SI1145 Classical Theoretical Physics 6.0 credits

Klassisk teoretisk fysik

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 SI1145 valid from Spring 2011

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Language of instruction

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

Intended learning outcomes

- understand and know how to use variational methods

- be able to use Green's function methods to solve certain problems with differential equations
- use the Lagrange and Hamilton formalism of mechanics
- solve specific problems using methods from analytical mechanics
- know fundamental equations of classical physics

Course contents

Variational methods; Green's functions

Analytical mechanics: Lagrange- and Hamilton formalism; tops; canonical transformations; Hamilton-Jacobi equations; Poisson brackets; applications to non-relativistic and relativistic mechanics and relation to quantum mechanics

Classical field theory: Euler- and Navier-Stokes equation, Maxwell and Einstein equation.

Specific prerequisites

Recommended: advanced course in mechanics; course on mathematical methods in physics (like SI1140).

Course literature

F. W. Byron, R. W. Fuller: Mathematics of classical and quantum physics, Dover (1970)

G. Sparr and A. Sparr, Kontinuerliga system, Studentlitteratur, Lund

Additional material will be available on the course homepage.

Examination

- TEN1 - Examination, 3.0 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.

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.