

Northwestern | McCORMICK SCHOOL OF
ENGINEERING
Civil and Environmental
Engineering

**Master of Science
Civil and Environmental Engineering
Student Handbook**

2022-2023

September 2022

Also available online

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

Table of Contents

Academic Time Table	3
People	4
Important Dates	5
Preface	6
Responsibility for Meeting Degree Requirements	7
Introduction	8
Missions	8
Student and Professional Organizations	9
Internship and Career Development	10
Academic Integrity and Engineering Ethics	11
Downloading Computer Software & File Sharing	13
Safety Training – Laboratory	14
Academic Advising	14
Degree Requirements	16

Academic Time Table

based on a 3-quarter program

What	When	How
Academic adviser assignment	CEE Orientation	Assigned by MS program coordinators
Plan for fall quarter courses	CEE Orientation break out sessions	Meet with your adviser, discuss course selection, adviser approve plan
Learn GSTS and CAESAR	CEE Orientation	Read MS CEE Student Handbook
Fall Registration	NU Orientation week till the end of first week of class	Fall course selection must be uploaded to GSTS and approved by the adviser in GSTS before registration hold is removed. Once registration hold is removed, students are ready to register via CAESAR
Job/internship search	As soon as you can	Register with McCormick Office of Career Development (MCD) adviser, register with McCormick Connect (http://www.mccormick.northwestern.edu/career-development/mccormickconnect.html). Networking with profession, alumni, etc.
	Fall quarter	Attend professional seminars available in the department. See announcements on presentation on job search resources, resume writing, etc. in CEE. Prepare resume and practice interview Start looking for jobs or internships
	October	Participate in CEE Fall Career Fair, http://www.mccormick.northwestern.edu/civil-environmental/career-opportunities/career-fair.html
	January	Participate in CEE Winter Career Fair
Curriculum Plan	By October 31	Submit curriculum plan for the entire degree program to GSTS. Plan must be approved by the academic adviser.
Winter quarter advising	Start at about the 5 th week of fall quarter	Make an appointment to meet your adviser to discuss courses you plan to take in the winter quarter.
Winter quarter registration	Start at about 9 th week of fall quarter	Have your course selection approved by your adviser.
Spring quarter advising	Start at about the 5 th week of winter quarter	Make an appointment to meet your adviser to discuss courses you plan to take in the spring quarter.
Spring quarter advising	Start at about 8 th week of winter quarter	Have your course selection approved by your adviser.
Spring graduation		
AFD	early spring quarter	Submit Application for a Degree form via CAESAR
Degree completion	late spring quarter	Form signed by at least two faculty advisers due at TGS. Check with Academic Coordinator

Staff Contact List

Academic Year 2022-2023

Prof. Kimberly Gray, Department Chair, k-gray@northwestern.edu

Ms. Christina Wagner, Academic Coordinator for Graduate Studies, christina.wagner@northwestern.edu

Prof. Giuseppe Buscarnera, Director of Graduate Studies, g-buscarnera@northwestern.edu

Prof. Jean-François Gaillard, EES MS program coordinator, jf-gaillard@northwestern.edu

Prof. David Corr, STR MS program coordinator, d-corr@northwestern.edu

Prof. Giuseppe Buscarnera, GEO MS program coordinator, g-buscarnera@northwestern.edu

Prof. Yu (Marco) Nie, TRN MS program coordinator, y-nie@northwestern.edu

Important Dates

Academic Year 2022-2023

Full Academic Calendar: <https://www.registrar.northwestern.edu/calendars/academic-calendars/index.html>

CEE Orientation	9/16/2022
Fall Classes Begin	9/20/2022
Last day to add a class for fall	9/26/2022
Last day to drop a class for Fall	10/28/2022
Winter Registration begins	11/14/2022 (tentative)
Fall quarter classes end	12/3/2022
Fall quarter final exams	12/5/2022
Winter classes begin	1/3/2023
Last day to add or change a course	1/9/2023
Martin Luther King Day Observance (no classes)	1/16/2023
Last day to drop a class for Winter	2/11/2023
Spring registration begins	2/20/2023 (tentative)
Winter classes end	3/11/2023
Winter quarter final exams	3/13/2023
Spring break	3/18/2023-3/27/2023
Spring classes begin	3/28/2023
Last Day to add or change a course	4/43/2023
Last day to drop a class for Spring	5/5/2023
Fall 2022 registration begins	5/22/2023 (tentative)
Memorial Day Observance (no classes)	5/29/2023
Spring classes end	6/3/2023
Spring quarter final exam	6/5/2023
Commencement	6/12/2023

Students with Student Visas:

If you plan to graduate Fall 2023 or beyond, please make sure you maintain full time student status. Below are the ways you can maintain full time student status. You do not need to maintain full time status in the summer, unless you are an international student and it is a requirement of your visa. If you are not sure, check with OISS.

- If you are completing a thesis, register for CivEnv 590. You will need a permission number.
- If you are completing an independent study, register for CivEnv 499.
- If you are completing a required paper (MS TRN students only registered with CivEnv 508), you need to register for TGS 512 in each academic quarter (except the summer term) until you complete the work.
- If you still have course(s) to take, but less than 3 courses, to meet the degree requirements, you need to complete a reduced course load form from the International Office. You are only permitted to register with a reduced load if that is the last quarter before graduation.
- Please, check the Registrar Office website for graduation deadlines
<http://www.registrar.northwestern.edu/calendars/index.html>

Preface

This handbook is intended to provide you with a comprehensive guide to the Master of Science degree in Civil and Environmental Engineering (CEE) programs granted by The Graduate School (TGS) at Northwestern University. We hope this handbook will enhance your experience at Northwestern.

This handbook is prepared as a handy reference guide to the degree requirements, programs, policies, and procedures of the Department and The Graduate School. An Academic Timetable on page 3 and Important Dates starting on page 4 are provided to guide you through various milestones during a 3-quarter (9 – 12 months) program. We hope that you will find the information you need for both planning and understanding your MS education.

The Department would also like to emphasize the importance of social and ethical implications of an engineer's work in the betterment of the society. Through student professional organizations, departmental seminars, and many ethnics groups, you can interact with world renowned researchers and engineers, and experience diverse cultures. You can also interact with professionals in the Greater Chicago area through meetings hosted by various professional groups. We hope you will take full advantage of the opportunities presented to you during your stay with us.

We hope you find this handbook a useful resource for your MS study. We wish you much success and welcome your suggestions for improvement of the handbook.

Kimberly Gray, Ph.D.

Kay Davis Professor and Chair

Civil and Environmental Engineering

Responsibility for Meeting Degree Requirements

Ultimately, students are responsible for understanding the degree requirements for their specialty area and for planning their course of study accordingly. The Department, Assistant Dean of Graduate Study of McCormick School of Engineering and Applied Sciences, The Graduate School, and the International Office are valuable resources for academic and visa information. Faculty advisers assigned to you will assist you in course selection. However, they are not responsible for ensuring that you meet all the degree requirements including grade point average (GPA) requirement and (when relevant) U.S. Citizenship and Immigration Services requirement. Those are the responsibilities of the student.

Introduction

Welcome to the Department of Civil and Environmental Engineering (CEE), McCormick School of Engineering and Applied Science (MEAS) at Northwestern University (NU). The faculty, staff, and students at CEE look forward to interacting with you so that you can enjoy the maximum learning, social, and cultural experience that Northwestern University can offer you. This handbook is part of our effort to help you achieve this goal from the academic aspect. In addition to academic requirements, this handbook includes an academic time table (based on a 3-quarter to 12-month program) of some milestones such as completion of curriculum plan, advising and registration, internship or permanent position, Application for a Degree (AFD), and degree completion. 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 members, in general, and our MS program coordinators are available to address any issue or question you may have. Please feel free to contact them.

