

Models in Physics

Programme course

8 credits

Fysikaliska modeller

TFYA15

Valid from: 2017 Spring semester

Determined by

Board of Studies for Computer Science
and Media Technology

Date determined

2017-01-25

Offered for the last time

Spring semester 2022

Replaced by

ny kurs i termin 7 för studenter antagna
till IT-programmet 2022 och senare

Main field of study

Applied Physics, Physics

Course level

First cycle

Advancement level

G1X

Course offered for

- Information Technology, M Sc in Engineering

Prerequisites

Basic algebra, Calculus of one variable.

Intended learning outcomes

To develop the ability to use, estimate and create models of physical systems related to classical mechanics. After successful examination the student should be able to model and analytically or numerically solve basic mechanics problems using motion equations, force laws, and derived momentum equations and energy principles. Furthermore, the student should individually and in group be able to apply;

- experimental problem solving to handle problems related to mechanics.

Course content

- Particle mechanics:
Kinematics; position, time, velocity, acceleration, angular position, angular velocity, angular acceleration, equations of motion, relative motion.
Kinetics; mass, force, torque, Newton's laws of motion. Work, kinetic energy, power, conservative forces, potential energy, and energy conservation.
- Mechanics of particle systems and Statics:
Centre of mass, momentum, conservation of momentum, angular momentum, conservation of angular momentum, inertia. Statics; equilibrium, static equilibrium, and centre of gravity.
- Oscillations and waves in a mechanical system:
Amplitude, frequency, wavelength, period time, and angular frequency.
Wave velocity superposition, interference, standing waves.
- Physics modeling:
The components of modeling. Experimental problem solving.

Teaching and working methods

Problem based learning, Lectures, Group work.

Examination

KTR1	Written test	0 credits	U, G
UPG2	Group work	1.5 credits	U, G
BAS1	Work in PBL-group	3 credits	U, G
TEN1	Written examination	3.5 credits	U, 3, 4, 5

Quizzes etc. may give credits at the written examination.

Grades

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

Other information

Supplementary courses: Elektromagnetism, Modern fysik, Halvledarteknik

Department

Institutionen för fysik, kemi och biologi

Director of Studies or equivalent

Magnus Johansson

Examiner

Fredrik Karlsson

Course website and other links

<http://cms.ifm.liu.se/edu/coursescms/TFYA15/>

Education components

Preliminary scheduled hours: 42 h

Recommended self-study hours: 171 h

Course literature

R.D.Knight, "Physics for scientists and engineers" 3rd edition Utdelat material via kursens webbsida

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.