

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	<p>After completing this module successfully students possess or have improved their competencies in the following fields:</p> <p>They know micro-and nanostructure fabrication processes and by discussing areas of application they can describe advantages and disadvantages;</p> <p>They have an improved understanding of semiconductor processes and tools and can draw them schematically;</p> <p>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;</p> <p>They have improved their physical understanding of solid state structures and devices with dimensions in the nanometer range; (</p> <p>They understand the interdisciplinary approach and comprehensive use of nanostructures and - devices.</p> <p>They can design a process flow for a given device, identify failures in thin film stacks, and develop improved processes.</p> <p>They have improved their technical English.</p>
Prerequisites	Bachelor degree, Fundamentals in solid state physics
Recommended reading	<p>Textbooks:</p> <p>S.M. Sze, Semiconductor Devices, Wiley,2002.</p> <p>R. Waser, Nanoelectronics and Information Technology: Materials, Processes, Devices, Wiley-VCH.</p> <p>Michael Köhler, Nanotechnologie, VCH Verlag, 2001.</p> <p>Moodle course with video lectures.</p>
Teaching methods	<p>180 h, of which:</p> <p>60 h seminaristic teaching</p> <p>120 h individual work</p>
Assessment methods	written exam, 90min
Language of instruction	English
Name of lecturer	Prof. Dr.-ing. Christina Schindler
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Link	www.fb06.fh-muenchen.de/fb/index.php/de/vita.html?staffid=738

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Course content	<p>Semiconductor physics Energy bands in semiconductors</p> <p>Devices MOS diodes MOSFETs New transistor concepts, e.g. cell-transistor coupling Example of use: logic, scaling, integrated circuits</p> <p>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 Exercises 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"</p> <p>The lecture is held in English.</p>
Remarks	<p>The exam can also be given in German. Videos are available.</p>