A new edition of the handbook is published annually to coincide with each academic year. Revisions will be made as needed each quarter. The handbook and all the forms listed in this handbook are available online at the following link [Forms & Documents | Students | Civil & Environmental Engineering | Northwestern Engineering](#).

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.

The Graduate School

The mission of The Graduate School at Northwestern University is to cultivate an environment of academic excellence where graduate students and postdoctoral fellows are enabled to learn, discover, and create knowledge that enlivens an understanding of human endeavors and the world in which we live. (<http://www.tgs.northwestern.edu/about/>).

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 inside 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>

The Graduate School – <http://www.tgs.northwestern.edu/about/>

Department – <http://www.mccormick.northwestern.edu/civil-environmental/about/mission-vision-statement.html>

Student and Professional Organizations

Student and professional organizations provide networking opportunities and seminars on the state of the art research and design in the civil and environmental engineering profession. The Department of Civil and Environmental Engineering is home to the Student Chapter of American Society of Civil Engineers (NU ASCE). Professional organizations of all branches of civil and environmental engineering have a local section in the Chicago area which hosts monthly meetings. You are encouraged to attend some of these meetings to interact and network with the engineering profession. Following is a list of organizations you may consider participating.



Northwestern University American Society of Civil Engineers Founded in 1852, the American Society of Civil Engineers represents more than 150,000 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! Graduate students are welcome and encouraged to join. For more information, visit their website: <http://asce.mccormick.northwestern.edu>.

Other student organizations:

Civil and Environmental Engineering Graduate Association (CEEGA) – see Charles Martell, staff advisor or Prof. Giuseppe Buscarnera, faculty adviser.

McCormick Graduate Leadership Council (MGLC) Founded in 2006, the MGLC fosters community among all McCormick graduate students. <http://mglc.mccormick.northwestern.edu/>

Graduate Student Association (NUGSA) at Northwestern enhances graduate students' experiences in and out of the classroom and strives to create resources and programs to improve the quality of students' lives. <https://nugsa.wordpress.com/>

Graduate Leadership and Advocacy Council (GLAC) is the voice of graduate students in academic and administrative matters at Northwestern University and a forum for graduate student leaders. <http://sites.northwestern.edu/glac/>

Chicago Area Professional Organizations



Illinois Section American Society of Civil Engineers represents Civil Engineers in Northern Illinois. The Section has five technical groups and the Younger Member Group (YMG). The technical groups are Environmental and Water Resources Institute (EWRI), Geo Institute (GEO), Structural Engineering Institute (SEI), Transportation and Development Institute (T&DI), and Urban Planning and Development (UBD). All groups hold monthly lunch or dinner meetings. YMG usually hosts social events for younger engineers of all disciplines to network and they also sponsor a number of outreach events to pre-college students. A great way to develop your professional network and career advancement. For more information, visit <http://www.isasce.org/>.

American Academy of Environmental Engineers and Scientists <http://www.aees.org/>

American Chemical Society: <http://www.acs.org>

American Concrete Institute (ACI) <https://www.concrete.org/>

American Geophysical Union: <http://sites.agu.org>

American Institute of Steel Construction (AISC) <http://www.aisc.org/>

American Society for Microbiology: <http://www.asm.org>

Association of Environmental Engineering and Science Professors: <http://www.aeesp.org>

Institute of Transportation Engineers (ITE) <http://www.ite.org/>

Structural Engineers Association of Illinois (SEAOI) advances and advocates excellence in structural engineering and to aid in safeguarding the public. <https://www.seaoi.org/>

Transportation Research Board (TRB) <http://www.trb.org/AboutTRB/AboutTRB.aspx>

Water Environment Federation <http://www.wef.org>

Internship and Career Development

Civil and Environmental Engineering Career Fair

Through the joint effort of NUASCE and EnVEUS, the inaugural **CEE Career Fair** was held in 2013. Since 2014, the Career Fair has been organized by the CEE Department with support from McCormick's Engineering Career Development office beginning in 2019. CEE Career Fair focuses on firms that hire civil and environmental engineering graduates for internships and for full time engineering positions. The number of participating companies has gone from six in 2013 to 24 in 2016. Starting in the 2016-2017 academic year, the Department expanded the Career Fair to have a Fall and Winter Career Fairs. **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 is sent to the Department. We suggest you check on the site periodically to see what is being posted.

SWE Industrial Day

A McCormick-wide career fair is hosted by the Society of Women Engineers. This career fair is usually held on the third Thursday of October. A McCormick networking mixer is held the evening before. The mixer is an informal meeting with company representatives. Watch Plan-it-Purple to see the exact date and location.

McCormick Office of Career Development (MCD)

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 Room 2.350 in Ford Building.

Northwestern Career Advancement (NCA)

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.

<http://www.northwestern.edu/careers/>

Academic Integrity and Engineering Ethics

Academic Integrity

Northwestern University and the CEE Department expect their students to hold high standards of academic honesty. Behaviors such as cheating on exams, plagiarism, using unauthorized materials for your work are not tolerated. Northwestern Provost Office issues a document **Academic Integrity: A Basic Guide, September 2020 edition** (<https://www.northwestern.edu/provost/policies/academic-integrity/academic-integrity-guide-2020.pdf>) which is a central resource of policies governing academic integrity for all students and faculty at Northwestern. There are four main sections of the Guide:

- Principles regarding academic integrity
- Eight Cardinal Rules of academic Integrity
- Counseling and contacts
- How to avoid plagiarism

Additional resources on academic integrity can be found in The Graduate School web site <https://www.tgs.northwestern.edu/academic-policies-procedures/policies/academic-integrity.html>

We strongly encourage you to familiarize yourself with all these documents. Failure on your part to understand the Academic Integrity Policy will not relieve you from that responsibility.

Engineering Ethics

As civil and environmental engineers, our primary responsibility is to serve the public through all the infrastructure systems we design and maintain. Hence, practicing engineering ethics is extremely important to our career and the public. The public entrusted us to provide a functional infrastructure system and to protect our environment. To guide us with our professional integrity are the Codes of Ethics from the National Society of Professional Engineers (NSPE) and the American Society of Civil Engineers (ASCE). Many states require an ethics exam as part of the Register Professional Engineer (PE) application and require continuing education in ethics as part of the renewal of PE. Below are the ASCE Code of Ethics Canons. They are very similar to the ones provided by NSPE. You can find the complete Code of Ethics at NSPE website <https://www.nspe.org/resources/ethics/code-ethics>.

ASCE Code of Ethics (<http://www.asce.org/code-of-ethics/>)

- Canon 1. Engineers shall hold paramount the safety, health and welfare of the public and shall strive to comply with the principles of sustainable development in the performance of their professional duties.
- Canon 2. Engineers shall perform services only in areas of their competence.
- Canon 3. Engineers shall issue public statements only in an objective and truthful manner.
- Canon 4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.
- Canon 5. Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.
- Canon 6. Engineers shall act in such a manner as to uphold and enhance the honor, integrity, and dignity of the engineering profession and shall act with zero-tolerance for bribery, fraud, and corruption.
- Canon 7. Engineers shall continue their professional development throughout their careers, and shall provide opportunities for the professional development of those engineers under their supervision.
- Canon 8. Engineers shall, in all matters related to their profession, treat all persons fairly and encourage equitable participation without regard to gender or gender identity, race, national origin, ethnicity, religion, age, sexual orientation, disability, political affiliation, or family marital, or economic status.

