Fluid power systems, advanced course

Fluidmekanisk systemteknik, avancerad kurs
6 credits

Programme course

TMHP06

Valid from: 2025 Spring semester

Determined by	**Main field of study**	
Board of Studies for Mechanical Engineering and Design	Mechanical Engineering	
Date determined	**Course level**	**Progressive specialisation**
2024-08-28	Second cycle	A1N
Revised by	**Disciplinary domain**	
	Technology	
Revision date	**Subject group**	
	Mechanical Engineering	
Offered first time	**Offered for the last time**	
Spring semester 2021		
Department	**Replaced by**	
Institutionen för ekonomisk och industriell utveckling		

Course offered for

- Master of Science in Mechanical Engineering
- Master's Programme in Mechanical Engineering

Prerequisites

Fluid Power Systems, Automatic Control

Intended learning outcomes

The course is intended to give a broad knowledge in hydraulic system design. After the course, the student should:

- be able to analyze and discuss fluid power systems in terms of performance, power consumption, controllability and dynamic properties.
- be able to model and implement dynamic analyses of fluid power systems.
- be able to create and apply calculation basis for component selection and system design.
- be able to explain component functions and component characteristics in the field of fluid power.
- be able to consider environmental aspects and ergonomically suitable solutions.
- conduct laboratory experiments and present experiments and results in writing.
- be able to incorporate and account for research literature in relevant journals.

Course content

Hydraulic machines: Design of different types of pumps and motors. Analyses of losses and efficiency models. Flow pulsations from hydraulic machines. Control actuators for variable displacement machines. Dynamic properties of hydraulic machines. Simulation and optimization of fluid power pumps/motors.

Transmission systems: Mobile and industrial applications. Completely hydraulic and hydro mechanical divided types of transmissions - principles of automatic control and dynamic characteristics. Servo systems for control of shaft speed and torque. Simulation of transmission drive systems.

Valve-controlled systems: Steady state and dynamic properties of pressure and flow control valves. Mobile and industrial applications. Open and closed systems. Load sensing hydraulic systems. Simuation of valve-controlled systems.

Teaching and working methods

The teaching consists of lectures, lessons and laboratory exercises

Examination

UPG1	Scientific article	1.5 credits	U, G
LAB1	Laboratory work	1 credits	U, G
UPG2	Assignments	3.5 credits	U, 3, 4, 5

Grades

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

Other information

Supplementary courses

TMMS13 - Electro Hydraulic Systems
TMPM06 - Project Course Advanced - Mechatronics

About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is “Swedish”, the course as a whole could be given in Swedish, or partly in English. Examination language is Swedish, but parts of the examination can be in English.
- If teaching language is “English”, the course as a whole is taught in English. Examination language is English.
- If teaching language is “Swedish/English”, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English depending on teaching language.

Other

The course is conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

The planning and implementation of a course should correspond to the course syllabus. The course evaluation should therefore be conducted with the course syllabus as a starting point.

The course is campus-based at the location specified for the course, unless otherwise stated under “Teaching and working methods”. Please note, in a campus-based course occasional remote sessions could be included.