Large Scale Optimization

Programme course

6 credits

Optimering av stora system

TAOP34

Valid from: 2017 Spring semester

Determined by
Board of Studies for Industrial Engineering and Logistics

Date determined
2017-01-25

Main field of study

Mathematics, Applied Mathematics

Course level

Second cycle

Advancement level

A1X

Course offered for

- Mathematics, Master's Programme
- Industrial Engineering and Management - International, M Sc in Engineering
- Industrial Engineering and Management, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Mechanical 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

An introductory course in optimization.

Intended learning outcomes

The course aims at giving insight into the practical application of optimization methodology to technical and economic decision problems, and to give knowledge about solution principles for certain classes of structured large-scale optimization problems that frequently arise in practical applications. After the course, the student shall:

- be able to state and describe the mathematical principles that are used to

decompose optimization problems
- be able to apply decomposition methods to solve structured optimization problems
- be acquainted with applications of decomposition methods, be able to identify applications that are well suited for such methods, and be able to choose a suitable methodology and use thereof
- have an enhanced knowledge of the practical use of optimization methodology.

Course content

Advanced linear programming and column generation. Price-directive decentralized planning and the Dantzig-Wolfe decomposition principle. Lagrangean relaxation and subgradient optimization. Application to problems arising in for example facility location and in the planning of production and distribution.

Teaching and working methods

The lectures cover model building, theory, and solution methods for large-scale optimization, and give examples of applications. The participants in the course present solutions to assignments, which include numerical excercises, theoretical questions, and further applications. The laboratory exercises comprise the solution of specially structured optimization problems using standard computer software.

Examination

MUN1	Examination	U, 3, 4, 5	6 credits
UPG1	Exercise	U, G	0 credits

Grades

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

Other information

Supplementary courses:
Supply chain optimization.

Department

Matematiska institutionen

Director of Studies or equivalent

Ingegerd Skoglund

Examiner

Torbjörn Larsson

Course website and other links

http://courses.mai.liu.se/GU/TAOP34

Education components

Preliminär schemalagd tid: 64 h
Rekommenderad självstudietid: 96 h

Course literature

Utdelat material.

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.