

Traffic Engineering
CIVE5305
Course Objectives and Outline

Carleton University
DEPARTMENT OF CIVIL &
ENVIRONMENTAL ENGINEERING

Fall 2022

Course Learning Objectives

1. To cover the principles and methods of traffic engineering.
2. To highlight traffic safety measures and environmental factors.
3. To describe intelligent transportation systems (ITS) as these relate to traffic engineering.
4. To introduce automation in driving.
5. To introduce traffic software that are currently in use or under development.

CIVE 5305 - Traffic Engineering

Learning Outcomes (General Statement)

It is expected that this course will bring into focus both concepts and methods that contribute to the safe, efficient and environmentally sustainable movement of road traffic.

Learning Outcomes (LOs)

It is intended that in this course, a contribution will be made to the following learning outcomes

LO	Description
LO1	Analysis of engineering problems
LO2	Conducting research in engineering
LO3a	Development of methodologies, tools, or engineering systems
LO3b	Application of methodologies, tools, engineering systems
LO4a	Effectively synthesize a relevant body of knowledge to peers and/or practicing engineers
LO4b	Effectively communicate a relevant body of knowledge to peers and/or practicing engineers

Learning Outcomes (LOs)

It is intended that in this course, a contribution will be made to the following learning outcomes

LO	Description
LO5a	Tackle, in some depth, engineering problems
LO5b	Tackle a wide range of engineering problems

CIVE5305 Traffic Engineering

Hours/Week: Lecture 3 Hours

WEEK

TOPIC

1 Course objectives and outline.

Introduction to transportation systems, traffic engineering, emerging issues and trends in traffic engineering, environmental factors, Intelligent Transportation Systems (ITS), automation in driving, sustainable transportation.

2,3 Traffic stream components and characteristics:

basic characteristics of drivers, and traffic.

Queueing of traffic. Geometric characteristics of roadways. traffic control devices. Traffic streams.

CIVE5305 Traffic Engineering

Hours/Week: Lectures 3 Hours

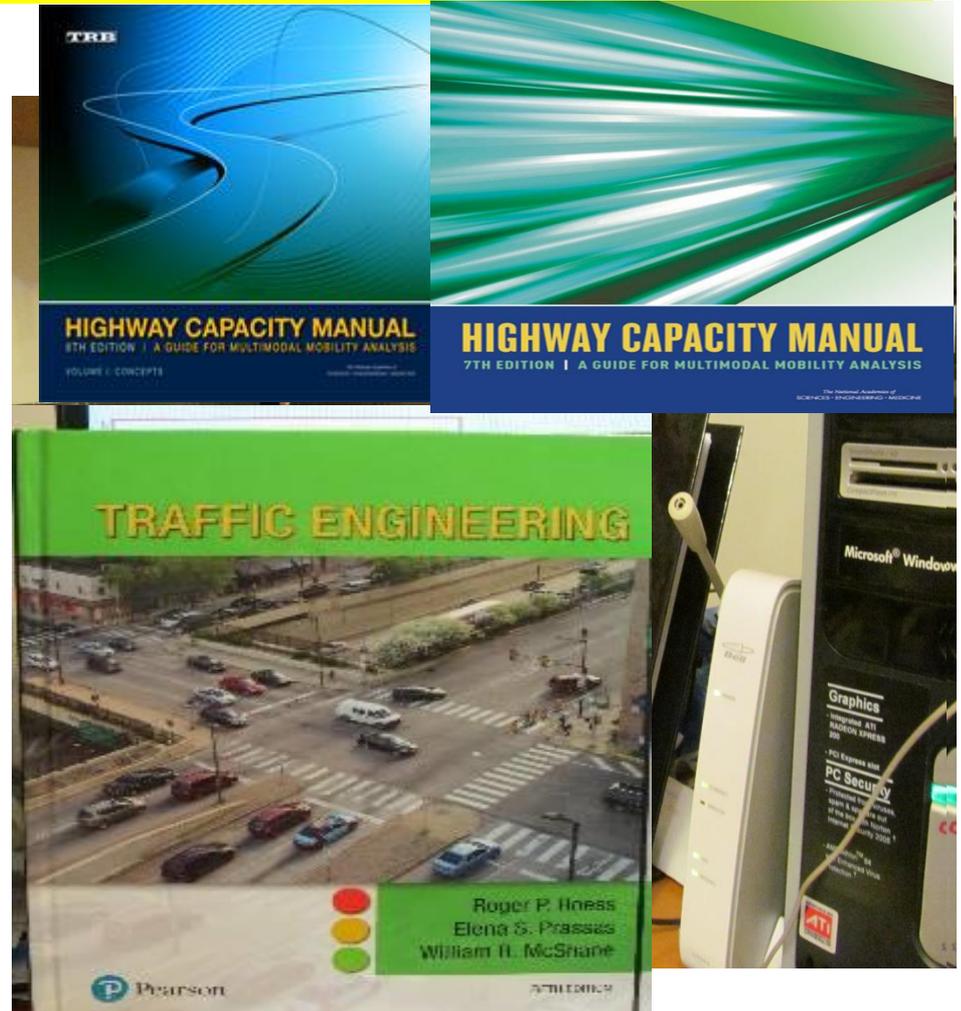
WEEK	TOPIC
4,5	Traffic studies: introduction and overview. Statistics and applications in traffic engineering; volume, speed, travel time and delay; parking
6	Accident studies.
7	Capacity analysis of roads and intersections.
8-11	Traffic control: intersections, networks. Traffic management. Environmental impacts. Traffic simulation.
12	Traffic impact studies.

NOTE: Fall Break: October 24-28, 2022

Frequently Used Book & Reference Manual

Roses, R.P., Prassas, E.S., McShane, W.R., Traffic Engineering. Fifth Edition. Pearson 2019.

