Mechatronics

Programme course

6 credits

Mekatronik

TMMS21

Valid from: 2017 Spring semester

Determined by
Board of Studies for Mechanical Engineering and Design

Date determined
2017-01-25

Main field of study
Mechanical Engineering

Course level
First cycle

Advancement level
G2X

Course offered for
- Mechanical Engineering, M Sc in Engineering
- Design and Product Development
- Industrial Engineering and Management - International, M Sc in Engineering
- Industrial Engineering and Management, 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
Mechanics, Dynamics, Fluid Power Systems, Automatic Control, Matlab

Intended learning outcomes

The object of this course is to give knowledge about design and functionality of mechatronic systems. This option concerns both the mobile and industrial sector as well as automation technology. The knowledge aims for the course are:

- to convey knowledge about mechatronic systems with respect to control engineering and sensor technology.
- to give knowledge about system design and calculation methods for dynamic analyses.
- to convey profound knowledge about control principals with respect to controllability and energy consumption.
- to give insight in measurement methods, signal conditioning, field bus systems and digital control systems.

The skill aims for the course are:

- be able to use measurement methods and simulation tools for analyses of system dynamics.
- be able to implement control algorithms in mechatronic systems.
- be able to adapt a technical specification on an effective system solution.

Course content

- Basic theory: Modelling of components and systems.
- Simulation technique: Simulation of system dynamics.
- Measurement technique: Measurement of flow, velocity, position, temperature, pressure etc. Background of energy technology, system aspects, sensors and signal processing. Servo systems for control of position, velocity and force. Control principles and dynamic behaviour. Distributed digital control systems, signal conditioning and field bus systems.

Teaching and working methods

The teaching consists of lectures, lessons and laboratory exercises.

Examination

LAB1	Laboratory work	1 credits	U, G
UPG1	Written presentation of project work	2 credits	U, G
TEN1	Written examination	3 credits	U, 3, 4, 5

Grades

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

Other information
Supplementary courses: Hydraulic Servo Systems, Models of Mechanics, Electrohydraulic Systems, Fluid Power Systems and Transmissions, Computational Heat Transfer, Mechanical Engineering Systems-Project Course.

Department
Institutionen för ekonomisk och industriell utveckling

Director of Studies or equivalent
Peter Hallberg

Examiner
Magnus Sethson

Course website and other links
http://www.iei.liu.se/flumes/courses

Education components
Preliminary scheduled hours: 62 h
Recommended self-study hours: 98 h

Course literature
Mechatronics, An Integrated Approach, Clarence W. de Silva, CRC Press, ISBN 0-84931274-4. Interna kompendier, forskningsartiklar.

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.