SYLLABUS

Applied Systems Simulation 7.5 credits M7032T

Tillämpad systemsimulering

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2022-02-14

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LULEÅ TEKNISKA UNIVERSITET

Applied Systems Simulation 7.5 credits M7032T

Tillämpad systemsimulering

Second cycle, M7032T

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	U G#	Maskinkonstruktion	Mechanical Engineering

Entry requirements

Basic knowledge in mechanics / dynamics corresponding to F0004T and F0006T, basic knowledge in CAD and good knowledge of ordinary differential equations, for example M0010T Computer-aided design and M0031M Linear algebra and differential equations.

Selection

The selection is based on 30-285 credits

Course Aim

The purpose is to be able to understand, simulate and analyze coupled systems. In here, coupled systems refers to integrated simulation of different physical disciplines (e.g. dynamics-control, flow-solid mechanics, etc.). After passing the course, you as a student should be able to:

1. Knowledge and understanding

- understand the basics and be able to solve coupled problems in mechanics.
- describe basic principles and methods for simulating coupled systems.
- describe possibilities and limitations in equations and methods used in system simulation.
- understand simulation and programming of coupled systems.

2. Skills and abilities

- create coupled system models from real problems.
- use different programs and create interfaces to simulate the whole system.
- evaluate results from the simulations

3. Judgement and approach

- critically assess the reasonableness of numerical results.
- explain tomorrow's simulation challenges in mechanical engineering

Contents

The course deals with coupled systems (mechanical, electrical, thermal, hydraulic) from analysis of simpler models to simulation of advanced coupled systems. The content is:

- analytical formulation of simpler coupled systems
- simulation of mechanical systems with active components and control systems
- co-simulation of different software
- evaluation of simulation results
- and a project assignment

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.
The course includes lectures, computer exercises and a project assignment that is presented orally and in a report.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.
For a passing grade, approved assignments and approved oral presentation are required.

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term “unauthorized aids” refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Overlap

The course M7032T is equal to M7030T

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Compulsory assignments	U G#	6	Mandatory	S20	
0002	Oral presentation	U G#	1.5	Mandatory	S20	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via

My LTU.

Last revised

by Niklas Lehto, Programme Director 2022-02-14

Syllabus established

by Head Faculty Programme Director Niklas Lehto 2021-02-17