

Department of Civil and Environmental Engineering

Transportation Network Analysis: CIVE 5808 – Winter 2023

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Course Description

This course will expose students to the basic concepts of transportation network analysis, as well as explore some applications. The course will require students to understand both the basic concepts of transportation network analysis and to apply these concepts in a project involving a written report. The course is divided into three parts. The first part focuses on reviewing some operation research topics such as transportation problem. The second part is devoted to understanding transportation systems and network models. The last part focuses on transportation equilibrium analysis including deterministic and stochastic equilibrium approaches. An introduction to dynamic equilibrium approach will be provided as well.

Course Objectives

This course is designed to meet the needs of graduate students in the transportation engineering discipline to understand the most common widely used concepts in operation research and transportation network analysis. By the end of this course, students will be able to formulate a variety of transportation planning problems such as network models, system optimization, and traffic assignment, and have the practical knowledge needed to solve them. Furthermore, students will have a conceptual understanding of these models which allows them to understand and critically evaluate models' results.

Course Evaluation

Quizzes	20 %
Midterm Exam	30 %
Term Project	40 %
Project Presentation	10 %

Reference Texts

- Sheffi, Y., 1985. Urban transportation networks: Equilibrium analysis with mathematical programming methods, Prentice Hall Inc.
- Bell, M.G.H., Lida, Y., 1997. Transportation network analysis. John Wiley and Sons.
- Ahuja, R.K., Magnanti, T.L., Orlin, J.B., 1993. Network flows: Theory, algorithms, and applications, Prentice Hall Inc.
- Cascetta, E., 2009. Transportation Systems Analysis: Models and Applications – Second Edition, Springer.
- Ortuzar, J.D., Willumsen, L.G., 2011. Modelling Transport – 4th Edition, Wiley (ebook available at McGill Library).

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Notes

- The instructor may alter the course outline and/or the marking scheme depending on the class performance.
- All materials posted on Brightspace are for the exclusive educational purpose by registered students in this course in the designated term and cannot be used for any other purpose. These materials may not be reproduced or redistributed without prior written consent of the author(s).
- You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:
 - **Pregnancy obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: <http://www.carleton.ca/equity/>
 - **Religious obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: <http://www.carleton.ca/equity/>
 - **Academic Accommodations for Students with Disabilities:** The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam.
- You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at <http://www.carleton.ca/equity/>

Special Information for Pandemic measures

1. It is important to remember that COVID is still present in Ottawa. The situation can change at any time and the risks of new variants and outbreaks are very real. There are [a number of actions you can take](#) to lower your risk and the risk you pose to those around you including being vaccinated, wearing a mask, staying home when you're sick, washing your hands and maintaining proper respiratory and cough etiquette.
2. **Feeling sick?** Remaining vigilant and not attending work or school when sick or with symptoms is critically important. If you feel ill or exhibit COVID-19 symptoms do not come to class or campus. If you feel ill or exhibit symptoms while on campus or in class,

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please leave campus immediately. In all situations, you must follow Carleton's [symptom reporting protocols](#).

3. **Masks:** Carleton has paused the [COVID-19 Mask Policy](#), but continues to strongly recommend masking when indoors, particularly if physical distancing cannot be maintained. It may become necessary to quickly reinstate the mask requirement if pandemic circumstances were to change.
4. **Vaccines:** Further, while proof of vaccination is no longer required as of May 1 to attend campus or in-person activity, it may become necessary for the University to bring back proof of vaccination requirements on short notice if the situation and public health advice changes. Students are strongly encouraged to get a full course of vaccination, including booster doses as soon as they are eligible, and submit their booster dose information in [cuScreen](#) as soon as possible. Please note that Carleton cannot guarantee that it will be able to offer virtual or hybrid learning options for those who are unable to attend the campus.
5. All members of the Carleton community are required to follow requirements and guidelines regarding health and safety which may change from time to time. For the most recent information about Carleton's COVID-19 response and health and safety requirements please see the [University's COVID-19 website](#) and review the [Frequently Asked Questions \(FAQs\)](#). Should you have additional questions after reviewing, please contact covidinfo@carleton.ca.

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