Fall 2023

Transportation Engineering and Planning

Civil and Environmental Engineering

CIVE3304A

Teaching Team

Instructor:

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Phone 613-520-2600 x 1709

Office Hours, Tuesday, Thursday; 12:00 PM to 1:00 PM. ME3362

TA(s): Information will be posted on Brightspace shortly and a new version of the syllabus will be uploaded

Course Description and requirements

1) Course schedule

Transportation Engineering and Planning - 31116 - CIVE 3304 - A

Section Type - IN-PERSON. NOT SUITABLE FOR ONLINE STUDENTS

Scheduled Meeting Times

Time	Days	Where	Date Range	Schedule Type	Instructors
10:05 pm - 11:25 pm	Tue Thu	Mackenzie Building 3269	Sep 06, 2023 - Dec 08, 2023	Lecture	Adam Weiss (P)
8:35 am - 11:25 am	Fri	Tory Building 208	Sep 11, 2023 - Dec 08, 2023	Laboratory L1E-L2O	Karim Ismail (P), Adam Weiss
Laboratory: Problem sessions will be held from every two weeks on Friday. Check your course registration to identify whether you are in an Odd (L2O) or Even (L1E) section and attend accordingly.					

2) Course description

Transportation and the socio-economic environment; modal and intermodal systems and components; vehicle motion, human factors, system and facility design; traffic flow; capacity analysis; planning methodology; environmental impacts; evaluation methods. Also listed as GEOG 4304..

3) Prerequisites and recommended knowledge

Prerequisite(s): third-year status in Engineering, or permission of the Department

4) Learning Outcomes

- 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.
- Choose and apply appropriate design models and apply them to solve fundamental problems of horizontal and vertical alignment of highways.
- Apply classic traffic flow models to predict traffic flow characteristics.
- Identify main parameters used to describe traffic flow characteristics.
- Apply deterministic queuing analysis techniques to predict queuing formation and dissipation.
- List and explain the main steps of the classic four-step model for travel demand forecast.
- Apply trip rate and regression techniques for trip generation in order to predict the frequencies of generated or attracted trips to traffic analysis zones.
- Apply the Gravity and Fratar techniques for trip distribution in order to predict the origin-destination trip matrices for a number of traffic analysis zones.
- Apply the Multinomial Logit techniques for predicting traveller mode choices.
- Apply basic techniques of network screening for safety application.
- Identify different components of the transportation system.
- Identify major impacts of transportation projects on the environment.

5) Graduate Attributes

The Canadian Engineering Accreditation Board (CEAB) requires graduates of undergraduate engineering programs to possess 12 attributes. Courses in all four years of our programs evaluate students' progress towards acquiring these attributes. Aggregate data (typically, the data collected in all sections of a course during an academic year) is used for accreditation purposes and to guide improvements to our programs. Some of the assessments used to measure GAs may also contribute to final grades; however, the GA measurements for individual students are not used to determine the student's year-to-year progression through the program or eligibility to graduate. This following list provides the GAs that will be measured in this course, along with the Learning Outcomes that are intended to develop abilities related to these attributes.

GA - Indicator	Assessment Tool
N/A	N/A

For information on GAs and continual curriculum improvement, visit the Accreditation section of Engineers Canada website.

Note there are no graduate attributes for CIVE4303.

6) Accreditation Units

Math	Natural Science	Complementary Studies	Engineering Science	Engineering Design
-	-	-	65%	35%

7) Textbook(s)/References

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.

Other relevant readings, course notes and lecture slides will be provided on Brightspace.