Nondiscrimination Statement

Northwestern University does not discriminate or permit discrimination by any member of its community against any individual on the basis of race, color, religion, national origin, sex, pregnancy, sexual orientation, gender identity, gender expression, parental status, marital status, age, disability, citizenship status, veteran status, genetic information, reproductive health decision making, or any other classification protected by law in matters of admissions, employment, housing, or services or in the educational programs or activities it operates. Harassment, whether verbal, physical, or visual, that is based on any of these characteristics is a form of discrimination. Further prohibited by law is discrimination against any employee and/or job applicant who chooses to inquire about, discuss, or disclose their own compensation or the compensation of another employee or applicant.

Northwestern University complies with federal and state laws that prohibit discrimination based on the protected categories listed above, including Title IX of the Education Amendments of 1972. Title IX

requires educational institutions, such as Northwestern, to prohibit discrimination based on sex (including sexual harassment) in the University's educational programs and activities, including in matters of employment and admissions. In addition, Northwestern provides reasonable accommodations to qualified applicants, students, and employees with disabilities and to individuals who are pregnant.

Any alleged violations of this policy or questions with respect to nondiscrimination or reasonable accommodations should be directed to Northwestern's Office of Equity, 1800 Sherman Avenue, Suite 4-500, Evanston, Illinois 60208, 847-467-6165, equity@northwestern.edu.

Questions specific to sex discrimination (including sexual misconduct and sexual harassment) should be directed to Northwestern's Title IX Coordinator in the Office of Equity, 1800 Sherman Avenue, Suite 4-500, Evanston, Illinois 60208, 847-467-6165, TitleIXCoordinator@northwestern.edu.

A person may also file a complaint with the Department of Education's Office for Civil Rights regarding an alleged violation of Title IX by visiting www2.ed.gov/about/offices/list/ocr/complaintintro.html or calling 800-421-3481. Inquiries about the application of Title IX to Northwestern may be referred to Northwestern's Title IX Coordinator, the United States Department of Education's Assistant Secretary for Civil Rights, or both.

Downloading Computer Software & File Sharing

It is incumbent on any person who uses Northwestern University resources, such as computers and associated networks, to ensure that they are not using illegal software. Downloading and using software that was obtained illegally is against University policy. Obtaining software legally means that either you personally, or your adviser through NU, has paid for the correct number of copies of the software for the number of computers you have installed the software on.

It is also against University policy to illegally download copyrighted material, such as movies, videos, mp3's, scientific papers, magazine articles, etc. **Any person who has violated this policy is subject to the disciplinary action determined by the University.**

There are many alternatives to using illegally obtained software. The University provides a limited number of software titles available for students on the IT website at <http://www.it.northwestern.edu>, located under the "Students" tab. Also, many software titles are available either free, or at a reduced cost, for educational purposes. In addition, there are many free alternatives to standard software titles, such as Open Office, that can be used freely and are very robust.

Any questions or concerns about this matter should be directed to your adviser or Department of Civil and Environmental Engineering technical support staff.

Safety Training – Laboratory

Northwestern University and the Department of Civil and Environmental Engineering take the safety of every member in the community very seriously. In that spirit, Northwestern University and CEE require students to take special care while working in the university laboratories. Everyone who works in any laboratories under the supervision of CEE MUST follow the Lab Safety Requirements outlined below.

- a. If you plan to use any lab for course projects or research, you must contact the lab coordinator: Dave Ventre, d-ventre@northwestern.edu, if you plan to use any of the civil engineering labs; or contact Chan Xiong, yingqian.xiong@northwestern.edu, if you plan to use any of the environmental engineering labs. The lab coordinator will also explain the lab rules of etiquette and cleanup. Then, the Lab Coordinator will add you to the lab roster.
- b. All lab workers must be on the official Office for Research Safety (ORS) lab roster in order to conduct any experiments or projects in the lab.
- c. Lab Safety Training and preparation are required by ORS and CEE ***before a student can begin any lab work***. The required training can be taken on-line.
- d. Once you are on the roster, you will receive email notification from Northwestern Safety Information System (NSIS), the automated training website. The email will provide links to take the on-line ORS training. They can be taken from any NU computer, or off campus (requires VPN).
- e. The lab coordinator will be notified when you have successfully completed the ORS training.
- f. In addition, you **MUST** take the CEE on-line training, <http://www.mccormick.northwestern.edu/civil-environmental/research/lab-safety.html>. Read the Safety Guide, then take the Safety Quiz. Submit the quiz as an attached file (pdf, doc, txt, etc) to Dave Ventre at d-ventre@northwestern.edu.
- g. You may be required to have additional training, such as welding safety, depending on the specific machinery or equipment you will use.
- h. Once you have successfully completed the CEE safety quiz, ORS training, and any additional safety training, the lab coordinator will give you your lab access code and you can begin lab work.
- i. Please note that our labs and workshops contain certain specialty machines and tools that require individual, hands-on training to operate safely. This includes MTS machines, the Hobart mixers, saws, grinders, drills, hand tools, welding equipment and others. Most are kept locked. **Using any such machines without proper training and lab coordinator approval is strictly forbidden.**
- j. Anyone working in a lab without the required training, failing to follow lab safety and hygiene rules, or operating equipment without proper training and authorization, will have their lab access and privileges suspended.
- k. Under no circumstances should there be only one person in the lab during weekends, holidays, and non-normal operating hours, which are 8:30 am to 5:00 pm Monday through Friday.

Academic Advising

You are among the elite groups of students in the Northwestern community. It is our goal for you to have an enjoyable and productive learning experience during your time with us. To achieve this goal, the Department has developed an Advising Policy for the MS programs described below to assist you with curriculum planning and progress towards your MS degree.

The Department is using the GSTS (Graduate Students Tracking System) to monitor all the MS student academic plan, academic progress, and advising. You will have 24/7 access to your unofficial academic record (the only official academic record is the transcript issued by the Registrar Office), study plan, curriculum plan. The url of GSTS is <https://gsts.northwestern.edu/site/login>. You can login with your netid and password.

While all the advising communication can be done online through GSTS, **it is not the intent of GSTS to replace your adviser**. You are **STRONGLY** recommended to meet with your adviser as often as you wish/need and certainly no less than once a quarter. Your adviser is your primary resource for academic and professional advice. As experts in their fields, you should take full advantage of the opportunity to interact with your advisers.

1. Academic Adviser

Each MS student is assigned a faculty adviser in the student's area of study during the new student orientation in the Fall quarter. The four major areas of MS program are: Environmental Engineering and Science (EES), Geotechnical (GEO), Structural Engineering (STR), and Transportation Systems Analysis and Planning (TRN). Each B.S. student interested in the BS/MS program must include the signature of his/her MS faculty-adviser-to-be in the application to BS/MS program. This faculty will become the BS/MS student's faculty adviser upon acceptance to the program.

A student may change his/her faculty (academic) adviser at any time. However, the **new faculty adviser must be a faculty member with at least 50% appointment in the Department of Civil and Environmental Engineering in the area of the student's study**. A change of adviser form, signed by the current adviser and adviser-to-be, must be submitted to the MS coordinator through the Academic Coordinator in the CEE office.

