



COURSE SYLLABUS

Mekanisk systemdynamik Dynamics of Mechanical Systems 7.5 credits (7,5 högskolepoäng)

Course code: MT1533

Main field of study: Mechanical Engineering

Disciplinary domain: Technology

Education level: First cycle

Specialization: G2F - First cycle, has at least 60 credits in first cycle course/s as entry requirements

Subject area: Mechanical Engineering

Language of instruction: The course is taught primarily in English, but teaching in Swedish may occur.

Applies from: 2018-03-01

Approved: 2018-03-01

Discontinued: 2025-01-24

1. Decision

This course is established by Dean 2018-01-22. The course syllabus is approved by Head of Department of Mechanical Engineering 2018-03-01 and applies from 2018-03-01.

2. Entry requirements

Admission to the course requires passed course Dynamics, 6 credits and taken course Linear Algebra, 6 credits.

3. Objective and content

3.1 Objective

The objective of the course is that the student shall obtain the necessary knowledge in order to understand basic three-dimensional motion and to utilize computer tools for the analysis of time dependent motion and forces. This shall give the student the abilities to process complex dynamical systems through an engineering approach.

3.2 Content

The course consists of rigid body dynamics in two and three dimensions. Problems are solved analytically with the help of three methods: the force method, the energy method, and the impulse method. Simulations and visualizations of mechanical systems' motions in three dimensions are done through commercial computer software. During the course the connection between the model of reality and reality itself will be considered.

4. Learning outcomes

The following learning outcomes are examined in the course:

4.1 Knowledge and understanding

On completion of the course, the student will be able to:

- choose among the analytical methods for the solution of plane motion of rigid bodies
- understand rigid body kinematics in three dimensions
- have insight in the usefulness of the used softwares for the description of the dynamical behavior of complex mechanical systems
- understand the mass inertia of rigid bodies in three dimensional motion
- have an understanding of some forces and phenomena that appear at rotation of rigid bodies, including gyroscopic effects

Skills and abilities

- calculate the plane dynamic behavior of rigid bodies by the force method
- calculate the plane dynamic behavior of rigid bodies by the energy method
- calculate the plane dynamic behavior of rigid bodies by the impulse method
- calculate the kinematic behavior in three dimensions of rigid bodies
- calculate the three dimensional dynamic behavior of rigid bodies by the force, energy, and impulse methods
- calculate the dynamics of simple gyroscopic problems
- obtain idealized models of real mechanical systems
- use softwares for the representation of the idealized models in a computer and for solving and visualizing the dynamical behavior of the systems

5. Learning activities

The student obtains knowledge through a combination of private studying and working, and learning in class. The teaching takes place in part through theory and analytical problem solving in lecture rooms, and in part through working on assignments in computer class rooms. The assignments shall be reported both by live showing of the solutions to the teacher as well as written reports. The teaching is normally in English, but teaching in Swedish may occur.

6. Assessment and grading

Modes of examinations of the course

Code	Module	Credits	Grade
I810	Written assignments	4.5 credits	GU
I820	Written examination	3 credits	AF

The course will be graded A Excellent, B Very good, C Good, D Satisfactory, E Sufficient, FX Fail, supplementation required, F Fail.

The course information for each course revision should include the assessment criteria and make explicit in which modes of examination that the learning outcomes are assessed.

7. Course evaluation

The course evaluation should be carried out in line with BTH:s course evaluation template and process.

8. Restrictions regarding degree

The course can form part of a degree but not together with another course the content of which completely or partly corresponds with the contents of this course.

9. Course literature and other materials of instruction

- Meriam and Kraige, Engineering Mechanics - Dynamics. SI version. John Wiley & Sons. Latest edition.
- Material from the department.

10. Additional information

This course replaces the course MTI472