8) Topics and tentative plan

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	• Identify component of the transportation system. • List different modes of transportation. • Discuss the Functions of each mode in the transportation system.	➢ Midterm ➢ Final	Ch. 1 Ch. 5
Goal 2: Fundamentals of highway geometric design	• 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 related to sight distance.	➢ Assignment 1 ➢ Midterm ➢ Final	Ch. 2

Course Goal	Related Learning Objectives	Testing Methods	Related Chapters
Goal 3: Fundamentals of Traffic Flow Theory	• 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.	➢ Assignment 2 ➢ Final	Ch. 3
Goal 4: Fundamentals of Transportation planning and travel demand forecast	• 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.	➢ Assignment 3 ➢ Final	Ch. 7 Ch. 8
Goal 5: Analytical techniques of common road safety analysis problems	• Identify the purpose of network screening. • Recognize the practical challenges of network screening for road safety treatments. • Apply classic and some specific statistical techniques for network screening. • Evaluate on logical grounds the effectiveness of each method, recognize their limitations, and estimate potential improvements.	➢ Assignment 4 ➢ Final	Lecture Notes
Goal 6: An overview of traffic impact analysis	• Identify and discuss main impacts of transportation projects on the environment. • Recognize typical approaches to evaluate transportation project alternatives.	Final	Ch. 10 Ch. 11

9) Evaluation and marking scheme

a) Final Examination

i) **<u>Final exams are for evaluation purpose and will not be returned to students.</u>**

ii) Closed book, calculator allowed

iii) Final Exam Weight: 50%

ii) Deferred Final Examinations: Students who are unable to write the final examination because of a serious illness/emergency or other circumstance beyond their control may apply for accommodation by contacting the Registrar's office. Consult the Section 4.3 of the University Calendar.

b) Exam format and e-proctoring statement

Exam will be held in person. Exam will be 3 hours in length.

c) Additional requirements

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

d) Term work late submission policy

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 2rd calendar day after submission deadline.

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]).

There is no make-up midterm. The student can receive formative feedback on regular midterm. The student must notify the instructor of inability to attend regular midterm no later than 3 days after the regular midterm. The weight of the midterm will be shifted to the final exam.

e) Self-Declaration form and deferred term work

Students who claim illness, injury or other extraordinary circumstances beyond their control as a reason for missed term work are held responsible for immediately informing the instructor concerned and for making alternate arrangements with the instructor and in all cases. This must occur no later than three (3) days after the term work was due. The alternate arrangement must be made before the last day of classes in the term as published in the academic schedule. Consult Section 4.4 of the University Calendar.

You need to submit a self declaration form for late work or midterms. Contact the instructor with the completed self-declaration form no later than 3 days after the date/deadline of term work including test/midterm, labs, assignments.

10) Academic dates

Students should be aware of the academic dates (eg. last day for academic withdrawal) posted on the Registrar's office web site https://carleton.ca/registrar/registration/dates/academic-dates/

Academic Integrity and Plagiarism

a) Please consult the Faculty of Engineering and Design information page about the Academic Integrity policy and our procedures: https://carleton.ca/engineering-design/current-students/fed-academic-integrity Violations of the Academic Integrity Policy will result in the assignment of a penalty such as reduced grades, the assignment of an F in a course, a suspension or, expulsion.

b) One of the main objectives of the Academic Integrity Policy is to ensure that **the work you submit is your own.** As a result, it is important to write your own solutions when studying and preparing with other students and to avoid plagiarism in your submissions. The University Academic Integrity Policy defines plagiarism as "presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one's own." This includes reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source.

   Examples of violations of the policy include, but are not limited to:

   · any submission prepared in whole or in part, by someone else;
   · using another's data or research findings without appropriate acknowledgement;
   · submitting a computer program developed in whole or in part by someone else, with or without modifications, as one's own; and
   · failing to acknowledge sources of information through the use of proper citations when using another's work and/or failing to use quotations marks.

Copyright

The materials (including the course outline and any slides, posted notes, videos, labs, project, assignments, quizzes, exams and solutions) created for this course and posted on this web site are intended for personal use and may not be reproduced or redistributed or posted on any web site without prior written permission from the author(s).

Learning and Working Environment

The University and all members of the University community share responsibility for ensuring that the University's educational, work and living environments are free from discrimination and harassment. Should you have concerns about harassment or discrimination relating to your age, ancestry, citizenship, colour, creed (religion), disability, ethnic origin, family status, gender expression, gender identity, marital status, place of origin, race, sex (including pregnancy), or sexual orientation, please contact the Department of Equity and Inclusive Communities at equity@carleton.ca
We will strive to create an environment of mutual respect for all through equity, diversity, and inclusion within this course. The space which we work in will be safe for everyone. Please be considerate of everyone's personal beliefs, choices, and opinions.

