



FSI3020 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

Grading scale

G

Education cycle

Third cycle

Specific 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 completed course, the PhD student 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.

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.). The mechanics of rigid bodies. 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).

Course literature

F. Scheck, Mechanics. From Newton's laws to deterministic chaos. Springer (1999)

Examination

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.

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.