

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 Lectures 3 and 4 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 7th, deadline for submission Mon Nov 19th, oral discussion and feedback on Seminar 1, Mon Nov 26th.)
- Hand-in assignment II: *Railway timetable construction*. (Published Fri Nov 16th, supervision at Lab 1, Fri Nov 23rd, deadline for submission Mon Dec 3rd, oral discussion and feedback on Seminar 2, Mon Dec 10th.)

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 30th, supervision at Lab 2, Mon Dec 17th, oral presentation and report submission on the seminar, Mon Jan 14th, 2019.)

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 14th, 2019. Thereafter there are two more chances to get a revision marked: March 31st and August 31st. Any revision which has still not been approved at latest September 30th, 2019, will not be further considered, and gives the student an unsatisfactory grade. The student then has to redo all hand-in assignments and/or the project assignments according the instructions that are given for the 2019 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).**
Sara Gestrelus RISE and LiU; Spetsen 6th floor/Stockholm; sara.gestrelus@ri.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 07/11	8–10	SP34	Lec. 1: Course introduction and bus traffic planning	Anders Peterson
Fr 16/11	13–15	SP34	Lec. 2: Railway timetabling	Sara Gestrelus
<i>Mo 19/11 Submission of Hand-in assignment I via Lisam.</i>				
Fr 23/11	13–15	TP4004	Lab. 1/Supervision	Sara Gestrelus
Mo 26/11	13–17	SP34	Sem. 1: Oral examination Hand-in assignment I	Anders Peterson
Fr 30/11	13–15	SP34	Lec 3. Demand-responsive transport 1	Carl Henrik Häll
<i>Mo 03/12 Submission of Hand-in assignment II via Lisam.</i>				
Fr 07/12	13–15	SP34	Lec. 4: Demand-responsive transport 2	Carl Henrik Häll
Mo 10/12	13–17	SP34	Sem. 2: Oral examination Hand-in assignment II	Sara Gestrelus Anders Peterson
Mo 17/12	13–17	TP4004	Lab. 2/Supervision	Carl Henrik Häll
Mo 14/01	13–17	K22	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.*