Courses in English
Course Description

Department: 06 Applied Sciences and Mechatronics
Course title: Design of integrated circuits
Hours per week (SWS): 4
Number of ECTS credits: 6
Course objective: Technology of highly integrated circuits. Analog and digital circuit design. Building up a chip hierarchy. Organizing and executing a development project. Some specifics of modern deep submicron semiconductor technologies.
Prerequisites: Basics knowledge of semiconductor physics would be advantageous
Recommended reading:
Teaching methods: Lectures and hands on training
Assessment methods: 100% written examination: 90'
Language of instruction: English
Name of lecturer: Helmut Fischer, Ullrich Menczigar
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Link: [Link](http://www.fb06.fb-muenchen.de/index.php/de/vita.html?staffid=76784)

Course content:
- Project planning and organization.
- Full custom versus semicustom design.
- The MOSFET (a refresher), the FINFET.
- Leakage mechanisms and low power design.
- Basics of full custom digital design.
- Design for manufacturing: 6 Sigma design and verification strategies.
- Mask generation: Lithography and OPC (Optical Proximity Correction).
- Device reliability and integrated circuits durability.
- Special analog and digital functional blocks.
- Single stage amplifier (common source circuit, source follower)
- Differential amplifier (with passive resp. with active load)
- Frequency behavior of amplifiers (single stage amplifier and differential amplifier)
- Single stage and dual stage operational amplifiers
- Hands on training:
  - Design and layout of a dual stage operational amplifier (Miller-OTA)
  - Matching constraints in design and layout of operational amplifiers
  - Layout rules
  - Extraction of layout parasitics
  - Simulation including layout parasitics
Remarks: This course is on master level, yet open to everybody