MH2059 Materials Structures II 7.5 credits

Materials strukturer II

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

Establishment

The official course syllabus is valid from the spring semester 2025 in accordance with the decision by the Head of the ITM School: M-2023-2074. Date of decision: 2023-10-11.

Grading scale

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

Education cycle

Second cycle

Main field of study

Materials Science and Engineering

Specific prerequisites

Knowledge in thermodynamic modelling and phase transformations equivalent to contents of MH2057 Computational Thermodynamics and MH2055 Materials Structures I.

Language of instruction

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

Intended learning outcomes

After passing the course, the student should be able to:

1. Explain the concept of diffusion in binary and multi-component systems
2. Carry out analytical and numerical calculations of problems in diffusion
3. Design and simulate a heat treatment process of a steel alloy, explain the development of the microstructure and summarise the results in a report.

Course contents

- Theory of diffusion in single-phase materials
- Driving force for diffusion
- Thermodynamic factor and mobility
- Fick-Onsager's law for multi-component diffusion
- Heat treatment processes for steel
- Analytical methods to solve diffusion problems
- Introduction to the software DICTRA

Examination

- DAT1 - Computer assignment, 1.0 credits, grading scale: P, F
- LAB1 - Laboratory work, 1.5 credits, grading scale: P, F
- TEN1 - Written exam, 5.0 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.

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.