2. Curriculum Plan

Each MS student **must complete a curriculum plan in GSTS by the end of October** in the academic year that the student first enrolled in his/her MS program. This would help facilitate your advising session and help your adviser understand your career goal. The curriculum plan must follow the guidelines of one of the four MS programs that are described on the CEE website (<http://www.mccormick.northwestern.edu/civil-environmental/graduate/index.html>).

Students with a registration hold will not be allowed to register for any courses until the hold is removed.

Students may revise their curriculum plan at any time prior to the student's graduation with the MS degree. The revised curriculum plan must be approved by the student's academic adviser. The most current curriculum plan in the student's file will be used for MS degree audit when the student submits the AFD (Application for a Degree) form to The Graduate School.

3. Monitoring of Progress

All MS and BS/MS students **must meet** with their faculty advisers at least once per quarter for academic advising and career planning. During each advising session, the student is encouraged to discuss current course performance, course selection for the subsequent quarter, and career planning such as internship, co-op, or post graduate job searching with the faculty adviser. Course selection should follow the most current curriculum plan.

Every MS and BS/MS student is required to complete the plan of study (course selection for the upcoming quarter) via the GSTS and approved by his/her adviser in order to receive permission to register for the following quarter. The mandatory advising session should be held no later than a week before the registration begins for each quarter. Registration holds will be in place until your adviser approves your

plan of study each quarter. Failure to meet with the academic adviser will delay the student's ability to register.

Registration hold is usually removed within 1 business day after your adviser approves your plan. E-mail will be sent when the registration hold is removed. A new registration hold is placed on each student in each quarter until the student completes all the degree requirements.

4. Satisfactory Progress

According to The Graduate School (TGS) requirements: *A student whose overall grade average is below B (3.0 GPA) or who has more than three incomplete (Y or X) grades is not making satisfactory academic progress and will be placed on probation by TGS. Individual programs may have stricter criteria* (<https://www.tgs.northwestern.edu/academic-policies-procedures/policies/satisfactory-academic-progress.html>).

A GPA of 3.0 is required for graduation. A GPA below 3.0 in any quarter will place a student on probation. Probation is intended as a notice of unsatisfactory academic performance and constitutes a warning that improvement must be made in subsequent work to demonstrate progress toward the MS degree. TGS allows a student **up to two (2) consecutive quarters** to return to satisfactory progress (quarter and cumulative GPA ≥ 3.0). Lack of improvement or evidence of inability to complete the work successfully in a given curriculum may provide reason for dismissal. Each student's academic performance is reviewed by the MS coordinator to ensure students are progressing satisfactorily.

If a quarter GPA (QGPA) or cumulative GPA (CGPA) falls below a 3.0, the MS coordinator will send an e-mail via GSTS before the beginning of a new quarter informing the student of his/her unsatisfactory progress. A letter from TGS will arrive in about the second week of the new quarter.

If a student's QGPA or CGPA is between 3.0 and 3.2, an e-mail from MS coordinator will be sent via GSTS to the student. Although this range of GPA is still considered satisfactory, a course below 3.0 could easily put the student's GPA in jeopardy. Unlike undergraduate, the MS program is only one year long, it is critical to recognize the importance of time and performance.

Degree Requirements

The Department of Civil and Environmental Engineering (CEE) offers The Graduate School (TGS) Master of Science degree in four (4) specialty areas. The requirement for MS in CEE is 12 units of courses. **A minimum of 9 units must be taken for grades.** Each specialty area requires a minimum of 2 to 3 quarters of seminar course. This is a zero unit, no tuition course.

In addition to the above requirements, each program has its own core and elective courses requirements; thesis, course-only, design project, or research paper requirement; and possibility for minor; etc. Please refer to the area degree requirements in subsequent pages for detail and discuss the requirements with your adviser.

Full Time Enrollment

While the MS degree is designed for full time enrollment, this is not an absolute requirement. For international students (F1 or similar visa holders), full time enrollment is required during the academic year (fall, winter, and spring quarters) but not for the summer session.

Full time enrollment is defined as 3 to 4 units of courses in a quarter. If a student wishes to enroll more than 4 units of courses in any one quarter, additional tuition will be charged (equivalent to 1/3 of quarter tuition per unit of course beyond 4 units in a quarter).

For students who have registered for 12 units of courses but have not completed the degree requirements, for example, completing research paper (must register for CivEnv 508, zero unit) in TRN; completing a CivEnv 499 project; or completing CivEnv 590 thesis, registration of TGS 512 is required for international students if the work is to be completed in U.S. during the following academic year. Registration of TGS 512 is recognized by Northwestern as full-time enrollment. The cost of this course is about \$100 and is only allowed after a student has registered for 12 units of courses. For U.S. residents or U.S. citizens, registration of TGS 512 is not required if the student is not completing the work on campus. More information can be found on TGS General Registration Policy <http://www.tgs.northwestern.edu/about/policies/general-registration-policies.html>

Part Time Enrollment

Part time enrollment is permitted and usually occurs when a student needs one or two courses to complete the degree. For international students (F1 or similar visa holders), part time enrollment is permitted during the quarter when the student only needs those courses to complete the degree. In this case, the student must submit a **Reduced Course Load Form**. This form is on the OISSPortal page. click on the appropriate link for your Reduced Course Load. Submit your application. Please note that the Reduced Course Load for Final Term requires an advisor's electronic recommendation

Independent Study (CivEnv 499)

Independent Study is a self-structured study that is agreed upon between the student and a faculty supervisor. For an Area that has a thesis option, CivEnv 499 is a good way for both the student and the faculty to see if research or thesis is right for each other. **Independent work done during CivEnv 499 can be expanded to become a MS thesis.** At that time the student should register for CivEnv 590.

Application for a Degree (AFD)

In any quarter if you **anticipate** completing ALL your degree requirements (12 units of courses and necessary paper, project, or thesis depending on the program), you **must** submit an Application for a Degree (AFD) via GSTS. Submission of this form does not bind you to complete all your work by the deadline of that quarter. It is a notice to TGS that you plan to graduate at the end of that quarter. There is a deadline for submitting AFD each quarter and in the summer session, which can be found [here](#). You may submit AFD more than once until you graduate.

Master's Degree Completion Form (MDCF)

Once we approve your AFD, you will return to GSTS to fill out the Master's Degree Completion Form. You will choose two faculty members to approve your graduation. One member will be your (academic, project, research, etc.) adviser; the second should be a graduate faculty member in CEE.

CIV_ENV 499 Project Application for an Independent Study

1) Your Topic

- a. Scope/project objectives

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

- c. References

- d. Deliverables (all projects must include a written report and an oral presentation; if this is for lab work, it must involve a significant lab report at the end of the quarter.)

2) How this independent study supports your curriculum

- a. Courses that led to this one

- b. How this enhances your learning in your master degree?

3) Interaction with professor

- a. How often will you meet
- b. Basis of evaluation (preference: itemized evaluation, example – weekly reports 15%, scholarly/technical component 50%, written report 20%, oral presentation 15%)

4) Signatures by sponsoring independent study Professor,

Sponsoring Project Adviser _____
(print name)

(signature) Date _____

Student _____
(print name)

(signature) Date _____

Please return completed form to CEE Academic Coordinator (Tech A236) to be placed in the student's academic folder and to receive a permission number to register CivEnv 499.

