



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.

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

Establishment

Course syllabus for SI2360 valid from Spring 2019

Grading scale

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

Education cycle

Second cycle

Main field of study

Physics

Specific prerequisites

Recommended prerequisites: Obligatory courses in Mechanics and Mathematical Methods in 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.
- know and analyze equations in classical field theory.
- see the similarities (and differences) between classical and quantum mechanics

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).

Disposition

15x2 hours lectures (mixture of theory and examples)

3 optional homework sets (strongly recommended)

3 workshops on problem solving

Course literature

Fastställs senare

Examination

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

This course includes SI1142. If you have points in SI1142 you can transfer 3 points and to have PART 1 of TEN1. If you only succeed to do Part 1 of TEN1 you can get the result registered as SI1142 (and you can decide later if you want to complete SU2360).

Other requirements for final grade

A written and/or 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.