

CIVIL-455

Transportation economics

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| Cursus | Sem. | Type |
|---|-------------|-------------|
| Civil Engineering | MA2, MA4 | Opt. |
| Urban Planning and Territorial Development minorE | | 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, and regulation, in classical economics and in the new economic world.
- 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**

Transportation Systems Engineering (GC-351) or Consent of the Instructor

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.
- Collect data.
- 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

Resources

Moodle Link

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