Northwestern

TRANSPORTATION CENTER

Undergraduate Minor in Transportation and Logistics

May 2024

- An interdisciplinary program available to all Northwestern undergraduates from any undergraduate school.

- Administered by Northwestern's renowned Transportation Center – one of the country's most prestigious academic and research centers dedicated to the study of transportation and logistics.

Students pursuing the Transportation and Logistics Minor have . . .

- access to numerous **transportation and logistics-related courses** available in a variety of schools and departments across campus taught by faculty who are recognized experts in their fields.

- personalized academic **advising** by senior faculty

- opportunities for involvement in exciting transportation **research** projects

- access to highly specialized **career counseling** and numerous **job opportunities** with top companies

- membership in the NU **Transportation Club** - and involvement in all of its activities including field trips, executive luncheons, speaker events and social activities

- opportunities to attend **research seminars** and presentations at the Transportation Center

- **interaction** with fellow **undergraduates** interested in transportation and logistics, and the Transportation Center's **faculty, graduate students and alumni/alumnae**

The Transportation and Logistics Minor

Interdisciplinary Cross-School accredited Minor available to all Northwestern Undergraduates

Passenger and freight transportation represents nearly a fifth of the United States Gross Domestic Product and influences every aspect of our lives: where we live, where we work and the goods we purchase. The study of transportation and logistics is inherently interdisciplinary, reaching across disciplines, schools and departments.

Northwestern offers relevant courses through the Department of Civil and Environmental Engineering and the Department of Industrial Engineering and Management Science in the McCormick School of Engineering and Applied Sciences, and the Department of Economics and other social science departments in the Weinberg College of Arts and Sciences.

The Minor offers undergraduate students the opportunity to obtain a more rounded education in transportation and logistics compared with that offered within their selected major program of study. The curriculum equips students with a broad understanding of the economics, engineering and operations of transportation and logistics systems and the role of public policy.

The Minor is administered by the **Transportation Center**, an interdisciplinary research center founded in 1954. The Center has been recognized for decades as a leader in graduate education, and now extends this expertise to undergraduates. The Center has affiliated faculty from many of the participating departments.

For more information on the Transportation Center, go to our web site at:

http://transportation.northwestern.edu

Degree Requirements

Students are required to complete **seven** of the courses listed below (at a grade of C- or better), of which:

- **one** is a required course (Trans 310 -- a seminar course taken in the senior year)

- at least **three** must be from the list of core courses, or which two must be from Departments other than that in which they are majoring.

- the remainder may be additional core courses or from the list of approved elective courses. Courses offered by Northwestern University that are not listed here can be considered for credit towards the Minor if the course is appropriate to the student's program of study.

- At most one course at the 200 level.

At least two courses of the core or elective courses must be outside the school in which the student is registered.

- Students in the McCormick School of Engineering and Applied Science may double count a maximum of two courses from their major program toward the Minor.

- However, students registered in other schools are not allowed to "double count" courses which are part of their major, but can count courses that form “related courses,” “distribution,” or “foundational discipline” requirements.

- The McCormick School of Engineering and Applied Science has approved TRANS 310 as acceptable for the “social science/humanities” requirement. In addition, TRANS 310 and other WCAS courses taken as part of the Minor are “thematically related” for purposes of the “social science/humanities” requirement.

In preparation for taking the minor, students should have taken courses in:

- calculus
- probability and statistics.

Curriculum

The following abbreviations identify the school and department:

WCAS - Weinberg College of Arts and Sciences

ANTHRO	Anthropology
BUS_INST	Business Institutions
EARTH	Earth, Environmental, and Planetary Sciences
ECON	Economics
ENV_POL	Environmental Policy and Culture
ENVR_SCI	Environmental Sciences
GEOG	Geography
HISTORY	History
ISEN	Initiative in Sustainability and Energy at NU
POLI_SCI	Political Science
SOCIOL	Sociology

KSM - Kellogg School of Management

KELLG_FE	Financial Econ. Certificate

MEAS - McCormick School of Engineering and Applied Science

CIV_ENV	Civil and Environmental Engineering
IEMS	Industrial Engineering and Management Science

Interschool Program

TRANS	Transportation Program

Required Course

TRANS 310 Seminar in Transportation and Logistics.