Instructions for Using GSTS (Graduate Students Tracking System)

<https://gsts.northwestern.edu/site/login>

Plan of Study Page – Part 1

Northwestern GRADUATE STUDENT TRACKING SYSTEM

Dashboard Committee Plan of Study Academic Progress Research Project Documents Communications Reporting Administration Logout (kcc769)

Plan of Study | Student Name Ali C20MS Active Student: A K L - [C20MS] SHOW PROFILE

Guidelines for Study Plan

Input your proposed plan of study for each quarter. Please update this section as your plan of study changes. As you complete courses in your plan of study, this will be noted and a grade displayed.

In order to assign a course to a category, hit Enter after choosing the category from the drop-down menu in the Study Plan Section column.

Study Plan & Progress

Suggested Plan of Study & Progress

Completed and ready for review
Not yet Completed

The Graduate School establishes the minimum requirements for courses and residency. Students must complete at least nine graded courses approved for TGS credit. Doctoral and masters students must meet the published residency requirements.

You can go to the Civil and Environmental Engineering MS Student Handbook for more information.

Information about advising starts on page 18.

Expand All

▼ Area of Specialization

Select your area of specialization. In case you do not see your specialization in the list, please contact the department chair to add it to the list.

Below are links to the curriculum plans for each of the MS specialization areas:

Environmental Engineering & Sciences

Geotech

Structural

Transportation

Structural Engineering (STR)

Program Office Change History

Review by Program Office

Completed review of the study plan?
Not yet Completed

Feedback from Reviewer

Approve the study plan?
Hold Approve

Once a student submits information, the program's Director of Graduate Studies (DGS) or DGS designate must review. Insert comments (if necessary), and submit an approval decision. Please note that comments are part of the student's educational record and should not be considered private.

Reviewer Comments

No comments found.

Changes Since Last Approval

Reviewed the changes?
Not yet Yes

Shown above is the top section of the Plan of Study page, you will see your area of specialization on the left hand panel. On the same panel, there is a toggle for “completed” when your quarter course selection plan is complete and ready for your adviser’s review and approval. Once you switch this toggle from “not yet” to “completed”, a notification is sent to your adviser and the MS coordinator requesting your adviser’s review of your quarter course plan.

The right hand panel is for your adviser or coordinator’s use. When your adviser wishes to comment on your quarter course plan, the comments will be shown here. A notification is sent to you when your adviser approves or has comments on your plan. Unfortunately, GSTS does not have a comment only notification. We advise you to check GSTS when you receive the automated notification from GSTS to see if your adviser leaves you a message.

Plan of Study Page – Part 2

▼ Courses Waived

Search courses... Add

Course	Term	Course Category	Updated	Notes (255 max)	Documents
--------	------	-----------------	---------	-----------------	-----------

If you have any courses waived by the program, it will appear here

No records to view

▼ Quarter 1

▼ Courses Planned

Search courses... Add

Course	Term	Updated	Notes (255 max)	Documents
--------	------	---------	-----------------	-----------

Select the courses you plan to take during orientation for the first quarter of your program by using the "search course" and "Add" above this box

▼ Courses Taken

No course found.

This box will be populated automatically if you denote the courses you selected as either required or elective

The change log is visible below.

No change logs found.

▼ Quarter 1

▼ Courses Planned

CIV_ENV 320-0 2016 Fall Add

Course	Term	Updated	Notes (255 max)	Documents
CIV_ENV 320-0 Struct Analysis--Dynamics Course ID: 004858-1	2016 Fall	2016-09-06		

Once the course is selected, the information is shown

Plan of Study Page – Part 3

▼ Quarter 2

▼ Courses Planned

Search courses...

Course ↕	Term	Updated	Notes (255 max)	Documents
<i>Follow the procedures for Quarter 1 to populate Quarter 2 and subsequent quarters. This is usually completed after academic advising for subsequent quarter.</i>				

No records to view

▼ Courses Taken

No course found.

▼ Quarter 3

▼ Courses Planned

Search courses...

Course ↕	Term	Updated	Notes (255 max)	Documents
----------	------	---------	-----------------	-----------

No records to view

▼ Courses Taken

No course found.

You will repeat the same process for each quarter. For Quarter 2 which is the winter quarter, the advising process starts at around the fifth week of the fall quarter (Quarter 1). Please make an appointment to meet with your adviser to discuss your course selection for Quarter 2. Registration for the winter quarter starts at about the 8th or 9th week of the fall quarter. The same process repeats for registration of the spring (Quarter 3).

Plan of Study Page – Part 4

▼ **Quarter 4**

▼ Courses Planned

Search courses...

Course	Term	Updated	Notes (255 max)	Documents
No records to view				

▼ Courses Taken

No course found.

▼ **Quarter 5**

▼ Courses Planned

Search courses...

Course	Term	Updated	Notes (255 max)	Documents
No records to view				

▼ Courses Taken

No course found.

▼ **Comments (if any)**

Enter any additional information or comments about your plan of study:

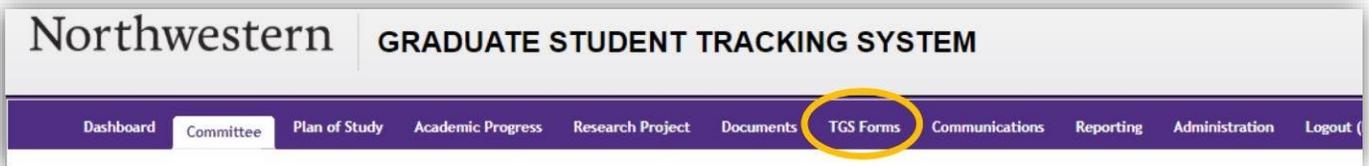
For most of you, three quarters of registration is needed to complete your MS program. If you plan to extend your study to beyond three quarters, you are required to have course selection beyond Quarter 3 approved by your adviser. This requirement is necessary even if you are registering for TGS 512 for cases where your Independent Study (CivEnv 499), Paper (CivEnv 508), required by Transportation Analysis and Planning, TRN), or thesis (CivEnv 590) requires more time to complete. Please note that there is no need to register for TGS 512 during the summer.

The “Comments” box is for you to communicate with your adviser for information such as a desire to have a minor, certificate, thesis advisor's name, alternative courses, etc.

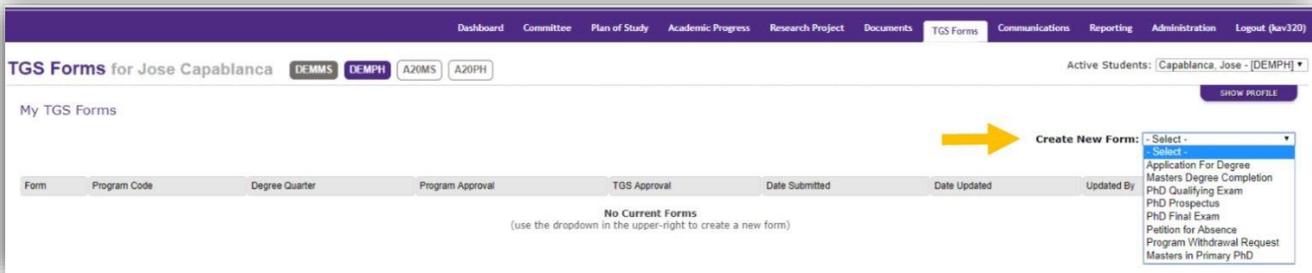
Quick Guide to TGS Forms in GSTS for Students in The Graduate School

