



# FSK3760 Graduate Seminar in Nanofabrication 7.5 credits

## Doktorandseminarium i nanofabrikation

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 FSK3760 valid from Spring 2010

## Grading scale

## Education cycle

Third cycle

## Specific prerequisites

Some experience of working in a lab, not necessarily a cleanroom. Good general science or technical education in Physics, Chemistry, Biophysics etc. Advanced level courses are not necessary to understand the basic ideas. A good sense for physical apparatus and computer interfaces are needed to properly use the rather complex systems in the Nano Fab Lab.

## Language of instruction

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

## Intended learning outcomes

After the course you should be able to apply your knowledge in clean room instrumentation to different clean room processes and to be able to collaborate with other users in such a way that both parties can benefit from it. This means you should be able to:

- Describe and explain how the instrumentation of the NanoFabLab works and how it can be used.
- Design the different steps for a specific process and choose the appropriate parameters for each step.
- Identify the most appropriate instrument that will let you evaluate each step of a given process.
- Document the different processes in such a way that other users

## Course contents

The course is divided in two parts: the first part consists of seminars in which we discuss the different instruments and their parameters; the second part involves lab work and meetings to discuss its progress.

### Part I. Seminars

All seminars are 2 h- long.

Seminar 1: Course presentation; What is a clean room?

Seminar 2: What is a clean room and clean room processes

### BLOCK I: Fabrication

Seminar 3: Lithography I: Resists, hotplates and ovens. Photolithography

Seminar 4: Lithography II: E- beam lithography and Focus Ion Beam

**Hand in your own clean room process. Problems, improvements**

Seminar 5: Etching. Wet and dry etching.

Seminar 6: Evaporation and Sputtering

### BLOCK II: Evaluation Instruments

Seminar 7: Surface profiler & SEM

Seminar 8: Optical Microscopy

Seminar 9: AFM

### Part II. Lab work and discussions

Seminar 10: Processes and group projects

Seminar 11: Presentation of the Group Project I

Seminar 12: Presentation of the Group Project II

## Course literature

Hand outs distributed via Nanophys web- site.

## 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.

In order pass the course, each participant must:

- Attend all the seminars and meetings
- Carry out the two different group projects.
- Present the two group projects and his /her own project in such a way that the rest of the participants can follow and understand your process problems and solutions.
- Hand in a written report about the lab- projects following the guidelines.

## 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.