RUPRECHT-KARLS-
UNIVERSITÄT
HEIDELBERG

VLSI Design

Prof. Dr. P. Fischer

Lehrstuhl für Schaltungstechnik und Simulation
Technische Informatik der Uni Heidelberg

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
- Monte Carlo Simulation / Process Corner Simulation

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

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

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
  INF368, 4.OG Tel. 06221 – 54.16400
  peter.fischer@ziti.uni-heidelberg.de
- Secretary: Sarah Englert
  INF368, 4.OG Tel. 06221 – 54.16401
  Sarah.Englert@ziti.uni-heidelberg.de
- 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.
- For some it was hard to complete the graded exercise….
- Please use the opportunity to get a ‘hands-on’ insight to chip design!
- Participate!
- Effort is MUCH less if you do not lose track!

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!
  - Only after you have signed, you will get access to the UMC technology

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 (globally)
- Prepare for multi channel use