



# MH2043 Advanced Course in Materials Design 12.0 credits

## Avancerad kurs i Materialdesign

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 MH2043 valid from Spring 2011

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Materials Science, Materials Science and Engineering

## Language of instruction

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

## Intended learning outcomes

After completing the course the student will be able to:

- Design the structure and mechanical properties of a high-performance alloy using theory in thermodynamics, kinetics and mechanical properties.
- Experimentally verify the structure and mechanical properties of the theoretically designed high-performance alloy.
- Conduct a project work in a structured way including project planning, problem solving, analysis and reporting (written and oral).

## Course contents

The concept of high performance materials. Chemical, thermal and mechanical response of high performance materials. Mechanical properties of materials including: plastic deformation of pure metals, hardening mechanisms in alloys. The concept of materials design. Thermodynamics, phase diagrams and diffusion. The use of simulation software (Thermo-Calc, DICTRA, Matlab) in materials design. Project work on an industrially relevant problem.

## Specific prerequisites

MH2038 Micro and Nano-structures in Materials.

MH2040 and MH2041 Applied Thermodynamics and Kinetics Part 1 and 2.

MH2032 Mechanical properties of materials

## Course literature

Material handed out

## Examination

- NÄR1 - Attendance, 2.0 credits, grading scale: P, F
- PRO1 - Project, 6.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 4.0 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.

## 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.