



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Mekanik II

Mechanics II

FMEA21, 6 credits, G1 (First Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED M

Date of Decision: 2023-04-11

General Information

Main field: Technology.

Compulsory for: F2

Language of instruction: The course will be given in Swedish

Aim

- give knowledge about the basic concepts in mechanics for material systems in motion
- give knowledge and skills in engineering modeling
- develop ability to solve problems
- develop engineering modeling skills using a simulation program as a help
- knowledge of and experience in academic writing
- give basic knowledge about the principles of analytical mechanics

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- be able to explain and apply fundamental concepts as linear and angular momentum, linear and angular impulse, moment of inertia, energy and work for a rigid body.
- be able to use the balance equations for particles and rigid bodies in plane motion
- be able to describe velocities and accelerations in Cartesian, polar and natural coordinate systems
- be able to formulate theoretical models for simple mechanical systems based on Lagrange's and Hamilton's methods
- be able to outline the most important result in the project work

Competences and skills

For a passing grade the student must

- starting with a real situation be able to delimit a problem and treat material bodies such as particles and rigid bodies
- be able to apply systematical methods to mechanical systems in motion
- be able to present written solutions to dynamical problems with suitable drawing of free body diagrams
- be able to formulate, describe and analyse a technical problem through text, equations and illustrations in a written academic report in the form of an article text. The report should include such elements as background, aim, purpose, execution, results and conclusions
- be able to present a written rapport with detailed description of the problem, made assumption, calculation and results

Judgement and approach

For a passing grade the student must

- evaluate the physical consistency of the obtained results

Contents

Kinematics of system of particles (general) and rigid bodies (plane). Energy, work, linear and angular impulse and momentum. Impact. Newton's laws. Kinetic for particles in 2D and 3D and kinetic for rigid bodies in plane motion. Damped and forced vibrations. Lagrange's and Hamilton's methods.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: Written exam. Written project report.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts

Code: 0121. **Name:** Mechanics II.

Credits: 6. **Grading scale:** TH.

Code: 0221. **Name:** Project.

Credits: 0. **Grading scale:** UG.

Admission

Assumed prior knowledge: FMEA35 Mechanics I or FMEA05 Engineering Mechanics - Statics and Particle Dynamics.

The number of participants is limited to: No

The course overlaps following course/s: FMEA30, FMEA10, FMEA15, FMEA20

Reading list

- Nicholas Apazidis: Mekanik II - Partikelsystem, stel kropp och analytisk mekanik. Studentlitteratur AB, 2019, ISBN: 9789144135069.

Contact and other information

Teacher: Per Hansson, per.hansson@mek.lth.se

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Course homepage: <http://www.mek.lth.se>