

SYLLABUS

Advanced Machine Elements 7.5 credits M7018T

Avancerade maskinelement

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2021-02-17**

Advanced Machine Elements 7.5 credits M7018T

Avancerade maskinelement

Second cycle, M7018T

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

Entry requirements

Fundamental understanding in physics, chemistry, solid mechanics, material science and machine components

Selection

The selection is based on 30-285 credits

Course Aim

After finishing the course, the student should:

Knowledge and understanding

- Understand the design, function and fundamental mechanisms of advanced machine elements such as couplings, planetary and worm gears, seals and plain bearings
- Understand the design, function and basic mechanisms for systems of machine elements such as transmissions and actuators (motors).
- Understand how machine elements interact in systems
- Have insight into ongoing research and development work in the subject area of machine element

Show ability to:

- Be able to use modern mathematical models and tools to analyze, predict and dimension machine elements
- Be able to choose machine components from an energy, environmental, service life and cost perspective
- Be familiar with dimensioning, analyzing, predicting the function of machine components in systems
- Have the ability to select the most suitable components with regard to the machine element system's intended function and impact on humans, the environment, energy use and climate

Judgement and approach

- Have trained your ability to think engineering
- Be able to determine what simplifications and assumptions can be made in analyzes of machine elements
- Be able to understand the need for new knowledge in machine elements and what future challenges the area faces

Contents

This is an advanced course in the subject machine elements. The course picks up where the basic courses on machine components ended. This means that we in this course address more advanced aspects of the most common machine elements. Machine elements such as various transmissions (planetary gears, worm gears, clutches, etc.), engines (internal combustion, hydraulic and electric motors), bearings (rolling and plain bearings) are treated from a perspective that includes strength, energy efficiency, cost, environmental impact and service life. The systems perspective is also included in the course. This means that systems of machine elements rather than individual components are treated. The general purpose of the course is to give the student sufficient knowledge of machine elements and machine systems so that he can dimension and choose components him/her-self. Calculations aimed at making dimensioning and selection are therefore central. The student can both use ready-made calculation tools and develop their own. Research and development in machine elements, at companies and universities, is also highlighted.

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 that are either recorded or carried out together with the students in a classroom. The lectures are then combined with practice-lessons where the students are given the opportunity to practice tasks related to the lectures under supervision. The course is divided into a number of work packages which after lectures and lessons end with a home assignment which deals with the content in the work package where a major problem of an open nature is to be solved individually or in small groups. The homework is then presented orally to the class on a presentation lesson linked to each work package. Some work packages are also supplemented with laboratory work that is presented orally in the same way as other theoretical homework assignments.

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 learning objectives are examined through grading according to grading scale U 3 4 5 of oral presentations from homework and laboratory work, as well as from an oral examination at the end of the course where the student is individually questioned by the teachers in the various work packages. The final grade is calculated as a combination of all graded elements in the course. Attendance is mandatory on the course's presentation lessons. During the course, there are also a number of quizzes available in the work packages, all of which must be approved at the end of the course in order to receive grades 3,4 or 5 according to the above grading of other course elements.

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.

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0007	Oral exam/Home assignments	G U 3 4 5	7.5	Mandatory	A20	
0008	Quizzes	U G#	0	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 Head Faculty Programme Director Niklas Lehto 2021-02-17

Syllabus established

by Department of Applied Physics and Mechanical Engineering 2010-08-07