Transportation Research Board (TRB). Highway Capacity Manual 2010, 2016 & 2022. National Research Council, Washington, D.C.



CIVE5305 Traffic Engineering

TEXT BOOKS & REFERENCES (Subject to change)

Roess, R.P., Prassas, E.S., McShane, W.R., Traffic Engineering. Fifth Edition. Pearson 2019.

[eText Version and Hard Copy Version: Availability can be discussed with the Carleton University Book Store.]

Transportation Research Board (TRB). Highway Capacity Manual 2022 & 2016. National Research Council, Washington, D.C.

Black & Veatch. Smart Transportation. Essential Technologies for Intelligent Transportation Systems. Burnaby, B.C. and other offices.

Banks, James, H. Introduction to Transportation Engineering. 2nd Edition. McGraw-Hill. 2002.

Kyte, M. and Tribelhorn, M. Operation, Analysis, and Design of Signalized Intersections: A Module for the Introductory Course in Transportation Engineering. First Edition. 2014.

Papacostas, C.S. and P.D. Prevedouros. Transportation Engineering and Planning. Latest Edition. Prentice Hall.

Hoel, A.H., Garber, N.J. and Sadek, A.W. Transportation Infrastructure Engineering, A Multimodal Approach. Thomson/Nelson. 2007/2008.

Fricker, Jon D. and Whitford, Robert, K. Fundamentals of Transportation Engineering. Pearson/Prentice Hall. 2004.

CIVE5305 Traffic Engineering

TEXT BOOKS & REFERENCES (Cont.)

Mannering, F.L., Kilareski, W.P., and Washburn, S.S. Principles of Highway Engineering and Traffic Analysis. Third Edition, John Wiley & Sons, Inc. 2005.

Garber, Nicholas J. and Lester A. Hoel. Traffic and Highway Engineering. Fourth (SI) Edition. CENGAGE Learning, 2010.

Transportation Association of Canada (TAC). Geometric Design for Canadian Roads. See the latest edition and supplements.

Council for Uniform Control Devices for Canada/Distributed by the Transportation Association of Canada. Uniform Traffic Control Devices for Canada. Metric Edition (latest edition).

Senate of Canada, Driving Change: Technology and the future of the automated vehicles. Ottawa, 2018.

CIVE5305 Traffic Engineering

TEXT BOOKS & REFERENCES (Cont.)

Currin, Thomas R. Introduction to Traffic Engineering: A Manual for Data Collection and Analysis. 2001. Brooks/Cole, Thomson Learning.

Federal Highway Administration (FHWA) (US Department of Transportation). Signal Timing Manual – Second Edition. NCHRP Report 812. 2015.

Web-based Course on Fundamentals of ITS and Traffic Management
(<http://www.citeconsortium.org/WebCT/priv/linx2class.htm>)

US Department of Transportation. Preparing for the future of transportation. Automated vehicles 3.0. October 2018.

IMPORTANT SOURCES OF INFORMATION (subject to change)

Institute of Transportation Engineers (www.ITE.ORG).

Transportation Research Board (TRB) (<http://nas.edu/trb>) [Use TRIS-on line for Transportation Research Information Service for literature search].

CIVE5305 Traffic Engineering

IMPORTANT SOURCES OF INFORMATION

(Cont.)

Intelligent Transportation Systems Society of Canada
(ITS Canada) (www.ITSCANADA.ca)

ITS America (<http://www.itsa.org/>)

Transportation Association of Canada (TAC)
(www.tac-atc.ca)

WORKLOAD & MARKING SCHEME

Assignments	20%
Term Paper/Research Paper/Mini-project	40%
Final (Take Home) Examination	40%

CIVE5305 Traffic Engineering

COURSE INSTRUCTOR

Professor Ata M. Khan

Contact by email: ata.khan@carleton.ca

Office Hours: Thursdays 10:00 a.m. – 1:00 p.m.

Office: Room 7064 Minto Centre

Telephone: 613 520 2600 (5786) (answered on Thursdays during office hours 10:00a.m.-1:00 p.m.)

Email: ata.khan@carleton.ca

Announcements: COVID

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.

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

COVID

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.

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.

COVID

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.

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.

Accommodations

“The [Paul Menton Centre for Students with Disabilities \(PMC\)](#) provides academic accommodations and support services to students with Learning Disabilities (LD), 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 permanent, persistent/prolonged, or temporary disability requiring academic accommodations in my course, please contact the PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation.

Announcements (Continued)

Other Academic Accommodation

***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://www2.carleton.ca/equity/accommodation/>

***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://www2.carleton.ca/equity/accommodation/>

Accommodations

If you are already registered with the PMC, please request your accommodations for this course through the [Ventus Student Portal](#) 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). Requests made within two weeks will be reviewed on a case-by-case basis. For final exams, the deadlines to request accommodations are published in the [University's Academic Calendars](#).

After requesting accommodations through the Ventus Student Portal, please meet with me to discuss your accommodation needs and how they will be implemented in my course.”

Announcements (Continued)

Marked Final Examination Papers

Marked final examinations will not be returned.

Students Who Wish to Audit the Course

Please refer to Carleton University regulations.

Announcements (Cont.)

Intellectual Property

"Classroom teaching and learning activities, including lectures, discussions, presentations, etc., by both instructors and students, are copy protected and remain the intellectual property of their respective author(s). All course materials, including PowerPoint presentations, outlines, and other materials, are also protected by copyright and remain the intellectual property of their respective author(s)."

Students registered in the course may take notes and make copies of course materials for their own educational use only. Students are not permitted to record lectures, reproduce or distribute lecture notes and course materials publicly for commercial or non-commercial purposes without express written consent from the copyright holder(s)."