Fluid Power Systems

Programme course

6 credits

Fluidmekanisk systemteknik

TMHP02

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
- Energy-Environment-Management
- Mechanical Engineering, M Sc in Engineering
- Mechanical Engineering, 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
Applied Mechanics and Heat Transfer, Machine Elements and Automatic Control

Intended learning outcomes

The object of this course is to give knowledge about components and systems for fluid transfer of energy and control principles for fluid power systems. The knowledge aims for the course are:

- to convey profound knowledge about component functionality and characteristics in the area of Hydraulic and pneumatic energy transformation.
- to give knowledge about system design and calculation methods.
- to convey profound knowledge about control principals with respect to controllability and energy consumption.
- to give insight in measurement methods and computer usage for system analyses.

The skill aims for the course are:

- be able to analyse fluid power systems with respect to performance, controllability and energy consumption.
- be able to apply calculation methods for component selections and system design.
- be able to perform measurements on components and systems.

Course content

Energy transmission based on hydraulics and pneumatics. Basic fluid dynamics. Component knowledge with respect to functionality and design of pumps, motors, cylinders, valves, accumulators, filters and line components. Characteristics of fluids. System design for different hydraulic and pneumatic circuits. Calculation methods for components and systems.
Basic system principles for control of position, velocity/speed, force/torque and power. Principles for load sensing hydraulic systems and hydrostatic transmissions. Characteristics of proportional- and servo-valves. Automatic sequence control. Measurement transducers in test-stands and control systems

Teaching and working methods

The teaching consists of lectures, lessons and laboratory exercises.

Examination

UPG1	Construction assignment	1.5 credits	U, G
LAB1	Laboratory work	1.5 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, Fluid Power Systems and Transmission, Mechanical Engineering Systems - Project Course

Department

Institutionen för ekonomisk och industriell utveckling

Director of Studies or equivalent

Peter Hallberg

Examiner

Liselott Ericson

Course website and other links

http://www.iei.liu.se/flumes/tmhp02

Education components

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

Course literature

Additional literature

Compendia

Exempelsamling för kursen Fluidmekanisk Systemteknik
Formelsamling Hydraulik och Pneumatik
Laborations-PM
Olsson O, Rydberg K-E, Kompendium i Hydraulik
Rydberg K-E, Basic Theory for Pneumatic System Design

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.