



VLSI Design (MScTI_ANADESIGN)

Prof. Dr. P. Fischer

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Content (not treated in this order)

- Hierarchical *schematics*, busses, global nets,...
- *Layout* of components, rules, matching

- Design Rule Check, Design Rules, technology files; Extraction & rule files; Layout versus Schematic Check; ESD and Antenna rules, Latchup
- Parasitic extraction

- Script programming using *skill*. (Simulation with ocean)
- *Mixed Mode Simulation*

- Technology, Manufacturing of Integrated Circuits
- Test equipment & procedures



Comments

- The lecture is a mandatory element of major ,chip design‘



Get to know each other

- About me....

- Who are you?
- What do you study?
- What is your background and 'chip design' knowledge
- Want to meet others for fun or to learn?
- Hobbies?
- ...



Organization of Lecture & Exercise

- Points: 6 Credit Points
- Time: Monday, 9:15 – 10:45, 11:00 – 12:00 (12:30)
- Location: OMZ, SR U012
- Teacher: Prof. Dr. P. Fischer
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- Internet: <http://sus.ziti.uni-heidelberg.de/Lehre/...>
- Prerequisites: CCS lecture or equivalent knowledge
- Examination: **Successful completion of a project work:
Schematics, simulation, layout, DRC, LVS,
Writeup**



Exercises

- Very important!
- Final project and grades require practical experience.
- In the past, participants did very little ‘at home’ and ‘on their own’ so that progress was very slow.
- Graded exercise was hard....
- Please use the opportunity to get a ‘hands-on’ insight to chip design!
- Participate!



Exercises

- You get an account on a SuS computer!
- NOTE: The account will be CLOSED automatically at the start of the next (summer) term!

- Homework can be done
 - Remote from home (via X2GO, see instructions on web site)
 - From all CIP pools, at KIP, PI, Philosophenweg,...

- For using the umc018 technology, a non-disclosure agreement has to be signed!



Literature

- **Principles of CMOS VLSI Design**

Neil H. E. Weste, K. Eshraghian, Addison-Wesley 1994,
ISBN 0-201-53376-6, 91 € (Amazon)

Classic for CMOS Design, easy to read, not really up to
date but sufficient for beginners.

- **Integrierte Schaltungen (in german language)**

K.H. Cordes, A. Waag, N. Heuck

Pearson Studium 2011, ISBN: 978-3-86894-011-4,
79,95 EUR

Gute Mischung der verschiedenen Themen



Demo

- Live Demo of what we will do:
 - Schematic
 - Symbol
 - Simulation
 - Layout
 - DRC, LVS

- Design of a Pulse Stretcher
 - Stretch by 10-50ns
 - Best adjustable