Updated May 26, 2019

Access GSTS at <https://gsts.northwestern.edu/site/login> and navigate to the “TGS Forms” tab:



To submit a new form, select the type of form you want to submit from the “Create New Form” drop down menu:



TGS forms and their uses:

Form Name	Audience	Use
Application for Degree	Master’s and PhD students	Use this form to petition to graduate for a future quarter, indicate the name as it should appear on the diploma, and the address where the diploma should be mailed. The diploma mailing address can be updated even after the form is submitted and approved.
Master’s Degree Completion	Master’s students	Use this form to indicate that you are completing master’s degree requirements, your faculty committee members, your advisor and whether or not you completed a master’s thesis (and if so, the title).
PhD Qualifying Exam	PhD students	Submit this form once you have passed the qualifying exam.
PhD Prospectus	PhD students	Submit this form once you have passed the prospectus.
PhD Final Exam	PhD students	Submit this form leading up to your dissertation defense.
Petition for Absence	Master’s and PhD students	Submit this form to request a general or family leave of absence, or a parental accommodation.
Program Withdrawal Request	Master’s and PhD students	Submit this form to request to withdraw from your graduate program.
Masters in Primary PhD	PhD students	Submit this form to request a master’s degree along the way to the PhD in the same program.

Fill out the required information per the form instructions and click the “Submit for Approval” button:

Submit For Approval

After you submit the form it will be routed to your program, then The Graduate School for review.

To make changes to a form you have already submitted, click on the form you want to update on the “My TGS Forms” list:

My TGS Forms

Create New Form:

Form	Program Code	Degree Quarter	Program Approval	TGS Approval	Date Submitted	Date Updated	Updated By	Status
APPLICATION FOR DEGREE								
Application For Degree	A20PH	2018 Fall	---	---	2018-11-13 09:23:10	2018-11-13 09:23:10	Kate Veraldi	Pending Approval
Application For Degree	A20PH	2019 Summer	---	---	2019-05-28 16:05:15	2019-05-28 16:05:15	Kate Veraldi	Pending Approval
PhD QUALIFYING EXAM								
PhD Qualifying Exam	A20PH	---	---	---	2019-01-04 16:07:49	2019-01-04 16:07:49	Kate Veraldi	Pending Approval
PhD Qualifying Exam	A20PH	---	Yes - Kate Veraldi 2018-11-14 15:19:41	Yes - Kate Veraldi 2018-11-14 15:19:52	2018-11-13 09:19:42	2019-01-04 16:06:54	Kate Veraldi	Canceled
PhD PROSPECTUS								
PhD Prospectus	A20PH	---	---	---	2019-01-04 16:08:56	2019-05-28 16:03:41	Kate Veraldi	Withdrawn
PhD Prospectus	A20PH	---	Yes - Kate Veraldi 2018-11-14 15:26:48	Yes - Kate Veraldi 2018-11-14 15:26:59	2018-11-13 09:22:43	2019-01-04 16:07:04	Kate Veraldi	Canceled
PhD FINAL EXAM								
PhD Final Exam	A20PH	2018 Fall	Yes - Kate Veraldi 2019-05-28 16:01:53	---	2019-01-04 16:09:51	2019-05-28 16:01:53	Kate Veraldi	Pending Approval
PhD Final Exam	A20PH	2018 Fall	Yes - Kate Veraldi 2018-11-14 15:31:56	Yes - Kate Veraldi 2018-11-14 15:32:09	2018-11-13 09:24:14	2019-01-04 16:07:16	Kate Veraldi	Canceled

Make the necessary changes to the form, then click the “Update Form” button:

Update Form

Note: For most forms, this can only be done **before** your program has reviewed the form. You may update your diploma name and diploma mailing address on the Application for Degree form **after** it has been approved and through the “Editing Deadline” listed on the form (typically the day of degree conferral).

To withdraw a form you submitted in error, click the “Withdraw Form” button located on the top right corner of the form:

Withdraw Form

Note: For most forms, this can only be done before your program has reviewed the form.

Withdrawing the form will move it to “withdrawn” status. You’ll need to create a new form from the drop-down menu when you are ready to submit the form again.

NORTHWESTERN - MASTER OF SCIENCE: PROGRAM IN ENVIRONMENTAL ENGINEERING & SCIENCE

2022-2023

The MS in EES requires 12 course units in addition to the Environmental Seminar Series – CIV ENV 516. 9 Courses constitute the core and are required, 3 are graduate elective courses that can be taken from other Departments/Programs after approval.

For the students with a BS in Environmental Engineering from Northwestern, 3 of their undergraduate courses, denoted by *, count towards the MS degree. As a result, they need to follow 9 additional courses. For other BS degrees, 3 graduate level courses can be selected for electives.

	1 st Quarter/Fall	2 nd Quarter/Winter	3 rd Quarter/Spring	Optional 4 th Quarter/Summer
4 Courses/Quarter and the EES seminar series	Environmental Microbiology* (Marcelino) CIV ENV 361-1	Environmental Laboratory* (Gaillard) CIV ENV 365 <i>Or: CIV ENV 361-2, 314</i>	Computational Chemodynamics (Gaillard) CIV ENV 448	Sustainability: The City (Gray) CIV ENV 368
	Chemical Processes in Aquatic Systems* (Gaillard) CIV ENV 367	Environmental Particles & Surface Chemistry (Aristilde) CIV ENV 495	Microbial Ecology for Resource Recovery (Wells) CIV ENV 443	Environmental Law and Policy (Harley) CIV ENV 303
	Environmental Transport Processes (Packman) CIV ENV 440	Ecohydrology (Packman) CIV ENV 346 <i>Or: CIV ENV 314 for BS-MS</i>	Emerging Organic Contaminants (Hartmann) CIV ENV 370	
	4 th Course from courses below or unrestricted electives	4 th Course from courses below or unrestricted electives	4 th Course from courses below or unrestricted electives	
	Environmental Engineering Science Seminar Series (CIV ENV 516-1,2,3)			CIV ENV 516-1
Technical Electives Choose 1 additional Course per Quarter	Sustainability: The City (Gray) CIV ENV 368	Biogeochemistry (Blair) CIV ENV 314	Water in Arid Lands: Israel & the Middle East (Packman) CIV ENV 395- 0- 25	
	Environmental Law and Policy (Harley) CIV ENV 303	Public & Environ. Health (Marcelino) CIV ENV 361-2	Environmental Justice (Harley) CIV ENV 308-0	
		Climate and Energy Law & Policy (Harley) CIV ENV 309-0		
MS Thesis (Typical path)	<i>Finding an advisor Or starting with CIV ENV 499</i>	Research Project - CIV ENV 499	Research Project CIV ENV 590	Research Project CIV ENV 590 or TGS 512 to continue

NORTHWESTERN UNIVERSITY MASTERS OF SCIENCE PROGRAM IN GEOTECHNICAL ENGINEERING

2022-2023

Note: The recommended program includes 12 courses, in addition to the Geotechnical Engineering Seminar.
The minimum number of courses for an MS is 12 (9 required + 3 electives).