Academic Accommodations

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

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 .

You should request your academic accommodations in the Ventus Student Portal, for each course at the beginning of every term. For in-term tests or midterms, please request accommodations at least two (2) weeks before the first test or midterm. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable).

Accommodation for Student Activities: Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor 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, see the Senate Policy on Accommodation for Student Activities (PDF).

Pregnancy Obligation: Please contact your instructor 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, please review the Student Guide to Academic Accommodation (PDF).

Religious Obligation: Please contact your instructor 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, please review the Student Guide to Academic Accommodation (PDF).

Survivors of Sexual Violence: As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit the Sexual Violence Prevention & Survivor Support.

Engineering Academic Advising

The Engineering Academic Support Service assists undergraduate engineering students with course selection, registration, and learning support from first-year through to graduation.
Academic Advisors Contact can be found here: https://carleton.ca/engineering-design/current-students/undergrad-academic-support/undergraduate-advisors/.

Student Mental Health and Wellness

As a university student you may experience a range of mental health challenges that can significantly impact your academic success and overall well-being. Carleton's Wellness Services Navigator is designed to help students connect with mental health and wellness resources.
If you need to talk to someone from the department for more information and support with connecting to resources, you can contact the following faculty members, depending on your program. Or contact the department at orCEEUGChair@cunet.carleton.ca.

ACSE: Prof. Scott Bucking
Email: scott.bucking@carleton.ca, Office: 5209 Canal Building

CIVE: Prof. Heng Khoo
Email: heng.khoo@carleton.ca, Office: 3364 Mackenzie

ENVE: Prof. Shoeleh Shams
Email: shoeleh.shams@Carleton.ca, Office: 4242 Mackenzie

Here is a list of on-campus and off-campus recourses:

1. **Carleton's Health and Counselling Services:** To book an appointment contact the main clinic by calling (613) 520-6674. If urgent, let the Patient Care Coordinator know or go in person to the main clinic (2500 Carleton Technology and Training Centre Building) and indicate that they are in crisis and need to speak to someone right away. For more information, please see https://carleton.ca/health/

2. Emergencies and Crisis and Emergency Numbers

3. **Good2Talk (1-866-925-5454):** Good2Talk is a free, confidential helpline providing professional counselling and information and referrals for mental health, addictions and well-being to post-secondary students in Ontario, 24/7/36 https://good2talk.ca/

4. **Empower Me:** Undergraduate students have access to free counselling services in the community through Empower Me, either in person, by telephone, video-counselling or e-counselling. **This free service is accessible 24/7, 365 days per year.** Call **1-844-741-6389 (toll free)** to make an appointment with a counsellor in the community. More information is available https://students.carleton.ca/services/empower-me-counselling-services/

5. **The Walk-In Counselling Clinic (off-campus community resource):** The walk-in Counselling Clinic have offices in various locations across Ottawa and the greater Champlain region that are open 7 days a week. Individuals will be assisted, with no appointment, on a first-come, first-serve basis during the Walk-in Counselling Clinic hours. The Walk-in Counselling Clinic **offers services in many languages** and is free and confidential. More information can be found at: https://walkincounselling.com/

6. **Distress Centre of Ottawa and Region**: Available 10am-11pm, 7 days/week, 365 days/year. **Distress Line:** 613-238-3311, **Crisis Line:** 613-722-6914 or 1-866-996-0991, **Text:** 343-306-5550. https://www.dcottawa.on.ca/

7. **Distress and Crisis Ontario**, Available for chat 2 pm – 2 am EST. https://www.dcontario.org/

8. **BounceBack Ontario (Toll-Free: 1-866-345-0224)** is a free skill-building program managed by the Canadian Mental Health Association (CMHA). It is designed to help adults and youth 15+ manage low mood, mild to moderate depression and anxiety, stress or worry. Delivered over the phone with a coach and through online videos, you will get access to tools that will support you on your path to mental wellness. https://bouncebackontario.ca/.