

CIVE 440/641 PLAN 478/678

Transit Planning and Operations

Winter 2019

Syllabus

University of Waterloo

Department of Civil and Environmental Engineering

School of Planning

Instructor

Jacob Terry

Office: E2-3308

Email: jacob.terry@uwaterloo.ca

Teaching and Course Assistants

Devin Feng (TA)

Office: E2-2365

Email: devin.feng@uwaterloo.ca

Xiaomeng (Ming) Xu (CA)

Office: EV1-352

Email: xiaomeng.xu@uwaterloo.ca

Course Description (Undergraduate Calendar)

The historical evolution of transit in cities; the technological innovations which made transit possible; and transit mode definitions. Models of transit vehicle motion are presented; transit travel times under different travel regimes are derived. Transit scheduling methods are shown. System operational characteristics are defined and quantitative measures of effectiveness are introduced. Transit network planning objectives are identified; actual geometries are qualitatively and quantitatively analyzed. Transit ownership structures and economics are discussed; contemporary ITS applications are presented. Methods for selecting appropriate transit modes are covered.

Meeting Times

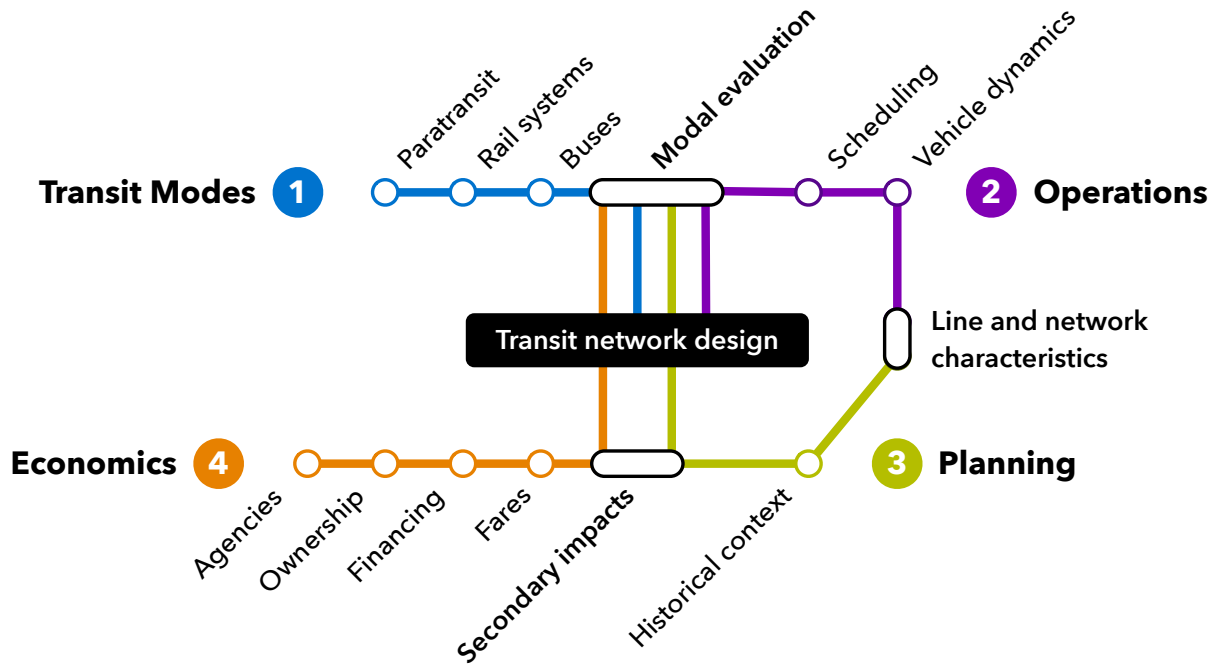
Lectures	Tuesdays / Thursdays	11:30 a.m. to 12:50 p.m.	RCH 105
Tutorials	Fridays	10:30 a.m. to 11:20 a.m.	RCH 110

The first lecture is held on **January 8**. In some cases, lectures may be held during tutorial times, and vice-versa, depending on scheduling constraints. Guest speakers may also be invited to discuss various topics. Other important dates include:

