



FSK3740 Introduction to Scanning Probe Microscopy 6.0 credits

Introduktion till svepprob-mikroskopi

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 FSK3740 valid from Autumn 2010

Grading scale

Education cycle

Third cycle

Specific prerequisites

Solid background in Physics, Chemistry and Biology.

Language of instruction: English

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

Intended learning outcomes

To provide the theoretical background and physical intuition necessary to understand how SPM's operate and how to interpret the images they produce. To provide an practical, hands-on introduction to the operation of SPMs in a laboratory setting.

Course contents

The course is designed for students from a wide variety of educational backgrounds, from Physics, Chemistry and Biology, who would like to learn about the technical details of how SPMs work, and the possibilities and pitfalls in interpreting the images that SPM's produce. We will look in detail at some of the many different modes of SPM usage, with particular emphasis on Atomic Force Microscopy (AFM) and its many variations.

- SPM overview
- Scanners, Sensors, Feedback and Control
- Cantilevers and Tips, Force Measurements
- Fluctuations, Noise and Fundamental Limits
- Surface Forces, Adhesion and Friction
- AFM Colloidal Probe Technique
- SPM Applications in Microelectronics
- Nonlinear Cantilever Dynamics

Course literature

Various articles, lecture notes, and training manuals, made available to participating students.

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.

Two Written lab reports, and either one literature project or one simulation project.

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.