



# FMH3702 Computational Solid State Physics 9.0 credits

**Fasta tillståndets fysik, modellering**

This is a translation of the Swedish, legally binding, course syllabus.

## **Establishment**

Course syllabus for FMH3702 valid from Spring 2019

## **Grading scale**

P, F

## **Education cycle**

Third cycle

## **Specific prerequisites**

Admitted to PhD studies

Minimum 1-2 years of doctoral studies.

Basic knowledge of solid state physics, advanced mathematics, quantum mechanics, electronic structure, total energy methods, magnetism. Familiarity with different electron structure methods.

## **Language of instruction**

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

# Intended learning outcomes

The aim of the course is to review the fundamental knowledge from the theoretical solid state physics by connecting it to the computational materials research based on first-principles theory. The physical terms and quantities will gain a deeper meaning when knowing how to take them into account during applications and/or how to calculate or estimate them using basic equations from quantum mechanics.

## Course contents

After the first 1-2 years period, the PhD students have already acquired some knowledge in computational materials research. During this course, they will revise the theoretical solid state physics (starting from very basics and progressing towards the most advanced levels) and connect it to what they have calculate using computer programs based on first-principles quantum theory. By relating the sometimes quite abstract theoretical terms to numerical parameters and quantities met during the calculations will significantly improve their understanding and bring their practical knowledge within solid state physics and materials science to a higher cognition level.

## Examination

- INL1 - Assignment, 9.0 credits, grading scale: P, 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.

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

## Other requirements for final grade

1. preparing and presenting 8-10 seminars (1 hour) by each student
2. peer-to-peer assessments
3. handing in course material (ppt files, plus discussions)

## 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.