SI2371 Special Relativity 6.0 credits

Speciell relativitetsteori

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

The course syllabus is valid from Spring 2022 according to the school principal's decision: S-2022-0529 Decision date: 2022-02-24

Grading scale

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

Education cycle

Second cycle

Main field of study

Engineering Physics

Specific prerequisites

English B / English 6

Completed course in Vector Analysis (SI1146, ED1110, or equivalent)
Completed course in Theoretical Electrical Engineering (EI1320 or equivalent)
Completed course in Physical Mathematical Methods (SI1200 or equivalent)

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 tensor notation in relativity.
- Use Lorentz transformations.
- Apply the concepts of length contraction and time dilation.
- Describe experimental tests of special relativity.
- Use and solve problems in relativistic optics.
- Use and solve problems in relativistic mechanics (including kinematic problems).
- Analyze Maxwell's equations and use their relativistic invariance.
- Explain the principle of relativity.
- Perform simple analyses using the Hamilton and Lagrange formalisms in special relativity.

Course contents

Tensor notation. The meaning of relativity. Einstein's postulates. Geometry of Minkowski space and Lorentz transformations. Length contraction and time dilation. Experimental tests of special relativity. Twin paradox and proper time. Relativistic optics. Relativistic mechanics. Electrodynamics. Hamilton and Lagrange formalism in relativity.

Examination

- TEN1 - Examination, 6.0 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.

The course is examined through an exam, which normally is a written exam.

- TEN1 - Examination, 6.0 credits, Grading scale: A, B, C, D, E, FX, F

Other requirements for final grade

Written examination

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.