Logistics Networks and Transports

Programme course

6 credits

Logistiknätverk och transporter

TNK099

Valid from: 2017 Spring semester

Determined by
Board of Studies for Industrial Engineering and Logistics

Date determined
2017-01-25

Offered for the last time
Spring semester 2021

Replaced by
TNK124

Main field of study
Transportation Systems Engineering

Course level
Second cycle

Advancement level
A1X

Course offered for
- Intelligent Transport Systems and Logistics, Master's programme
- Communication and Transportation Engineering, M Sc in Engineering

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Basic courses in economic, logistics, optimization and simulation. Basic knowledge of AMPL or other mathematical modelling language, Basic programming skills.

Intended learning outcomes

The aim of the course is for the students to get a deep understanding for how logistics systems can be modeled and analyzed from a network perspective, primarily using quantitative models. The role of transportation as preconditioner and solution for strong supply chains and logistics networks, are especially discussed. After the course the student shall be able to:

- Analyze a logistics network, identify its parties and evaluate the different parties' effects on the efficiency of the network as well as on an individual company
- Explain the basics of the SCOR-model, and use the SCOR model on a smaller example, to compute and evaluate important KPI's
- Explain the basic structure for an ERP and explain what constitutes an advanced planning system
- Analyze and structure a smaller planning problem, develop a planning model and draw conclusions about the problem, from the solutions that the model delivers
- Analyze and evaluate results from a network planning model.
- Discuss difficulties and possibilities in supply chain networks
- Compute potential savings by increasing the level of cooperation in a supply chain network, e.g., by cooperating in transportation or vendor managed inventory
- Use mathematical models to suggest cost allocation in cooperation in logistic networks and transportation
- Discuss an evaluate possible savings by using transport telematics, e.g., to increase traceability
- Evaluate differences in efficiency by using different means of transport or by combining different means of transport
- Know and apply planning models for logistics related to e-trade
- Know and understand how cooperation and more efficient planning can improve sustainability
- Know basic technical concepts in transportation

Course content

The course looks at supply chain networks, to illustrate the necessity to look at a system from a holistic perspective, to avoid sub optimization. The course shows how quantative methods can be used to analyze a supply chain as part of a network. The course consists of

- Logistics network - Terminology & models
- The SCOR-model and KPI's
- ERP-systems and advanced planning systems
- Strategic network planning
- Vehicle routing problems
- Vehicle routing in e-trade
- Cooperation and coordination in supply chain networks
- Cooperation: City logistics
- Cost allocation in transport cooperation
- Cooperation: Vendor Managed Inventory & Inventory Control
- Transport telematics and traceability
- Means of transport and terminology in transportation

Teaching and working methods

The course is delivered using lectures, seminars, lessons, laboratory work and smaller projects. On lectures, the basic theory is presented. The seminars are used to present and discuss the different case studied in the course, as well as some games. Seminars are also used for problem solving of larger problems relating to the course content. On the laboratory work, larger problems are formulated using standard and commercial software.
Examination consist partly of two individual assignments, where students are expected to make longer discussions on a few topics, and to solve larger planning problems using quantitative methods and Tools.

Examination

LAB1	Laboratory work	1 credits	U, G
PRA1	Project assignment	2 credits	U, G
UPG2	Assignments	3 credits	U, 3, 4, 5

Good Projects & Laboratory work, with corresponding reports, may lead to higher course grade than grade on the individual assignments.

Grades

Four-grade scale, LiU, U, 3, 4, 5

Other information

Supplementary courses:
Project course in Communications- and transport systems

Department

Institutionen för teknik och naturvetenskap

Director of Studies or equivalent

Erik Bergfeldt

Examiner

Stefan Engevall

Education components

Preliminary scheduled hours: 58 h
Recommended self-study hours: 102 h

Course literature

Aktuella vetenskapliga artiklar enligt anvisningar på kurshemsida. Föreläsningsmaterial, Praktikfallsbeskrivningar, Laborationshandledningar, Utdrag ur böcker mm., som distribueras i samband med motsvarande kurstillfällen, eller finns tillgängliga som nätbaserad litteratur. Scientific papers according to course homepage Materials from lectures, case descriptions, laboratory instructions etc. Additional literature such as excerpts from books may also be handed out during the course.

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.