

CIVIL 324 Urban Public Transport Systems

Spring 2025

Monday 16h15 – 19h @ GR A3 31

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Office hours: Monday 15h – 16h @ GC D2 401 (or by appointment)

Overview

This course offers an introduction to urban public transport system planning, operations and management. The course consists of three modules and each module will cover the main characteristics and key design problems of several types of public transport services:

- **Regular transit:** shuttle system, bus corridor and network, railway, flexible-route transit;
- **On-demand mobility:** taxi, ride-hailing, micromobility;
- **Integrated transport system:** park & ride, first/last-mile service, mobility-as-a-service, co-modality.

The course will include a combination of lectures and laboratories. The former will focus on the theoretical and modelling approaches to different urban transport systems, while the latter will provide hands-on experience of service design.

Course materials

Lecture slides and exercise questions will be posted before each course, and the exercise answers will be provided afterwards. All these materials are based on the following books:

- Daganzo, and Ouyang. *Public Transportation Systems: Basic Principles of System Design, Operations Planning and Real-Time Control*. 2019.
- Vuchic. *Urban Transit: Operations, Planning, and Economics*. 2005
- Hansen, and Pachl. *Railway timetabling and operations: Analysis, modelling, optimisation, simulation, performance, evaluation*. 2014.
- Larson, and Odoni. *Urban operations research*. 1981.

Other references

If you're interested in the philosophy in transit design, here are two nice books:

- Walker. *Human Transit*. 2011
- Mees. *Transport for suburbia: beyond the automobile age*. 2009.

Grading

- Assignment: 60%
- Project: 40%

Assignment

There are three individual assignments: two cover the first module and the other covers the other two modules. Each assignment amounts 20% of the course grade and will be published

at least two weeks before the deadline. An exercise session will be dedicated to assignment Q&A before each deadline. Discussion and collaboration are permitted but must be declared. Late submissions are not accepted.

Project

There is one group project on selective topics. Each group consists of no more than 4 persons. The grade will be determined based on a proposal presentation (10%), a final presentation (15%), and the project report (15%).

Schedule

Week	Date	Topic	Assignment/Project
1	17.02	Introduction; Shuttle system	
2	24.02	Bus corridor	Assign. 1 published
3	03.03	Transit network I: Stop location and line planning	
4	10.03	Transit network II: Scheduling and pricing	
5	17.03	Transit network III: Operations	Assign. 1 due
6	24.03	Railway system and operations	Assign. 2 published
7	31.03	Flexible-route transit	Project published
8	07.04	Taxi and ride-hailing/sharing	
9	14.04	Micromobility	Assign. 2 due
10	21.04	<i>Easter break</i>	Project proposal due
11	28.04	Project: proposal presentation	
12	05.05	Intermodel 1: Park & ride; First/last-mile service	Assign. 3 published
13	12.05	Intermodel 2: Mobility-as-a-service; Co-modality	
14	19.05	(TBD)	
15	26.05	Project: final presentation	Assign. 3 due