MF2054 model-based design, adaptation course (3cr)

Course-PM

Autumn 2022

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Canvas activity: MF2054 HT22-1 Model-Based Design, Adaptation Course

KTH Maskinkonstruktion

System and component design
Department of Machine Design
School of industrial engineering and management
Royal Institute of Technology
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Background

The main goal is that all students shall get the basic required skills in operating the most important computer tools used in the mandatory master level courses in the Machine design master track.

Aim

A student that has completed the course shall:

- be able to elaborate on the business motives for using CAD- and CAE-in technical development and engineering;
- be able to use MATLAB to make simple programs that solves the basic mathematical and engineering problems.
- be able to use SolidEdge to make CAD-models of mechanical parts and assemblies, and to do some basic design evaluations with the model.
- be able to use Ansys to set up and solve static, dynamic, and thermal engineering problems with the finite element method.
- have performed integrated CAD- and FEM-modelling.
- be able to use Adams to set up and solve multi-body dynamic models in the time domain.

Course components

Four *Lectures* (4 x 2 hours): Lectures on model-based design, numerical modelling with Matlab, CAD modelling with SolidEdge, finite element modeling with Ansys, and MBS modeling and simulation with Adams..

- Eight *Exercises* (8 x 2 hours): Practical exercises on topics introduced at a preceeding lecture. Each exercise is performed individually, documented, uploaded as an Exercise assignment to the Canvas activity *MF2054 HT22-1*, and approved.

Final grading

The grading is Pass/fail. A pass grade requires that all exercises are approved, attendance at three of the four digital Zoom-based lectures, and delivery of a personal log book (a digital document) of the four lectures and the eight computer exercises.

Prerequisites

A Bachelor in Mechanical Engineering or similar.

Course literature

1 – Documents in the Canvas.module folders

Course examinor

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Schedule, Autumn 2021

	Period 1 (w 35-43)	Time	Location	Lecture (L)/ Excercise (E)/ Assignment (A)
W36	Tuesday. Sept. 6	13-15	M23	**L1: Model-based design and Matlab**
	Wednesday Sept. 7	10-12	Toker	**E1: Matlab exercise 1**
	Friday Sept. 9	13-15	Toker	**E2: Matlab exercise 2**
W37	Wednesday Sept. 14	10-12	M23	**L2: Dynamic models and Solid Edge**
	Friday Sept. 16	13-15	Toker	**E3: Solid Edge exercise 1**
W38	Friday Sept. 23	13-15	Toker	**E4: Solid Edge exercise 2**
W39	Tuesday Sept. 27	13-15	M31	**L3: Elastic bodies and Ansys**
	Wednesday Sept. 28	10-12	Toker	**E5: Ansys exercise 1**
	Friday Sept. 30	13-15	Toker	**E6: Ansys exercise 2**
W40	Tuesday Okt 4	13-15	M31	**L4: FE Modeling + MBS Modeling with Adams**
	Friday Oct. 7	13-15	Toker	**E7: FE modeling**
W41	Friday Oct. 14	13-15	Toker	**E8: Adams exercise**
W43	Sunday Oct. 30	23:59	Canvas	**Deadline for uploading all deliverables (exercises and personal log book)**