



# IM2654 Smart Electronic Materials 6.0 credits

Elektroniska materials särskilda egenskaper

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

## Establishment

Course syllabus for IM2654 valid from Autumn 2007

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Physics

## Specific prerequisites

Knowledge of mathematics and physics corresponding to the basic courses given during preceding three years at KTH.

## Language of instruction

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

## Intended learning outcomes

To familiarize the students with the main physical concepts of the broad class of electronic ceramics that exhibit different types of ordering: metallic, super conducting, ferroelectric, ferro- and antiferromagnetic. To show how variation in the electronic bonding and the atomic structure ranges ceramics properties from the highest electrical resistance to the lowest super conducting. To give the student the basic knowledge in ceramic material design, the correlation between crystalline and electronic structure and material performance.

## Course contents

Fundamentals of electronic theory of solids: "from bonds to bands"; Semiconductors; Solid electrolytes and fast ionic conductors; Linear dielectrics and ferroelectrics; Ferrites; Electro-optical ceramics; Photonic and laser materials; High-temperature superconducting ceramics; Photo- and x-ray sensitive oxides.

## Course literature

L.L. Hench and J.K. West, Principles of Electronic Ceramics, A Wiley-Interscience Publication, NY, 1990; L. Solymar, D. Walsh, Lectures on the Electrical Properties of Materials, Oxford University Press, Oxford, 1993; MRS Bulletin, Lecture notes, etc.

## Examination

- INL1 - Assignments, 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.

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

## Other requirements for final grade

Sets of Quiz, one lab course report, and a review article on selected topic related to the course content (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.