

# Optimal Control

Programme course

6 credits

Optimal styrning

TSRT08

Valid from: 2017 Spring semester

**Determined by**

Board of Studies for Electrical  
Engineering, Physics and Mathematics

**Date determined**

2017-01-25

## Main field of study

Electrical Engineering

## Course level

Second cycle

## Advancement level

A1X

## Course offered for

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

Automatic Control

## Intended learning outcomes

Optimal control consists of theory and methods for controlling dynamical systems so that a mathematical criterion is minimized. The course aims at giving basic theory and engineering oriented computational methods in the area. After taking the course the participants are expected to be able to:

- Analyze and synthesize optimal open loop control signals using the Maximum principle.
- Analyze and synthesize optimal feedback laws using the Hamilton-Jacobi-Bellman equation.
- Use numerical software to solve optimal control problems.
- Describe the connections between optimal control and other optimization approaches.

## Course content

Formulation of the optimal control problem. The Maximum Principle. Optimal feedback and the Hamilton-Jacobi-Bellman equation. Numerical methods for solving optimal control problems. Relations to MPC and convex optimization.

## Teaching and working methods

The course consists of lectures, problem solving sessions and hand-in assignments.

## Examination

UPG1	Hand-in assignments	2 credits	U, G
TEN1	Written examination	4 credits	U, 3, 4, 5

## Grades

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

## Department

Institutionen för systemteknik

## Director of Studies or equivalent

Johan Löfberg

## Examiner

Anders Hansson

## Course website and other links

<http://www.control.isy.liu.se/student/tsrto8/>

## Education components

Preliminary scheduled hours: 56 h

Recommended self-study hours: 104 h

## Course literature

### **Additional literature**

#### **Compendia**

Ulf Jönsson, Claes Trygger, Petter Ögren, Optimal Control

## 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://stydokument.liu.se/Regelsamling/Innehall/Utbildning\\_pa\\_grund-\\_och\\_avancerad\\_niva](http://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva).