

Hardware Modeling and Simulation

WiSe 2024/2025

Prof. Dr.-Ing. Diana Göhringer



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Additional exercise instructors:

- M.Sc. Ensieh Aliagha
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- M.Sc. Veronia Iskandar
- Dipl.-Ing. Julian Haase



Lectures:

- Monday, 16:40 – 18: 10 in room MER/0002/H

Exercises / Computer Labs:

- Tuesday, 14:50 – 16:20 in room APB 1061
- Exercises start in the second lecture week
- Additional exercise appointment in case > 30 students

Attention:
Changes will be announced via OPAL!

Material / Slides:

- All materials can be downloaded as PDF from OPAL
- These materials and active participation in exercises/labs is sufficient to prepare for examination
- References to textbooks will be given in according lectures

1. Design Process for Integrated Circuits (ICs)
and Printed Circuit Boards (PCBs)
 - 1.1 Design and Realization Alternatives
 - 1.2 Design Methods
 - 1.3 Use of Hardware Description Languages (HDLs)

2. The Hardware Description Language VHDL

- 2.1 Hardware Description Languages
- 2.2 Hardware Description Language VHDL
- 2.3 Components of the Language VHDL
- 2.4 Objects
- 2.5 Entity
- 2.6 Architecture
- 2.7 Configuration
- 2.8 Timing in VHDL
- 2.9 Context Commands
- 2.10 Testing Environments
- 2.11 Method for creating VHDL Models
- 2.12 The new Logic System std_logic_1164
- 2.13 Examples
- 2.14 Synthesis Examples

3. Verification - Validation - Simulation

3.1 System Level Simulation

3.2 Logic Simulation

4. SystemC

4.1 Introduction

4.2 Register-Transfer-Level-Modeling with SystemC

4.3 Transaction-Level-Modeling with SystemC

5. Summary

Recommended textbooks:

- Dirk Jansen et.al. (Eds.)
"The Electronic Design Automation Handbook"
Kluwer Academic Publishers, Boston, 2003
ISBN 1-4020-7502-2
- Dirk Jansen
"Handbuch der Electronic Design Automation"
Carl Hanser Verlag, München, 2001
ISBN 3-446-21288-4
- Lehmann, Wunder, Selz
"Schaltungsdesign mit VHDL"
- Mealy, Tappero
"Free Range VHDL"

Magazines

- Computer
- Computer Design
- EDN
- Electronics
- Electronic Design
- IBM Journal of Research and Development
- IEEE Proceedings of the IEEE
- IEEE Spectrum
- IEEE Transactions on Circuits and Systems (CAS)
- IEEE Circuits and Devices Magazine
- IEEE Transactions on Computers
- IEEE Transactions on Computer-Aided Design of integrated Circuits and Systems

- IEEE Design & Test of Computers
- IEEE Expert
- IEEE Software
- IEEE MICRO
- IEEE Journal of Solid-State Circuits (JSSC)
- VLSI Systems Design
- Elektronik
- Markt und Technik
- mikroelektronik
- Siemens Forschungs- und Entwicklungsberichte

Conferences

- DAC
- DATE
- ICCAD