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
TFYB12 i termin 7 för studenter antagna till IT-programmet 2022 och senare. Studenter som har moment kvar i TFYA15 hänvisas följa TFYA93 eller TFYB12

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