

SYLLABUS

FEM for applied modelling and simulation 7.5 credits M0031T

FEM för tillämpad modellering och simulering

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2022-02-14**

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FEM för tillämpad modellering och simulering

First cycle, M0031T

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Maskinkonstruktion	Mechanical Engineering

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and General entry requirements as well as basic knowledge in solid mechanics (e.g. M0011T or matching) and mechanics/dynamics (e.g. F0004T and F0006T or matching) as well as basic knowledge in mathematics (e.g. M0047M, M0048M och M0049M or matching).

Selection

The selection is based on 1-165 credits.

Course Aim

After passing the course, you as a student should be able to:

Knowledge and understanding

- explain basic FEM theory.
- describe how simulations using the finite element method (FEM) can be applied to predict product behavior.
- describe how FEM can be used in product development

Skills and Abilities

- use FEM when simulating linear static and dynamic problems.
- methodically analyze and solve calculation problems using the finite element method.
- idealize problems in solid mechanics as well as in thermal and dynamic problems and then analyze using the finite element method

Assessment and attitude

- critically evaluate results from analyzes with finite element method.
- evaluate the relevance of models used in finite element analysis.

Contents

The course deals with how to systematically analyze mechanical problems using the finite element method. Knowledge from mechanics, physics and mathematics are important aids in the analysis, as well as basic knowledge in strength theory and machine elements. The course deals with basic finite element theory such as:

- matrix-formulated analysis of bar and frame support.
- basic assumptions for the finite element method.
- element formulation
- isoparametric formulation

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 is conducted through lectures where important parts of the course are highlighted and explained. Lessons in the form of some theory review and arithmetic exercises complement the lectures. The computer exercises and assignments give you the opportunity to model and simulate problems that an engineer can be faced with using the finite element method.

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. Compulsory submissions of analyzed problems as well as computer exercises are included and these are reviewed and assessed during the course. In order to obtain a final grade in the course, approved computer exercises and assignments are required, as well as passing the written exam. The grading of the final grade for the course is based on the grade on the written exam.

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 M0031T is equal to M0025T

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0002	Computer exercises	U G#	1.5	Mandatory	S15	
0003	Written exam	G U 3 4 5	4.5	Mandatory	A21	
0004	Assignments	U G#	1.5	Mandatory	A21	

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 Mats Näsström 2014-06-10