



# SI2215 Symmetries in Physics

## 7.5 credits

### Symmetrier i fysiken

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

Physics

### Specific prerequisites

English B / English 6

Knowledge corresponding to the first two years courses in mathematics and vectoranalysis, mathematical physics and theoretical physics.

## Language of instruction

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

## Intended learning outcomes

After the course the student should be able to

1. Use group theory and symmetry considerations to analyse and solve models in physics
2. Simplify the analysis of differential equations arising in physics by using symmetry considerations
3. Use symmetry considerations as a tool within the Lagrange and Hamiltonian formulation of classical mechanics

## Course contents

Introduction to group theory, examples of symmetry groups arising in physics, discrete groups, Lie groups and Lie algebras, introduction to representation theory, Lagrange and Hamiltonian formulation of classical mechanics, relation between symmetries and conservation laws, various examples where symmetries are used in physics, recent applications in particle physics and condensed matter physics.

## Examination

- TEN1 - Examination, 5.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN2 - Examination, 2.5 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.

## Other requirements for final grade

Grade A-E on both TEN1 and TEN2.

## 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.

