

Carleton University

Department of Civil and Environmental Engineering

CIVE3304/GEOG 4304 Transportation Engineering and Planning

Fall 2022

Course Description: This is an introductory course to key analytical techniques and design methods of Transportation Engineering and Transportation Planning. The course covers the following general topics: transportation and the socio-economic environment, components of transportation systems, fundamentals of vehicle motion, vehicle stability on horizontal curves, different modes of transportation, design controls, vehicle motion on horizontal curves and on, design of key highway geometric elements, fundamental of traffic flow theory, capacity analysis, fundamentals of transportation planning methodologies, introduction to traffic safety analysis, and introduction to transportation impact studies and evaluation techniques of transportation projects.

Learning Materials: Lectures Notes and selected handouts will also be posted on BrightSpace.

Recommended Textbook: Transportation Engineering and Planning, C.S. Papacostas and P.D. Prevedouros. Third Edition. Publisher: Prentice Hall. ISBN 0-13-081419-9. Available in the Bookstore.

Course Goals and Learning Objectives: This course is designed to provide foundational technical, analytical knowledge, skills required in major practice areas of Transportation Engineering and Planning. Following is an outline of the course goals and learning objectives:

Course Goal	Related Learning Objectives	Testing Methods	Related Chapters
Goal 1: Introducing the transportation system	<ul style="list-style-type: none">• Identify component of the transportation system.• List different modes of transportation.• Discuss the Functions of each mode in the transportation system.	<ul style="list-style-type: none">➤ Midterm➤ Final	Ch. 1 Ch. 5
Goal 2: Fundamentals of highway geometric design	<ul style="list-style-type: none">• Recognize key geometric elements of highways from a designer’s perspective.• Identify main geometric design requirements for key geometric elements and the influence of human factors on geometric design.• Apply models of vehicle motion and stability on horizontal curves.• Differentiate analytical treatments of geometric elements and distinguish contextual variables.• Choose appropriate design models and apply them to solve fundamental problems of horizontal and vertical alignment of highways.• Recognize the importance of alignment coordination as a task in highway design.• Recognize the significance of design consistency on highway design.	<ul style="list-style-type: none">➤ Assignment 1➤ Midterm➤ Final	Ch. 2

Continued:

<p>Goal 3: Fundamentals of Traffic Flow Theory</p>	<ul style="list-style-type: none"> Recognize and discuss main traffic flow patterns and relationships that govern speeds of moving road users versus their density. Choose and apply main traffic flow models to predict traffic conditions in some traffic engineering problems; in this course shockwaves and queues formation. 	<ul style="list-style-type: none"> ➤ Assignment 2 ➤ Final 	<p>Ch. 3</p>
<p>Goal 4: Fundamentals of Transportation planning and travel demand forecast</p>	<ul style="list-style-type: none"> Identify the purpose and goals of the Transportation Planning process. List and explain the main steps and classic models used in the traditional four-step model for Travel Demand Forecast. Apply the classic models for demand forecast. Recognize limitations of this model, devise, and estimate potential improvements. 	<ul style="list-style-type: none"> ➤ Assignment 3 ➤ Final 	<p>Ch. 7 Ch. 8</p>
<p>Goal 5: Analytical techniques of common road safety analysis problems</p>	<ul style="list-style-type: none"> Identify the purpose of network screening. Recognize the practical challenges of collision data analysis. Apply a specific statistical technique appropriate for network screening. 	<ul style="list-style-type: none"> ➤ Assignment 4 ➤ Final 	<p>Lecture Notes</p>
<p>Goal 6: An overview of traffic impact analysis</p>	<ul style="list-style-type: none"> Identify and discuss main impacts of transportation projects on the environment. Recognize typical approaches to evaluate transportation project alternatives. 	<p>Final</p>	<p>Ch. 10 Ch. 11</p>

Lectures: Two times a week as per the University schedule.

Problem Sessions: Problem sessions will be held from every two weeks on Wednesdays. Check your course registration to identify whether you are in an Odd (A2O) or Even (A1E) section and attend accordingly.

Student Performance Evaluation: Assignments: 20% Quizzes: total weight of 10% (5% each quiz), Mid Term: 20% , and Final: 50% (To pass in this course, at least 40% of the final examination mark must be received).

Communications: All done through the internet course portal on BrightSpace.

Office Hours: Instructor: Tuesday 12:00 –1:00 and Thursdays 12:00-1:00 at ME 3362

Teaching Assistants: Office hours and locations will be posted on the course online portal.

Course-related University Rules and Services:

[1] 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.

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."

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/>

[2] Plagiarism: Academic Integrity:

<https://carleton.ca/registrar/academic-integrity/>

[3] Emergencies or Unsuitable Exam Times: Exam Deferrals:

<https://carleton.ca/registrar/deferral/>

[4] For last day of registration, please refer to University regulations for the academic year on

<https://calendar.carleton.ca/academicyear/>

[5] Covid19 countermeasures:

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.

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. 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.

Course-specific Rules:

[1] Lectures and course materials, including presentations, outlines, and similar materials, are protected by copyright. You may not and may not allow others to reproduce or distribute lecture notes and course materials publicly without the Instructor's express written consent.

[2] On-time attendance is very important. Late students whose arrival is disrupting to the class must do due diligence to minimize the impact of their late entry.

[3] Late assignments (not covered by Article 2.6: Deferred Term Work in Undergraduate Regulations for Course Evaluation) will not be accepted if submitted later than one day after the announced submission deadline. The total mark will be discounted by 15% after the submission deadline and will be discarded if submitted on or after the 2nd calendar day after submission deadline.

[4] Assignments are to be submitted online through the course portal on BrightSpace.

[5] Assignments detected by the Teaching Assistants to be of similar form will be referred to the Instructor and will not be awarded a mark for their work. The Instructor will review these assignments against university policy on plagiarism (refer to university policy [2]).

[6] The student must request permission to be absent from the midterm examination without forfeiting its mark. This request must be submitted to the Instructor no later than 3 days after the scheduled time of the midterm examination. The student must accompany this request with a proof of an unavoidable cause, *e.g.*, a formal medical report. Any claim of extraordinary circumstances must be substantiated by proof. Claims which lack adequate proof will be dismissed and the student will receive a zero for the midterm examination. The student will need to immediately consult with the Instructor to make alternative arrangement for the missed test. The student must notify the Instructor of the request for alternative arrangement in due course, *i.e.* no later than 3 days after the scheduled day of the midterm test.

[7] The student is responsible for following all course-related announcements on BrightSpace. These announcements include, but not limited to, assignments, deadlines, and examination instructions.