SI2360 Analytical Mechanics and Classical Field Theory 7.5 credits

Analytisk mekanik och klassisk fältteori

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

The course syllabus is valid from Spring 2023 according to the school principal's decision: S-2022-1505 Decision date: 2022-10-10

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Physics

Specific prerequisites

English B/English 6

Knowledge of mechanics corresponding to SG1113 Mechanics, continuation course and knowledge of physics corresponding to SI1200 Mathematical methods of physics.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After completion of the course you should be able to:

- use the formalisms of Lagrange and Hamilton in specific examples.
- solve a larger variety of problems using methods in analytical mechanics than before.
- apply the mathematical tools that have been developed during the course.
- analyze and apply equations in classical field theory.

Course contents

Review of elementary Newtonian mechanics (Newton's laws, Galilei transformations and conservation laws, accelerated reference systems, etc.).

Principles of canonical mechanics (Lagrange and Hamilton formalism, canonical transformations, Hamilton-Jacobi equations, etc.).

Relativistic mechanics (Lorentz transformations etc.).

Geometric aspects of mechanics (introduction to differential geometry and its use in mechanics).

Continuous systems (introduction to classical field theory).

Examination

- TEN2 - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

This course includes SI1142.

If you have points in SI1142 you cannot earn points in TEN1 Part A, and to get TEN1 Part A you need to transfer 3 points from SI1142 to SI2360.

It is possible to do only TEN1 Part A and get the result registered as SI1142.

SI2360 and SI1142 cannot be counted in the final exam at the same time (only one or the other).

TENA and TENB can be given at the same exam. TENA corresponds to course SI1142. SI2360 and SI1142 cannot be included in the same degree.

Other requirements for final grade

TEN 1 Part A (3p) TEN 1 Part B (1.5hp) TEN 2 (3p).

TEN1 Part A corresponds to SI1142. SI1142 can therefore be transferred to TEN1 Part A.

TEN1 Parts A and B are normally written exams and can be written at the same time. TEN2 is usually an oral exam.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.