Engineering Mechanics 7.5 credits F0059T

Teknisk mekanik

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2021-02-17

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Engineering Mechanics 7.5 credits F0059T

Teknisk mekanik

First cycle, F0059T

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

Main field of study

Engineering Physics and Electrical 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 M0029M Differential calculus, M0030M Linear algebra and integral calculus, M0031M Linear algebra and differential equations, M0032M Multivariate analysis and computer tools. Other mathematics courses that include multi-dimensional analysis and vector analysis can replace these courses. M0014M Mathematical Physics, alternatively M0046M Mathematics Ry. Mechanics in F0004T Physics 1 and F0006T Physics 3 or equivalent.

Selection

The selection is based on 1-165 credits.

Course Aim

1. Knowledge and understanding

After completing the course, you should be able to:

- Apply analysis of more technically complex problems in strength theory and fluid mechanics.
- Describe and analyze components and mechanical constructions from a fluid mechanical and strength perspective by methodically attacking and solving calculation problems.
- Apply basic knowledge in flow mechanics with the basic relationships formulated in differential equation form.

2. Skill and ability

- Determine the occurring forces, moments, stresses and deformations in commonly occurring structural elements and understand the background to and be able to use common dimensioning methods.
- Critically evaluate methods and results from an engineering perspective.
- Apply mathematical methods to different flow processes.
- Apply the mathematical methods covered in the basic courses, and how they are used to solve technical flow processes.
- Make assumptions and simplifications to solve problems in strength theory and fluid theory.

3. Judgment and attitude

- Apply engineering thinking in problem solving.
- Have insight into the role of strength theory and fluid mechanics in industry and academia.

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Contents

In solid mechanics, the principles of how deformable bodies react to mechanical stress are studied. This includes analysis of external forces and their effect on structures and components as well as analysis of emerging stresses and deformations. The course includes the following elements: Definitions and basic concepts. Simple homogeneous states. Rotation of circular sections. Beam bending: Section quantities, normal and shear stresses, deformations. Multi-axis stress and strain analysis. Constitutive relations. Flow hypotheses.

In fluid mechanics, basic concepts such as tensors, model experiments, description of flow fields and laws for mass, momentum and energy are studied. Furthermore, inviscid flow with Euler's and Bernoulli equations is included. Viscous flow, Navier-Stokes equations.

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.

The teaching consists of lectures, problem solving, homework and laboratory work. The lectures provide theoretical background, motivations, explanations and examples of applications of the current course section. In problem solving, methodology and working methods for solving problems are demonstrated. The laboratory work is devoted to practically illuminating certain sections within the course, and / or using numerical tools to calculate different courses in the course.

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.

The course ends with an exam and differentiated grades are given. In order to obtain a final grade in the course, in addition to an approved exam, an approved laboratory report is also 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 F0059T is equal to F0030T

Course offered by

Department of Engineering Sciences and Mathematics

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Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Written Exam	G U 3 4 5	6	Mandatory	A18	
0002	Laboratory Work	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 Head Faculty Programme Director Niklas Lehto 2021-02-17

Syllabus established

by Mats Näsström 2018-02-15

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