



# FEK3310 System Integration for MEMS and NEMS 4.5 credits

Systemintegration för MEMS och NEMS

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

## Establishment

Course syllabus for FEK3310 valid from Spring 2013

## Grading scale

G

## Education cycle

Third cycle

## Specific prerequisites

EK2350 Microsystem technology or similar course.

## Language of instruction

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

## Intended learning outcomes

After the course, the students should be able to:

- Select one or more suitable MEMS/NEMS integration and packaging approaches for a given application.
- Correctly motivate the choice of MEMS/NEMS integration and packaging approach for the specific device and target application, based on application and environmental constraints, such as target-cost for the application, economic and technological framework and available infrastructure.
- Independently collect and review the scientific literature for a specific topic.
- Critically analyze the scientific literature for a specific topic, extract the important underlying issues and principles and summarize them in a structured way (creating a “synthesis” of the data), thereby possibly also challenging unsubstantiated statements in the scientific literature.

## Course contents

Course main content:

### **Lectures:**

The course consists of one lecture at the course start, which presents a classification of different MEMS/NEMS integration and packaging approaches. In addition, the students will attend presentations on details of specific MEMS/NEMS integration and packaging approaches given by the other course participants. All course moments have mandatory participation.

### **Homework:**

MEMS/NEMS integration and packaging can be categorized in a number of different approaches. At the start of the course each student will be assigned two or three different approaches for MEMS/NEMS integration and/or packaging. Related to the assigned approaches, the student will review the scientific literature and summarize the important underlying concepts (3-4 pages for each integration/packaging approach). All summary reports from the students will be assembled by the course leader in form of a review report. Each student will then assess the assembled report. The students (including the course leader) will present and discuss in a group session with all course participants, their respective comments and based on this feed-back each student will re-work and re-submit their respective summary report. The feed-back and re-work process will be iterated until all summary reports reach a good quality. The process will result in a final state-of-the-art “review report”.

### **Other:**

At least one group discussion with all course participants and the course leader will take place, in which the participants provide constructive feed-back on the summaries of the other course participants. Mandatory participation.

### **Presentations:**

Each student will give a presentation to all course participants related to two or three MEMS/NEMS integration/packaging approaches, and subsequently a group discussion related to the presentation will take place. Mandatory participation.

### **Other:**

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### **Presentations:**

Each student will give a presentation to all course participants related to two or three MEMS/NEMS integration/packaging approaches, and subsequently a group discussion related to the presentation will take place. Mandatory participation.

## **Disposition**

Based on the understanding of the subject demonstrated in the presentations and based on the respective summary report, each student will receive the grade “pass” or “fail”. This course does not have a written exam.

## **Course literature**

As part of the course activities, the students will review and analyze the scientific literature in the area of MEMS/NEMS integration and packaging. No specific course book is used within this course.

## **Equipment**

N/A

## **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.

If the course is discontinued, students may request to be examined during the following two academic years.

## **Other requirements for final grade**

Pass grade for presentation and written summary report.

## **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.