Courses in English
Course Description

Department
06 Applied Sciences and Mechatronics

Course title
Semiconductor and Thin Film Technology

Hours per week (SWS)
4

Number of ECTS credits
5

Course objective
Related to the generic educational objectives of the degree program, this module intensifies the engineering knowledge in engineering physics with focus on the most important fabrication processes in modern semiconductor technology. Students gain the ability to understand, describe, and evaluate correlations between the fabrication processes of semiconductor devices. They gain practical experience with typical fabrication tools. After completing this module, students can plan the fabrication process for a target device, they can recognize failures in thin film systems, and they can develop improved processes.

Prerequisites

Recommended reading
S. M. Sze, Semiconductor devices, physics and technology, John Wiley & sons
R. Waser, Nanoelectronics and Information Technology: Materials, Processes, Devices, Wiley-VCH
Moodle-course with videos

Teaching methods
lecture, exercises, lab class

Assessment methods
75% Written: 90’; 25% Lab Class

Language of instruction
English

Name of lecturer
Prof. Christina Schindler

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Link
https://www.fb06.fh-muenchen.de/fbalt/forms/fachbeschreibungen.php?lang_nr=1&

Course content
- Introduction
  - historical review
  - short introduction to semiconductor physics
  - silicon as base material
  - properties of thin films
  - semiconductor fabrication
  - clean room technology

- Structuring
  - lithography
  - etching technology

- Thin film fabrication
  - oxidation, diffusion, implantation
  - PVD processes (physical vapor deposition)
  - CVD processes (chemical vapor deposition)

- Analytics
  - thickness measurement
  - surface characterization
  - analysis of interfaces

- Application: memory devices
  - DRAM
  - Flash
  - Memristor

Lab class: fabrication of a temperature sensor
Experiments to the above mentioned topics

Remarks