Mechanics

Mekanik
6 credits

Programme course

TFYI03

Valid from: 2024 Spring semester

Determined by	**Main field of study**	
Board of Studies for Electrical Engineering, Physics and Mathematics	Applied Physics	
Date determined	**Course level**	**Progressive specialisation**
2023-08-31	First cycle	G1F
Revised by	**Disciplinary domain**	
	Technology	
Revision date	**Subject group**	
	Engineering Physics	
Offered first time	**Offered for the last time**	
Spring semester 2023		
Department	**Replaced by**	
Institutionen för fysik, kemi och biologi		

Course offered for

- Bachelor of Science in Applied Physics

Prerequisites

Calculus in one variable, vector algebra. Basic physics.

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. After completing the course, the student should be able to:

- use kinematics to describe motion, and solve problems in mechanics by using equations of motion and conservation laws
- determine statics and dynamics of particles, particle systems, rigid bodies.
- carry out mechanical experiments and analyze the resluts.

Course content

- Kinematics: linear and planar motion, relative motion.
- Fundamental physical concepts: mass, force, linear momentum, angular momentum, torque, work, kinetic energy, power, conservative and non-conservative forces (friction), potential energy.
- Newton’s laws of motion. Conservation of linear momentum, angular momentum, and energy.
- Systematic solutions methods, including free body diagrams and constraint equations.
- Statics and dynamics of particles, particle systems, and rigid bodies. Centre of mass. Moments of inertia. Kinetic energy and dynamics of rigid body planar motion.
- Other applications of the theory in the course includes: Gravitation and satellite motion. Statics and dynamics of fluids. Elasticity of materials. Oscillations.

Teaching and working methods

Lectures, problem solving sessions, and laboratory work.

Examination

TEN1	Written Examination	5 credits	U, 3, 4, 5
LAB1	Laboratory Work	1 credits	U, G
KTR1	Optional Assignment	0 credits	U, G

Grades

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

Other information

About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is “Swedish”, the course as a whole could be given in Swedish, or partly in English. Examination language is Swedish, but parts of the examination can be in English.
- If teaching language is “English”, the course as a whole is taught in English. Examination language is English.
- If teaching language is “Swedish/English”, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English depending on teaching language.

Other

The course is conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

The planning and implementation of a course should correspond to the course syllabus. The course evaluation should therefore be conducted with the course syllabus as a starting point.

The course is campus-based at the location specified for the course, unless otherwise stated under “Teaching and working methods”. Please note, in a campus-based course occasional remote sessions could be included.