



# IH2658 Semiconductor Theory and Device Physics, Advanced Course 6.0 credits

Halvledarteori och komponentfysik, fortsättningskurs

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 IH2658 valid from Autumn 2007

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Physics

## Specific prerequisites

Course IH2651 or IH1611.

## Language of instruction

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

## Intended learning outcomes

**The objective is to give a detailed theoretical platform for a quantitative treatment of charge carrier transport in semiconductors. After completion of the course the student will:-Have a theoretical understanding of the dominant scattering mechanisms.-Understand how charge carriers moving in thermal gradients or magnetic fields will be affected.-Be able to estimate the influence of surfaces on charge carrier transport.-Know how to quantitatively estimate the interactions of photons with semiconductors.**

## Course contents

**The course treats fundamental properties of semiconductors and electron hole dynamics. Charge carrier scattering mechanisms and transport properties will be treated, including thermo-electric and magnetic effects as well as hot carrier phenomena. The influence of surfaces on charge carrier transport is discussed, and some important interactions between photons and semiconductors are elucidated, to explain magneto-optical and electro-optical effects.**

## Course literature

Semiconductor Physics and Applications, M. Balkanski and R.F. Wallis  
Upplaga: Förlag: Oxford University Press År: 2000 ISBN: 0 19 851740 8 **Övrig litteratur** Scientific articles

## 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.

## Other requirements for final grade

Home assignments (INL1;6.0 hp)

## 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.