Engineering Mechanics Y

Programme course

4 credits

Mekanik, del 1

TMME12

Valid from: 2017 Spring semester

Determined by
Board of Studies for Electrical Engineering, Physics and Mathematics

Date determined
2017-01-25

Offered for the last time
Autumn semester 2022

Replaced by
TFYB04 + ny kurs 2025

Main field of study
Applied Physics, Mechanical Engineering

Course level
First cycle

Advancement level
G1X

Course offered for
- Applied Physics and Electrical Engineering, M Sc in Engineering

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Basic courses in algebra and calculus, wave physics.

Intended learning outcomes
The purpose of the course is to give the students an understanding knowledge of the basic laws of classical mechanics, and ability to apply the laws in problems within engineering mechanics. After the course the student should be able to:

- Explain the difference between different idealized models of real bodies: particle, rigid body and deformable continuum.
- Define fundamental concepts in mechanics such as moment of a force, velocity, acceleration, linear momentum, angular momentum, linear impulse, angular impulse, power, mechanical work and energy.
- Be able to perform simpler derivations of theorems used in statics of rigid bodies and dynamics of a particle.
- Formulate and solve engineering problems within the scope of statics, kinematics and dynamics of particles, and be able to judge whether a calculated result is reasonable.
- Derive the governing differential equations for a mechanical system, and solve these numerically using MATLAB.

Course content
Particle kinematics (velocity and acceleration, curvilinear motion in natural, cartesian, and polar coordinates). Particle kinetics (laws of motion, power, work and energy, impulse and momentum, impact, vibrations, central force motion). Statics for rigid bodies, center of mass.

Teaching and working methods
The lectures treat topics of principal importance, and might, apart from theory and examples, also contain clarifying experiments. During the classes, the students strengthen their ability to solve problems independently. A computer assignment is mandatory, where the students write a short report.

Examination

UPG1	Computer simulation exercise	0.5 credits	U, G
TEN1	Written examination	3.5 credits	U, 3, 4, 5

Grades
Four-grade scale, LiU, U, 3, 4, 5

Other information
Supplementary courses: Mechanical Engineering Y part 2 (Rigid body dynamics), Multibody Dynamics and Robotics, Models of Mechanics, Flight Dynamics Y, Analytical mechanics, Modern physics, Chaos and non-linear phenomena.

Department
Institutionen för ekonomisk och industriell utveckling

Director of Studies or equivalent
Peter Schmidt

Examiner
Peter Christensen

Course website and other links

Education components
Preliminary scheduled hours: 50 h
Recommended self-study hours: 57 h

Course literature

Additional literature

Books

P. Christensen, *Elementär mekanik, del 1: masspunkters mekanik, jämviktslära*

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.