



MH2000 Experimental Methods

6.0 credits

Experimentella metoder

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 MH2000 valid from Spring 2009

Grading scale

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

Education cycle

Second cycle

Main field of study

Specific prerequisites

- Knowledge of basic materials physics and chemistry
- Knowledge of basics thermodynamics and kinetics

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 should be able to:

- Describe modern experimental methods in materials physics and chemistry.
- Judge the precision and accuracy of the measurements.
- Name the limitations of the respective techniques.
- Choose the right technique to address specific material physics and chemistry questions.

Course contents

- Frontline techniques in analysis and characterisation of materials (transmission electron microscopy, x-ray diffraction, scanning electron microscope, optical microscope)
- Experimental conditions (high temperature furnaces, temperature control, gas phase, holding and refractory materials, other conditions)
- Thermodynamic studies (calorimetry, thermal analysis, electromotive force, phase diagram studies, equilibrium and quenching, gas-condensed phase equilibria)
- Kinetic studies (gravimetric analysis, electromotive force)
- Physical properties (thermal and electrical conductivity, viscosity, surface and interfacial tension, density)
- Experimental uncertainty analysis (types of error, standard methods for expressing error, measurement of error, propagation of determinate errors)

Disposition

1. Part:

- 6 lectures in frontline techniques in analysis and characterisation of materials
- 3 days laboratory work (1 day - self-study and group work, 2 days - materials analysis and characterisation)
- Report for laboratory work is required

2. Part:

- 6 lectures in high temperature experimental methods
- 3 days laboratory work (1 day - self-study and group work, 2 days - high temperature laboratory work)
- Report for the laboratory work is required

Final Exam – covering Part 1 and Part 2

Course literature

Excerpts from various books, manuals and review articles will be used for background information.

Examination

- LABA - Laboratory Work, 1.0 credits, grading scale: P, F
- LABB - Laboratory Work, 1.0 credits, grading scale: P, F
- TENB - Examination, 2.0 credits, grading scale: A, B, C, D, E, FX, F
- TENC - Examination, 2.0 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.