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Digital Electronics Plan

2024-2025

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Workshops Content

Digital Design workshop content plan

This is the plan for the Digital Design workshop throughout the season.

Session 1 (introduction to Digital Electronics)

1. Intro to Digital
2. Digital vs analog
3. Digital design flow
4. Gates and Tech. mapping
5. Break
6. Verilog basics
7. Start coding with Verilog
8. Lab1
9. Lab2

Session 2 (Combinational Circuits)

1. Building code & code outlines
2. Comb. Logic
3. Lab 1
4. Behavioral modeling (always block)
5. If & case statements
6. Lab 2
7. Gate level & structural modeling
8. Lab 3
9. Recap and compare between styles

Session 3 (Sequential Circuits)

1. Testbenches
2. Tasks and functions
3. Lab 1
4. Do file
5. Break
6. Intro to seq. logic
7. Seq. vs comb.
8. Basic storage elements (latches and FF)
9. Blocking vs non-blocking assignment
10. Synch. Vs Asynch.
11. Event queue
12. How to avoid unintentional latch
13. Race conditions
14. Lab 2

Session 4 (Registers & Counters)

1. Cont. Seq.
2. Registers & shift registers
3. Counters and their types
4. Lab 1
5. Break
6. Casex & Casez
7. Generate block
8. Local parameter
9. Testbenches for seq.
10. Lab 2

Session 5 (FSM & STA)

1. Revision on FSM types and states
2. Coding FSMs with Verilog
3. Lab 1
4. Break
5. STA (timing)
6. Linting techniques and linting tool errors

Session 6 (Memories)

1. Memory types
2. Coding memory with Verilog
3. Single port RAM
4. Double port RAM
5. Lab 1
6. FIFO
7. Break
8. FPGA Basics
9. FPGA flow using a tool
10. Lab 2

Session 7 (Designing techniques)

1. CDC
2. Power consumption and reduction techniques
3. Break
4. FPGA (design on the whole flow)
5. Lab