Mechanics I

Programme course

6 credits

Mekanik, grundkurs

NFYA03

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
Physics

Course level
First cycle

Advancement level
G1X

Course offered for
- Physics, Bachelor´s Programme

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 variable.

Intended learning outcomes
The purpose of the course to develop the student's knowledge in classical mechanics and to lay a foundation for further studies in physics. Following the course, the student should be able to:

- use kinematics to describe motion.
- solve problems, explain phenomena, and carry out calculations in mechanics 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.
- carry out mechanical experiments, and write a brief report of results and conclusions.

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, lessons, and laboratory work.

Examination

LAB1	Laboratory Work	1.5 credits	U, G
TEN1	Written Examination	4.5 credits	U, 3, 4, 5

Grades

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

Other information

Supplementary courses: Wave physics, Mechanics II, Analytical mechanics.

Department

Institutionen för fysik, kemi och biologi

Director of Studies or equivalent

Magnus Boman

Examiner

Magnus Boman

Course website and other links

Education components

Preliminary scheduled hours: 48 h
Recommended self-study hours: 112 h

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.