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

Course-PM

Autumn 2021

Version 2021-08-26

Canvas activity: MF2054 HT21-1 Model-Based Design, Adaptation Course

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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

Effect from the Covid-19 pandemic, and an aim to keep social distancing, is that all lectures and scheduled supervisions will be digital, each with a dedicated virtual room in Zoom. Each of the eight computer exercises are scheduled in a computer room with supervision available in a virtual Zoom room. Links to all Zoom rooms can be found in the module "Virtual meeting rooms (in chronological order)" that is available in the Canvas course activity "MF2054 HT21-1 Model-based design, adaptation course". All students registrered to the course are automatically members of that Canvas activity.

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 HT21-1*, 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.

Student prepararations for using Zoom

Most of you,have, more or less, been using Zoom in the spring semester. If not:

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- Carefully read the instructions for zoom that is available in
  https://intra.kth.se/en/utbildning/e-larande/webbmoten/webbmoten-med-zoom-1.836430
- Install the app/client and check that it works. https://kth-se.zoom.us
  You are encouraged to try by connecting with a fellow student or a friend. There is also a feature so you can check your audio settings.
- You should use your individual computer with a descent internet connection. It works much better if you have one computer each, rather than sharing one computer between two or more students. This also applies if you want to organize smaller Zoom meetings with your mates. If you do not have a laptop, or similar, you should contact it-support@kth.se.
- You should use a headset with a microphone. Regular iPhone headset and alike works fine. When your microphone is turned off (preferably from within Zoom) you need no microphone or headset, IF THERE IS NO SIGNIFICANT BACKGROUND NOISE WHERE YOU ARE.
- We prefer that you have your camera enabled so we can see you, but if you don't have a camera or webcam on your computer, or if you are very uncomfortable with it, that's also ok.

The first virtual meeting in MF2054, i.e. Lecture 1 on Tuesday 7 Septmber 10:15, but you should sign in already at 10:00 so you have time to ensure that everything is working (especially audio setting).

- You will find a link to the virtual lecture on top in the Canvas Module folder "Virtual meeting rooms (in chronological order)". Just click on the link to enter the Zoom meeting room. If have not installed the zoom app or client, it will work in most web browsers.
- The responsible for the course is the Host for the virtual meeting.
- As default, your microphones are turned off, but you may toggle the Mute/Unmute icon, which is the leftmost icon at the bottom of the Zoom screen.
- The chat function within zoom is enabled so you can type comments/questions, just like in Messenger.
- The lecturer might not be able to respond to your comments/questions in the chat during the lecture, but there will be an opportunity for oral questions at the end.

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. 7	10-12	Zoom	**L1: Model-based design and Matlab**
	Thursday Sept. 9	10-12	Toker, Zoom	**E1: Matlab exercise 1**
	Friday Sept. 10	13-15	Toker, Zoom	**E2: Matlab exercise 2**
W37	Tuesday Sept. 14	10-12	Zoom	**L2: Dynamic models and Solid Edge**
	Thursday Sept. 16	13-15	Toker, Zoom	**E3: Solid Edge exercise 1**
W38	Thursday Sept. 23	10-12	Toker, Zoom	**E4: Solid Edge exercise 2**
W39	Tuesday Sept. 28	10-12	Zoom	**L3: Elastic bodies and Ansys**
	Thursday Sept. 30	10-12	Toker, Zoom	**E5: Ansys exercise 1**
	Friday Okt. 1	13-15	Toker, Zoom	**E6: Ansys exercise 2**
W40	Tuesday Okt 5	10-12	Zoom	**L4: FE Modeling + MBS Modeling with Adams**
	Thursday Oct. 7	10-12	Toker, Zoom	**E7: FE modeling**
W41	Thursday Oct. 14	10-12	Toker, Zoom	**E8: Adams exercise**
W43	Sunday Oct. 31	23:59	Canvas	**Deadline for uploading all deliverables (exercises and personal log book)**