Courses in English

Course Description

Department 06 Applied Sciences and Mechatronics
Course title Micro- and Nanostructures
Hours per week (SWS) 4
Number of ECTS credits 6

Course objective
After completing this module successfully students possess or have improved their competencies in the following fields:
They know micro- and nanostructure fabrication processes and by discussing areas of application they can describe advantages and disadvantages;
They have an improved understanding of semiconductor processes and tools and can draw them schematically;
They know selected examples for micro- and nanostructures and -devices based on the mentioned processes, they can describe them physically and point out areas of application and the potential for further development;
They have improved their physical understanding of solid state structures and devices with dimensions in the nanometer range;
They understand the interdisciplinary approach and comprehensive use of nanostructures and -devices. They can design a process flow for a given device, identify failures in thin film stacks, and develop improved processes.
They have improved their technical English.

Prerequisites
basics in semiconductor physics and electronics

Recommended reading
R. Waser, Nanoelectronics and Information Technology: Materials, Processes, Devices, Wiley-VCH.
Moodle course with video lectures.

Teaching methods
seminaristic teaching

Assessment methods
100% written, 90min

Language of instruction
English

Name of lecturer
Tbd

Email christina.schindler@hm.edu

Link http://www.fb06.ft-muenchen.de/fb/index.php/en/graduate/mnm/course-catalog.html?ItemID=&id=82&code=MNM150&lang_nr=1

Course content
Semiconductor physics
Energy bands in semiconductors
Devices
MOS diodes
MOSFETs
New transistor concepts, e.g. cell-transistor coupling
Example of use: logic, scaling, integrated circuits

Semiconductor technology
Lithography
Etching technology (focus on KOH and dry etching)
Oxidation, diffusion, implantation
Thin film deposition (physical and chemical vapor deposition, self-assembling monolayers)
Printed electronics
Example of use: memory technology
Excercises to all discussed topics
Working on technical publications on the different topics and presentation in front of the class short presentations of up-to-date topics in the field of "micro- and nanostructures"

Remarks
it is not clear, whether the course can be offered in winter 17/18