Students obtain one credit based on formal enrollment in the Spring Quarter of their senior year. However, class activities occur during the entire senior year.

For WCAS students entering after Spring 2023 this class fulfills the WCAS Advanced Expression requirement.

This capstone course is the culmination of the Minor. It brings together the knowledge gained from other courses in the Minor and in their Major. Unlike the technical courses offered as part of the Minor, this course is designed to emphasize the relation of theory to the real world, and to recognize the interdisciplinary nature of the degree. There are three components to TRANS 310. Evaluation is based on two extended papers and on class participation.

1. Seminar Attendance

During the senior year, students should attend 27 hours of approved lectures, seminars and other related activities. This would be equivalent to the time in lectures in a regular course. There are group seminars about seven or eight times each quarter for an hour each time. Some of these sessions comprise of a discussion of a contemporary issue.

Students read materials beforehand and prepare to lead the discussion. Other sessions comprise presentation of students' work on their two required papers.

In addition to the group seminars, students can also count towards the 27 hours any of the following: seminars in the various Transportation Center seminar series, other Transportation Center special lectures and events, and other public lectures or conferences outside of Northwestern with the permission of the instructor.

2. Case Study Paper (due first week of Winter Quarter)

A descriptive case study of a particular transportation or logistics firm or industry, or of a public policy debate. The objective is for students to read and investigate the existing literature on a subject, and to organize and report on what they have learned in the form of a six-page paper. For this paper, there is no need for any original data analysis, but students need to use analytical skills in interpreting and organizing the existing literature. Students are expected to look at multiple sources. The subject matter can be anything in the field of transportation and logistics. The deadline for submission of this paper is the end of the first week of Winter Quarter.

3. Research Paper (due in May)

An extended, analytical, paper that evaluates a specific public policy initiative or a business issue. While purely theoretical work is welcomed, it is likely that most papers are empirical. TRANS 310 is not an honors course, so the extent of the paper is less than that associated with an honors thesis. While purely theoretical work is welcomed, it is likely that most papers are empirical. The paper usually involves some data collection and statistical or econometric analysis (fortunately, transportation and logistics does have many easily accessible databases for the student to use). Simulation of networks is also a possibility. The paper can be an analytical extension of the literature-review paper submitted earlier in the year, but this need not be the case. The paper is typically about ten pages, exclusive of any tables and/or data appendices.

Students typically agree on the topic with the instructor of TRANS 310 in January and work on their papers during Winter and Spring Quarters. The deadline for submission is the eighth week of Spring Quarter.

In addition to the written paper, students make a presentation of their work to the faculty and other students. Typically, this occurs during WCAS Reading Period at the end of Spring Quarter.

Core Courses

Students must select at least three core courses, of which at least two are from Departments other than that in which they are majoring. No substitutions are allowed for the core courses.

CIV_ENV 304	Civil and Environmental Engineering Systems Analysis
CIV_ENV 371	Introduction to Transportation Planning and Analysis
CIV_ENV-376	Transportation System Operations
CIV_ENV 377	Behavioral Choice Modeling in Engineering
ECON 310-1	Microeconomics
ECON 355	Transportation Economics and Public Policy (Econ 310-1 and ECON 281 or equivalent are prerequisites)
Either IEMS 310	Operations Research (for those wishing to take only one course in industrial engineering)
or IEMS-313	Foundations of Optimization (for IEMS Majors and those wishing to take additional IEMS courses, GEN_ENG 205-1 or MATH 228-1, and COMP_SCI 110 or 111 or 150 are prerequisites)
IEMS 381	Supply Chain Modeling and Analysis (IEMS 313 prerequisite)
IEMS 383	Service Operations Management (IEMS 313 prerequisite)

Elective Courses

The remainder of the program is from additional core courses and the following list of approved elective courses. Courses offered by Northwestern University that are not listed here, such as topics courses offered by departments, can be considered for credit towards the minor if the course if appropriate to the student's program of study. Approval for substitutions is made by the Transportation Center's Program Committee based on a written submission by the student.