Track		1 st Quarter/Fall	2 nd Quarter/Winter	3 rd Quarter/Spring
Recommended: 4 Courses/Quarter plus Geotechnical Engineering Seminar		Soil Mechanics I (450-1)	Foundation Engineering (352)	Constitutive Models for Soils (454)
		Finite Element Methods in Mechanics (327) OR Mechanics of Continua (417)	Plasticity and Limit Analysis (455)	Terramechanics (357)
		Individual Design/Research Project (499)	Individual Design/Research Project (590)	Individual Design/Research Project (590)
		4 th Course from Tracks below	4 th Course from Tracks below	4 th Course from Tracks below
			Seminar in Geotechnical Engineering in winter (515-1) and spring (515-2) quarters	
Tracks Choose 1 Course/Quarter	Structures	Structural Analysis – Dynamics (320) Matrix Analysis of Structures (423) Building Science (388-1)	Properties of Concrete (321) Reinforced Concrete (325) Stability of Structures (424) Building Science (388-2)	Structural Steel Design (323) Computational Forensics and Failure Analysis (328) High Performance Architectural Design (386) Plates and Shells (410) Quasibrittle Fracture and Scaling (430)
	Others	Uncertainty Analysis (306) Environmental Transport Processes (440) Seismology and Earth Structure (Earth 323) Scientific Programming in Python (Earth 361)	Advanced Finite Element Methods 1 (426-1) Theory of Elasticity (415) Infrastructure Systems Analysis (483)	Advanced Finite Element Methods 2 (426-2) Experimental Solid Mechanics (413) Computational Chemodynamics (448)
Note: required courses/projects are in bold face ¹ number in parenthesis are Civ-Env courses unless noted otherwise				

NORTHWESTERN UNIVERSITY MASTERS OF SCIENCE PROGRAM IN STRUCTURAL ENGINEERING 2022-2023

The MS in STR requires 12 course units in addition to the STR Seminar.

Track		1 st Quarter/Fall	2 nd Quarter/Winter	3 rd Quarter/Spring
Required Courses		Seminar (CEE 512 – zero units)	Stability of Structures (CEE 424) Seminar (CEE 512 – zero units)	Theory of Plates and Shells (CEE 410) Seminar (CEE 512 – zero units)
Professional Tracks¹	Design ²	Structural Design 1 (CEE 428-1)	Structural Design 2 (CEE 428-2)	Structural Design 3 (CEE 428-3)
	Research ³	Research (Independent Study 499)	Research (590)	Research (590)
Recommended list of electives		Mechanics of Continua (CEE 417)⁴ Dynamics of Structures (CEE 320)⁵ Matrix Analysis of Structures (CEE 423) Prestressed Concrete Design (CEE 421) Finite Elements (CEE 327) Building Science I (CEE 388-1)	Theory of Elasticity (CEE 415)⁴ Advanced Finite Elements-1 (CEE 426-1) Properties of Concrete (CEE 321) Foundation Engineering (CEE 352) Building Science II (CEE 388-2)	Cohesive Fracture (CEE 430) Energy Geosturctures (CEE 353) Mechanics of Vibrations (ME 363)⁵ Advanced Finite Elements-2 (CEE 426-2) Experimental Solid Mechanics (CEE 413) Computational Geotechnics (CEE 456) High Performance Building Design (CEE 386) Mechanics of Earthquakes (CEE 495)
Other approved electives		Uncertainty Analysis (CEE 306) Design of Sustainable Urban Developments (CEE 387) Engineering Project Management (CEE 330) Numerical Solution of Partial Differential Equations (ES-APPM 446-1) Soil Mechanics (CEE 450-1)	Steel Design (CEE 323)⁶ Independent Study (CEE 499)	Reinforced Concrete Design (CEE 325)⁶ High Performance Scientific Computing (ES-APPM 444) Independent Study (CEE 499)

Notes:

¹ Students must select one track (either Design or Research) and commit to 3 quarters of study in the selected track.

² For the Design track, students must complete all three units, and must begin the track in fall quarter. The Design track can be completed in one academic year.

³ For the Research track, desire to complete this track is not sufficient: students must identify (1) a research advisor willing to support study and (2) a topic that will result in a scholarly thesis. The Research track will in almost all cases take longer than one academic year to complete. The research work need not begin in fall quarter of the first year, and can begin with a CIV_ENV 499 unit of independent study (this unit can count as one of the required 590 units).

⁴ Either CEE 415 or CEE 417 is required

⁵ Either CEE 320 or ME 363 required. **CEE 320 strongly encouraged.**

⁶ Required if not taken at the undergraduate level.

NORTHWESTERN UNIVERSITY MASTERS OF SCIENCE PROGRAM IN TRANSPORTATION SYSTEMS ANALYSIS AND PLANNING (2022-2023)

The MS in TRN requires 12 course units in addition to a writing requirement and the Seminar in Transportation Engineering

Track		1 st Quarter/Fall	2 nd Quarter/Winter	3 rd Quarter/Spring
4 Courses/Quarter plus Transportation Engineering Seminar The five courses listed on the right columns are required courses		Transportation Systems Planning and Management (479)	Infrastructure Systems Analysis (483)	Evaluation and Decision Making for Infrastructure Systems (482)
			Travel Demand Analysis & Forecasting 1¹ (480-1)	
	Seminar in Transportation Engineering (517) – no tuition zero credit seminar			
Tracks Recommendation	Transportation Science and Systems	Introduction to Transportation Engineering (376, *)	Transportation Systems Analysis I (471-1, *) Transportation Systems Operations I: Scheduled Modes and Real Time Systems (472-1, +, #)	Transportation Systems Analysis II (471-2, *) Transportation Systems Operations II: Urban Network (472-2, +, #)
	Operations Research and Logistics	Mathematical Programming (IEMS 450-1, \$, &) Deterministic Models and Optimization (IEMS 313, \$, &) Supply chain modeling and analysis (IEMS 381)	Mathematical Programming (450-2),	Civil and Environmental Engineering Systems Analysis (304) Data Analytics for Transportation and Urban Infrastructure Applications (495-32)
	Travel Demand Analysis	Intermediate statistics (IEMS 401,\$, !) Introduction to Applied Econometrics (ECON 281-0, !) Uncertainty analysis (306) Introduction to Econometrics (ECON 480, !) Statistical Methods for Data Mining (IEMS 304), Stochastic models and simulation (IEMS 315) Microeconomics (Econ 310)		Choice Modeling (377-0,\$);
	Urban Planning and Policy	Transportation Economics and Public Policy (ECON 355, \$) Elements of Public Finance (Econ 309)		
Writing requirement		A zero-unit independent study course (508) Please see Appendix B for detailed requirement.		
Please see Appendix A for explanations.				
¹ Pre-requisites: any course from ECON 281, CIV_ENV 306, IEMS 304, IEMS 315, IEMS 401, ECON 480-1, or equivalent.				

Appendix A: Important notes on MS Program Table

1. Recommended courses/projects are in **bold** face in the table.
2. Recommended courses without any marks are *required*; Recommended courses marked with “\$” are electives.
3. For the three recommended courses marked with “*”, at least two *must* be taken to fulfill the MS degree requirement.
4. For the four recommended courses marked with “+”, at least one *must* be taken to fulfill the MS degree requirement.
5. Recommended courses marked with “#” are offered in alternating years.
6. The students are recommended to take one of the two courses marked with “&”. While both courses cover optimization, IEMS 313 is more suitable for those who do not have a strong background in this area.
7. The course marked with “!” is a prerequisite for the required course CIV_ENV 480-1. Of these courses, ECON 281-0 would NOT count towards the degree requirement because it is a 200-level course. However, it is *highly recommended* for both MS and PhD students who need a solid introductory course to applied econometrics. ECON 480-1 is suitable for students with strong background in statistics.
8. CivEnv 517: Seminar in Transportation engineering. All students are expected to register and attend the seminar series through the year.
9. Seminar in Responsible Conduct for Research. Researchers and MS/PhD students are required to attend. MS students with PhD aspirations are encouraged to attend. Please contact CEE DGS, Dave Corr (d-corr@northwestern.edu), for additional details.
10. Electives are not limited to the courses listed in the table. Other 300 level courses or above may be taken as electives, subject to the faculty supervisor’s approval. Students may also take up to 3 research/independent-study units, which also requires the faculty supervisor’s approval.

