Courses in English
Course Description

Department: 06 Applied Sciences and Mechatronics

Course title: Semiconductor and Thin Film Technology (PBR 650)

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 (voluntary)

Language of instruction: English

Name of lecturer: Prof. Christina Schindler

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Link: https://sci-intern.hm.edu/fk/modulbeschreibungen.php?lang_nr=&id=1681

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

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

Remarks