ANTHRO 373	Power and Culture in American Cities
ANTHRO 383	Environmental Anthropology
BUS_INST 331	Real Estate Finance & Investment
Either CIV_ENV 205	Economics and Finance for Engineers[1]
or BUS_INST 304	Corporate Finance

[1] For IEMS Majors entering in Fall 2022 or later, this course is now part of the IEMS Major and is subject to the maximum of two courses that can be double counted between their Major and the T&L Minor.

or ECON 360-1	Foundations of Corporate Finance Theory
or KELLG_FE 310	Principles of Finance
CIV_ENV 330	Engineering Project Management
CIV_ENV 368	Sustainability: The City
CIV_ENV 387	Design of Sustainable Urban Developments
EARTH 342	Contemporary Energy and Climate Change
ECON 309	Public Finance
ECON 337	Economics of State and Local Governments
ECON 349	Industrial Economics
ECON 350	Monopoly, Competition and Public Policy
ECON 354	Issues in Urban and Regional Economics
ECON 361	International Trade
ECON 371	Economics of Energy
ECON 372	Environmental Economics
ECON 373	Natural Resource Economics
ECON 381-1,2	Econometrics
ENVR_SCI 390-21	Geographic Information Systems Level 1 *or equivalent course*
HISTORY 292-0-20	World Travel Before Steam
HISTORY 309	American Environmental History (co-listed as ENV_POL 309)
HISTORY 322-2	Development of the Modern American City, 1870 - Present
HISTORY 376	Global Environments and World History (co-listed as ENV_POL 340)
HISTORY 382	The Modern Japanese City
IEMS 315	Stochastic Models
IEMS 317	Discrete-Event Systems Simulation
IEMS 365	Analytics for Social Good
IEMS 382	Production Planning and Scheduling
ISEN 220	Introduction to Energy Systems for the 21st Century
POLI_SCI 321	Urban Politics
POLI_SCI 329	U.S. Environmental Politics
POLI_SCI 390-0	Comparative Urban Politics
SOCIOL 207	Cities in Society
SOCIOL 301	The City: Urbanization and Urbanism
SOCIOL 336	The Climate Crisis, Policies, and Society (co-listed as ENV_POL 336)

- **Graduate Level Courses** *Qualified advanced students may take the following courses upon petition to the instructor and the Director of the Transportation and Logistics Program*

CIV_ENV 471-1,2	Transportation Systems Analysis
CIV_ENV 472-1,2	Transportation Systems Operations and Control
CIV_ENV 480-1,2	Travel Demand Analysis and Forecasting
CIV_ENV 482	Evaluation and Decision making for Infrastructure Systems
CIV_ENV 484	Advanced Theories of Traffic Flow
IEMS 481	Logistics
IEMS 482	Operations

- **Discontinued Courses** *These courses are no longer offered, but prior registrations count for the Minor*

GEOG 312	Geography of Chicago and its Region
GEOG 341	Principles of Cartography
GEOG 343	Geographic Information Systems

- **Independent Study** Students may count up to one credit of approved independent study in transportation and logistics towards the minor. The student may register in either TRANS 399, or a 399 in the department appropriate for the supervising faculty member.

For More Information

➢ For academic advising, and to declare a Minor see the Program Director:

Professor Ian Savage
Department of Economics
Room 3371
2211 Campus Drive
ipsavage@northwestern.edu

➢ Contact an Associate Program Director in your department. These include:

Civil & Environmental Engineering:
Professor Pablo Durango-Cohen pdc@northwestern.edu

Industrial Engineering and Management Science:
Professor Karen Smilowitz ksmilowitz@northwestern.edu