

ECE 474 – VLSI System Design

Catalog Description: Introduction to custom and semi-custom digital integrated circuit design as used in VLSI systems. The use of CAD/CAE tools, design management, and design methodology are introduced.

Credits: 4 **Terms Offered:** Winter

Prerequisites: ECE 322, ECE 375

Courses that require this as a prerequisite: None

Structure: Three 50-minute lectures per week, plus large projects.

Instructors: R. Traylor

Course Content:

- Top down design methodology
- Design description using HDLs
- Logic synthesis with HDLs
- Timing closure
- Full and partial scan test insertion
- Testbench creation
- Formal verification
- Design automation with scripting

Measurable Student Learning Outcomes:

At the completion of the course, students will be able to...

1. Hierarchically **partition** a complex digital system into subcomponents ready for implementation (ABET Outcomes: a, c, e, m, n)
2. **Write** synthesizable HDL code for a moderately complex digital system (ABET outcomes: c, e, g, j, k, m, n)
3. **Generate** appropriate synthesis and timing constraints for synthesizing RTL-level HDL code (ABET outcomes: b, c, j, K, n)
4. **Simulate and test** a large digital design by means of a HDL testbench at RTL and gate levels (ABET outcomes: b, c, e, K, n)
5. **Apply** appropriate test methodology to **create** integrated circuits that are testable in a manufacturing environment (ABET outcomes: c, j, K)

Learning Resources:

- *Essential VHDL - RTL Synthesis Done Right*, Sundar Rajan, Self published, 1999

Students with Disabilities:

Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting the faculty member in charge of the course prior to or during the first week of the

term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should contact SSD immediately at 737-4098.

Link to Statement of Expectations for Student Conduct:

<http://oregonstate.edu/admin/stucon/achon.htm>

Revised: 10/17/07