karen Chou
Assistant Chair
Tech A218
Karen-chou@northwestern.edu

Professor Charles Dowding
Associate Chair and ABET Coordinator
Tech A122
c-dowding@northwestern.edu

Professor Jean-François Gaillard
BSEE ABET Coordinator
Tech A324
Jf-gaillard@northwestern.edu

For Questions on registration, permission numbers, and other academic matters, please see

Melissa Koelling
Academic Coordinator
Tech A236
mkoelling@northwestern.edu
8:30 am - 5:00 pm Monday - Friday

For Questions on department student groups and academic assistance on EA 2, 216, 221 and other lower division courses, please see

Professor Karen Chou
Assistant Chair
Tech A218
karen-chou@northwestern.edu

For Questions on change of major, social science and humanity themes, graduation, academic assistance, please go to

McCormick Undergraduate Engineering Office
Tech L269

For Questions regarding advising during Freshmen year, please go to

First Year Advisers, FORD Room 1.200, 2133 Sheridan Rd.
e-mail: mcc-advising@northwestern.edu; voice: 847-491-7379

For student with disabilities requesting accommodations, please visit

AccessibleNU Center, 2122 Sheridan Road, Room 130, Evanston.
e-mail: accessiblenu@northwestern.edu; voice: 847-467-5530

For student seeking mental health and counseling service, please visit

Counseling and Psychological Services (CAPS), 633 Emerson, Evanston. voice: 847-491-2151
http://www.northwestern.edu/counseling/about-us/what-is-caps/index.html