- **Midterm:** February 14
- **Reading Week:** February 18-22 (no lectures, tutorials, or due dates)
- **Pre-Exam Study Days:** April 8-9

Course Outline

Course Concept Map



Intended Learning Outcomes

By the end of the course, students should be able to:

- Classify urban transportation modes by right-of-way, technology, and service type
- Graph quantitative relationships, including vehicle dynamics and time-space diagrams
- Apply systems planning processes to transit network design
- Explain the qualitative impacts of different economic factors and ownership models on public transportation systems
- Select the optimal mode for a transportation route based on vehicle characteristics, planning contexts, travel forecasts, and economic factors
- Design a basic transit network with efficient transfers and schedules

Readings

V1: *Urban Transit: Systems and Technology*, Vukan R. Vuchic (HE 308 V834 2007)

- Relevant pages of V1 are provided, so finding a copy is **optional**.

V2: *Urban Transit: Operations, Planning and Economics*, Vukan R. Vuchic (HE 305 V83 2005)

- This forms the bulk of the course, and finding a copy is **recommended**.
- Two copies are placed on 3-hour course reserves at the library (Dana Porter)

Topics

Dates (tentative)	Topic	Textbook Reference
Jan 8	Introduction	
Jan 8, 10	Modal classification	V1 Chapter 2
Jan 18 (Friday)	History	V1 Chapter 1
Jan 17, 22, 24, 29, 31	Buses, rail, paratransit, new technologies	V1 Chapter 5, 6, 9
Feb 5	Vehicle dynamics	V1 Chapter 3
Feb 7, 12	Operations and scheduling	V2 Chapter 1
Feb 26	Capacity and speed	V2 Chapter 2
Feb 28, Mar 5	Transit lines and networks	V2 Chapter 4
Mar 12, 14, 19, 21	Systems planning and modal selection	V2 Chapter 10, 11, 12
Mar 26	Transit agencies	V2 Chapter 6
Mar 28	Transit fares	V2 Chapter 7
Apr 2	Transit financing	V2 Chapter 8
Apr 4	Transit ownership	V2 Chapter 9

Evaluations

Component	Weight
Assignments	20%
Project	20%
Midterm	20%
Final Exam	40%

- **Evaluation Methods:** Students in the graduate section of the class (CIVE 641 / PLAN 678) will have the same weighting in the course, but will have more independently-directed assignments, midterm questions, and exam questions.
- **Late and Missed Assignments:** Due dates will be provided for each assignment when they are published on LEARN. A 5% penalty is applied for each day an assignment is late, up to 4 business days, at which point the assignment will no longer be accepted.
- **Term Project:** Undergraduate students will work in groups on a project summarizing their knowledge in transit network design, with groups containing both CIVE 440 students and PLAN 478 students. Graduate students will work on the same project individually.

The Legal Text

Things you should know by now, but should always review:

Academic integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check the [Office of Academic Integrity](#) for more information.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70, Student Petitions and Grievances, Section 4](#). When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for his/her actions. [Check the [Office of Academic Integrity](#) for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/ collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to [Policy 71, Student Discipline](#). For typical penalties, check [Guidelines for the Assessment of Penalties](#).

Appeals: A decision made or penalty imposed under [Policy 70, Student Petitions and Grievances](#) (other than a petition) or [Policy 71, Student Discipline](#) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to [Policy 72, Student Appeals](#).

Note for students with disabilities: [AccessAbility Services](#), located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with [AccessAbility Services](#) at the **beginning of each academic term**.

Writing and Communication Centre: The Writing and Communication Centre works with students in all faculties to help you consider your audience, clarify your ideas, develop your voice, and write in the style appropriate to your discipline. WCC staff offer one-on-one support for writing papers, delivering presentations, citing research, and revising for clarity and coherence. Group appointments for team-based projects, presentations, and papers are also available.

You can pre-book appointments with WCC staff, or drop in at the Library for quick questions and feedback from WCC peer tutors. To book an appointment and to see drop-in hours, visit www.uwaterloo.ca/wcc.

Please note that communication specialists guide you to see your work as readers would. They can teach you revising skills and strategies, but will not change or correct your work for you. Please bring hard copies of your assignment instructions and any notes or drafts to your appointment.