Appendix B Transportation System Program Writing Requirement for the M.S. Degree

In addition to satisfactory completion of required coursework, M.S. students must conduct an independent research effort and prepare a research report. This could focus on a subject covered in the coursework of our program, or it may go beyond into an area of special interest to the student. The work and the product must have these characteristics:

- The work may be basic or applied research, an innovative analysis and solution to a practical problem, evaluation or development of a transportation policy, etc.
- It must be an original effort which, though limited in scope, demonstrates an interesting contribution to transportation and significant growth in the student's knowledge.
- By "original" we mean that the work must feature a contribution from the student him/herself, rather than being merely a survey of what others have done.
- The topic must be mutually agreed upon by student and his/her faculty advisor, which is to say that the advisor has a role in selection of topic from the outset.
- Students should consult with their advisors in the design of the effort, selection of tools and data, and interpretation of results.
- Any transportation faculty member may serve as principal advisor. Another Northwestern faculty member, or (if the substance of the topic so warrants) even an outside senior professional in the field, may serve as principal advisor with the consent of student, the candidate advisor, and the Transportation Program area coordinator, Prof. Nie.
- The effort should reflect approximately one month or 180 hours of full-time work. Of course the effort itself may be spread over a much longer time period.
- The final product must be a well-written report which is:
 - Suitable for use as a professional report or a paper for submission to a journal.
 - In clear and correct English
 - Structured with a title page, executive summary, table of contents, lists of figures and tables, main text including a review of the literature and/or work of others, structured with thoughtful headings, graphics integrated in the text, and references presented in proper and consistent format.
- Draft reports should be presented for review by the principal advisor and second faculty member prior to completion. Advisors must be given *a minimum of two weeks* for report review. Students must address all significant comments from the advisor.
- When the report is found to be satisfactory, advisor and secondary reader will clear the student for graduation.

Appendix C: Sample Course Plan (Instructor or schedule may vary)

Fall Quarter		
Course	Instructor	Time Schedule
CIVENV 376, Intro. to Transportation Engineering	Nie	MW 8-9:50
CIVENV 479, Transp. Systems Planning and Management	Schofer	MW 2-3:50 F (Lab) 2-3:50
ECON 281-0, Introduction to Applied Econometrics	Lewis	MWF 12- 12:50 PM
IEMS 313, Deterministic Models & Optimization	Wilson	MWF 11-11:50, M 4-4:50
CIVENV 517-1, SEMINAR IN TRANSPORTATION ENGINEERING	STATHOPOULOS	TH 3:30-5
Two additional courses from:		
IEMS 450-1, Mathematical Programming	Nohadani	MW 12:30-1:50
IEMS 401, Intermediate Statistics	Apley	MW 11-12:20
Econ 355, Transportation Economics and Public Policy	Savage	MWF 11-12:20
CIVENV 303, Environmental Law and Policy	Harley	Th 3:30-6:20
CIVENV 368: Sustainability: Issues & actions, near & far	Gray	T: 3:30-6:20
CIVENV 306, Uncertainty Analysis	Chen	MWF 12-12:50, T 9-9:50
Econ 331, Economics of Risk and Uncertainty	Siniscalchi	TTh 2-3:20
Econ 480-1, Introduction to Econometrics	Manski	TTh 1:00-2:50, F 9-10:50
Other electives: In EECS, Statistics, IEMS, Applied Math, Math, Economics. For example, Econ 309, 310, 326. IEMS 415, 464.		

Winter Quarter		
Course	Instructor	Time Schedule
CIVENV 471-1, Transportation Systems Analysis-1	Nie	TBA
CIVENV 472-1, Transportation Operations and Control: Scheduled Modes and Real Time Systems or Advanced Theories of Traffic Flow	Mahmassani	TBA
CIVENV 480-1, Travel Demand Modeling I	Stathopoulos	TBA
CIVENV 483, Infrastructure Systems Analysis	Durango-Cohen	TBA
CIVENV 517-2, Seminar in Transportation Engineering	Stathopoulos	Th 3:30-5
Elective: The City (Sociology 301), Development of the Modern American City 1870-Present (History 322-2), Introduction to Stochastic Simulation (IEMS 435), others in EECS/Stats/IEMS/Applied Math/Economics		

Spring Quarter

Course	Instructor	Time Schedule
CIVENV 471-2, Transportation Systems Analysis-2	Nie	TBA
CIVENV 472-2 Transportation System Operations: Urban Networks or Advances in Travel Demand Analysis and Forecast	Mahmassani	TBA
CIVENV 473-0, Survey methods, data and analysis	Stathopoulos	TBA
CIVENV 482, Evaluation and Decision Making for Infrastructure Systems	Schofer	TBA
CIVENV 517-3, Seminar in Transportation Engineering	Stathopoulos	Th 3:30-5
Electives: EECS/Stats/IEMS/Applied Math/Economics or others depending on advisor's approval		

Contacts for Frequently Asked Questions

Questions

Students should consult with their academic advisers regarding academic and professional issues such as course selections and career guidance. The MS coordinator will assist the academic coordinator when procedural issues arise. The list below is intended to help you identify resources that could address your questions.

Staff Contact Information

Academic Coordinator	Christina Wagner (Tech A236)
CEE IT	Craig Neumann (Tech A144)
Laboratory (dry) coordinator & Lab safety coordinator	Dave Ventre (Tech A142)
Environmental laboratory & safety coordinator	Chan Xiong (Tech A254)
Payroll	Lauren Kay (Tech A138)
Access to MS study room	CEE staff (Tech A236)

University Contact Information

If you have question related to:	Who should you see or where should you go:
Academic – satisfaction progress	Professor David Corr (Tech A224) Bianca West or Kate Veraldi, TGS
Academic Calendar	http://www.registrar.northwestern.edu/calendars/index.html
CAESAR – reference materials, how to register	http://www.northwestern.edu/caesar/
Counseling and Psychological Services (CAPS)	Student Affairs http://www.northwestern.edu/counseling/
Course schedule/listings – current academic year	http://www.mccormick.northwestern.edu/civil-environmental/courses/index.html
General MS degree requirements	Dr. Bruce Lindvall, Assistant Dean for Graduate Study, McCormick
GSTS	Academic Coordinator
Health Service	http://www.northwestern.edu/health/
Internship, Co-op	http://www.mccormick.northwestern.edu/career-development/index.html
MS in CEE degree requirements	academic advisers, area coordinators
Parking – walking zone, rates, FAQ, campus shuttle, U-Pass CTA	http://www.northwestern.edu/up/parking/
Reduced Course form	International Office
Optional Practical Training form	https://www.northwestern.edu/international/living-working/form-library/student-forms.html
Curricular Practical Training form	
Registration hold	Academic Coordinator
Transportation Center & Library	http://www.transportation.northwestern.edu/ http://www.library.northwestern.edu/libraries-collections/evanston-campus/transportation-library
Visa	International Office https://northwestern.edu/international/index.html
WildCard	http://www.northwestern.edu/userservices/wildcard/