

Course information

Planning of public transportation and railway traffic, 6 ECTS

Aim

The purpose of the course is to give insights in how the planning and operation of public transportation and railway traffic is carried out. The course is focusing on strategic aspects such as transport network planning, timetable construction, rolling stock planning and pricing, but it also includes traffic and delay management. The course is preparatory for research studies. After completing the course, the student shall be able to:

- describe state-of-the-art in research in planning of public transport and railway traffic.
- understand and describe relevant models and methods used to design a new transport network, evaluate this and discuss its strengths and weaknesses
- understand and discuss issues regarding timetable construction and conflict resolution, in particular with respect to railway traffic.
- implement planning methods for solving numerical instances.

Organization and course content

The course consists of lectures and seminars, given by several researchers from the field and is organised in three blocks: In the first block we focus on bus network planning: how should we design the transit routes and how will the travel demand split up on alternative routes. An important part is the reading and understanding of methods from the research. Lecture 1 (see the teaching plan below) introduces the text material and put it in a relevant context and Seminar 1 summarizes the experiences.

The second block focuses on railway traffic modelling. The lecture will give an overview of how the advanced optimisation techniques can be used to find feasible timetables that fulfil the requirements of the rail undertakings as good as is possible. In Lab 1 students will extend an existing optimization model to meet these requirements. The work should be described and submitted as Hand-in assignment II. It will be discussed during Seminar 2.

Finally, the third block concerns demand-responsive public transport. The area is introduced in Lecture 3 and will be examined via a project, where a model should be implemented. Support and supervision are given in Lab 2, and the project will be presented oral and written at Seminar 3.

Course literature

The course literature consists of lecture slides, and material that successively will be provided via the course learning platform. Parts of the course may require access to scientific journals, which are available via the university library.

Information flow

For the information flow in the course, the learn platform *Lisam* is used. Lisam will also be used for submitting assignments.

Examination

Every student should solve two hand-in assignments individually, each of which will be graded (Fail, 3, 4, 5):

- Hand-in assignment I: *Public transport network modelling*. (Published Wed Nov 6th, deadline for submission Mon Nov 18th, oral discussion and feedback on Seminar 1, Mon Nov 25th.)
- Hand-in assignment II: *Railway timetable construction*. (Published Fri Nov 15th, supervision at Lab 1, Fri Nov 22nd, deadline for submission Mon Dec 2nd, oral discussion and feedback on Seminar 2, Mon Dec 9th.)

In addition, a project assignment is solved in groups of two or three students; also this is graded (Fail, 3, 4, 5):

- Project assignment: *Demand-responsive public transport*. (Published Fri Nov 29th, supervision at Lab 2, Mon Dec 16th, oral presentation and report submission on the seminar, Mon Jan 13th, 2020.)

Detailed instructions are given together with respective assignment.

The course grade is computed as a weighted sum of the three parts, where every part is equally important. A part which is handed in with delay or has been subject to revision may be given grade 2 for the computation of the course grade. In order not to delay the grade, any possible revisions must be handed in no later than Mon Jan 13th, 2020. Thereafter there are two more chances to submit a revision: March 31st and August 31st. Any revision which has still not been approved at latest September 30th, 2020, will not be further considered, and gives the student an unsatisfactory grade. The student must then redo all hand-in assignments and/or the project assignment according the instructions that are given for the 2020 version of the course.

Contact persons:

- **Course coordinator and examiner.**
Contact person Block I (Public transport network modelling).
Anders Peterson; Spetsen 7th floor, 011 – 36 31 07; anders.peterson@liu.se
- **Contact person Block II (Timetable construction).**
Tomas Lidén; Spetsen 7th floor, 011 – 36 34 13; tomas.liden@liu.se
- **Contact person Block III (Demand-responsive public transport):**
Carl Henrik Häll; Spetsen 7th floor; 011 – 36 34 68; carl.henrik.hall@liu.se

Teaching plan

We 06/11	15–17	TP31	Lec. 1: Course introduction and bus traffic planning	Anders Peterson
Fr 15/11	13–15	TP31	Lec. 2: Railway timetabling	Tomas Lidén
<i>Mo 18/11 Submission of Hand-in assignment I via Lisam.</i>				
Fr 22/11	13–15	TP4004	Lab. 1/Supervision	Tomas Lidén
Mo 25/11	13–17	TP31	Sem. 1: Oral examination Hand-in assignment I	Anders Peterson
Fr 29/11	13–15	TP31	Lec 3. Demand-responsive transport	Carl Henrik Häll
<i>Mo 02/12 Submission of Hand-in assignment II via Lisam.</i>				
Mo 09/12	13–17	TP31	Sem. 2: Oral examination Hand-in assignment II	Tomas Lidén Anders Peterson
Mo 16/12	13–17	TP4004	Lab. 2/Supervision	Carl Henrik Häll
Mo 13/01	13–17	TP31	Sem. 3: Oral examination Project assignment <i>Submission of project report (print-out) at the seminar.</i>	Carl Henrik Häll Anders Peterson

Colours:

- Dark colour = Block I: *Public transport network modelling.*
- Light colour = Block II: *Railway timetabling.*
- No colour = Block III: *Demand-responsive public transport.*