

SYLLABUS

Nonlinear Continuum Mechanics for Finite Element Analysis 7.5 credits M7031T

Olinjär kontinuumsmekanik för finita elementanalys

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2020-02-14**

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Second cycle, M7031T

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Teknisk mekanik	Engineering Physics

Entry requirements

Basic knowledge in Solid Mechanics and Fluid Mechanics, for example M0011T Solid Mechanics and F7016T Fluid Mechanics or corresponding courses.

Selection

The selection is based on 30-285 credits

Course Aim

1. Knowledge and understanding

The aim of the course is that the student should earn basic knowledge in continuum mechanics for applications in numerical methods within solid mechanics and fluid mechanics.

2. Skills and abilities

The course provides understanding for advanced numerical methods and the knowledge, concepts and mathematical formulations and tools needed to use, understand and develop advanced finite element methods for nonlinear problems with large deformations.

3. Valuation and approach

The aim is that the students should gain insight in the limitations and possibilities they have with the knowledge and skills they have earned in the subject during their education.

Contents

- Introduction, methods for nonlinear analysis
- Basic mathematical concepts, vector and tensor analysis
- Analysis of 3-dimensional truss structures
- Kinematics, deformation and strain
- Stress and equilibrium
- Hyperelasticity, material models
- Applications in fluid mechanics

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.
The theoretical part is dealt with in the lectures and the practical application through examples in the exercises.

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. Written examination with differentiated grades and compulsory assignments.

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 M7031T is equal to F7023T

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Written exam	G U 3 4 5	6	Mandatory	A18	
0002	Compulsory assignments	U G#	1.5	Mandatory	A18	

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 HUL Niklas Letho 2020-02-14

Syllabus established

by Mats Näsström 2018-02-15