CIVIL-455

Transportation economics

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Cursus	Sem.	Type
Civil Engineering	MA2, MA4	Opt.
Civil engineering minor	E	Opt.
Territories in transformation and climate minor	E	Opt.
Urban Planning and Territorial Development minor	E	Opt.

Language of teaching	English
Credits	3
Session	Summer
Semester	Spring
Exam	During the semester
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

The scope of the lecture is to provide the basic concepts in transport economics and introduce new ones for private and public transport and environmental issues. Demand, supply, welfare analysis and regulation will be illustrated.

Content

-Foundation of microeconomics: consumer behaviour, firm behaviour, cost functions, equilibrium, optimum, perfect and imperfect competition.
-Transport in Europe and in the world, passenger and freight. Urban development.
- Static model in Transport. Small network (analytical): equilibrium, optimum, pricing. Cost in transport.
-Dynamic model in Transport. One route: equilibrium, optimum, pricing in the homogeneous case. Extension to take account of heterogeneity. Large scale models. Road pricing.
- Cost benefit analysis and self-financing. The 4 stage model revisited. Risk: theory, measure and applications.
- Externalities: environmental externalities, accidents. Local and global pollution. Instruments and regulation.
- Demand, Discrete Choice Models. Modeling demand from individuals, households and firms in the domains of transport and urban Economics. Estimation of demand using binary and multinomial models.
- LUTI Models. Modeling interactions between residential location, job and firm location, real estate prices, urban development, and transportation. Partial and general equilibrium.

Keywords

transport economics, equilibrium, rational behaviour, competition, pricing, externalities

Learning Prerequisites

Required courses

Traffic Engineering (GC-349) or Consent of the Instructor

Important concepts to start the course

Calculus and Algebra

Learning Outcomes

By the end of the course, the student must be able to:

- Design multimodal systems
- Analyze equilibrium models
- Assess / Evaluate consumer behaviour

- Demonstrate knowledge in transport economics
- Develop discrete choice models
- Illustrate environmental externalities
- Investigate cost benefit analysis

Transversal skills

- Plan and carry out activities in a way which makes optimal use of available time and other resources.
- Evaluate one's own performance in the team, receive and respond appropriately to feedback.
- Access and evaluate appropriate sources of information.
- Demonstrate a capacity for creativity.

Teaching methods

Ex-cathedra with assisted exercises, course group projects

Expected student activities

Attending lectures, doing exercises and lab projects, preparing for exams

Assessment methods

30% Midterm
40% Final exam
30% Laboratory/group projects

Supervision

Office hours	Yes
Assistants	Yes
Forum	Yes

Resources

Virtual desktop infrastructure (VDI)

No

Bibliography

Material is provided in moodle that consists of scientific papers and class notes.

Moodle Link

- https://go.epfl.ch/CIVIL-455

Prerequisite for

Future studies in transportation and economics