

Mechanics

Programme course

6 credits

Mekanik

TFYA76

Valid from: 2017 Spring semester

Determined by

Board of Studies for Electrical
Engineering, Physics and Mathematics

Date determined

2017-01-25

Main field of study

Applied Physics, Physics

Course level

First cycle

Advancement level

G1X

Course offered for

- Biomedical Engineering, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, 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

Calculus in one and several variables, Linear algebra

Intended learning outcomes

The purpose of the course is to give the student basic knowledge in mechanics. After the course the student should be able to:

- use kinematics to describe motion
- solve problems, describe phenomenon, and perform mechanical calculations by using Newton's laws of motion and conservation laws
- apply the theory in order to determine statics and dynamics of particles, particle systems, rigid bodies, and fluids
- perform and analyze mechanical experiments

Course content

Kinematics: position, velocity, acceleration, angular position, angular velocity, angular acceleration, relative motion.

Fundamental physical concepts: mass, force, linear momentum, angular momentum, torque, work, kinetic energy, power, conservative forces, potential energy.

Newton's laws of motion. Conservation of linear momentum, angular momentum, and energy. Statics and dynamics of particles and particle systems. Centre of mass. Total linear and angular momentum. Kinetic energy of a particle system. Rotation of a rigid body. Moments of inertia. Equilibrium, static equilibrium. Newton's theory of gravity. Statics and dynamics of fluids.

Teaching and working methods

Lectures, tutorials and laboratory work.

Examination

LAB1	Laboratory work	1 credits	U, G
TEN1	Written examination	5 credits	U, 3, 4, 5

Grades

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

Other information

Supplementary courses: Mechanics (second course), Analytical mechanics

Department

Institutionen för fysik, kemi och biologi

Director of Studies or equivalent

Magnus Boman

Examiner

Bo Durbeej

Course website and other links

<http://www.ifm.liu.se/edu/coursescms/tfya76/>

Education components

Preliminary scheduled hours: 48 h

Recommended self-study hours: 112 h

Course literature

Additional literature

Books

Young et al, (2013) *University Physics with Modern Physics* 13

Volume 1 (Chaps. 1-20). Pearson New International Edition, Pearson, Paperback

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://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.