Optimization

Programme course

6 credits

Optimization

TNK053

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
Autumn semester 2022

Replaced by
TNK127

Main field of study

Mathematics, Applied Mathematics

Course level

First cycle

Advancement level

G2X

Course offered for

- Intelligent Transport Systems and Logistics, Master's Programme

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

Linear Algebra and Multivariable Calculus

Intended learning outcomes

The course will provide basic insight in optimization, especially optimization of
linear, nonlinear, and integer problems and problems with a network structure.
The students can, after completing the course, formulate and analyze optimization
models in the area of economic and technical applications; comprehend the basic
mathematical theory on which the model and algorithms are based on; and be able
to solve optimization problem both manually and with the help of a computer.

Course content

Linear programming: Modelling, basic mathematical theory and geometry, the
simplex method, sensitivity analysis, duality, optimality conditions.
Nonlinear optimization: Modelling, convexity, unconstrained optimization,
optimization under constraints, optimality conditions.
Network optimization: Modelling, shortest paths.
Integer optimization: Modelling, cutting plane and branch and bound.

Teaching and working methods

Lectures, exercises and laborations

Examination

LAB1	Laboratory work	1.5 credits	U, G
TEN1	Written examination	4.5 credits	U, 3, 4, 5

Grades

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

Department

Institutionen för teknik och naturvetenskap

Director of Studies or equivalent

George Baravdish

Examiner

Zhuangwei Liu

Course website and other links

http://www2.itn.liu.se/utbildning/kurs/index.html?coursecode=TNK053

Education components

Preliminary scheduled hours: 48 h
Recommended self-study hours: 112 h

Course literature

Additional literature

Books

Winston, Wayne L., Venkataramanan, Munirpallam, Goldberg, Jeffrey B., (2003)
Introduction to mathematical programming : operations research
ISBN: 0534359647, 9780534359645
Pacific Grove, CA : Thomson/Brooks/Cole Duxbury, c2003.

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.