EE 434

Catalog Description:

ASIC architectures and design methods; digital systems and circuits; system test methods.

Semester: Spring 2015

Instructor: Dae Hyun Kim

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Office Hours: MWF 4-5pm or by appointment

TA: Dongjin Lee

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TA Office: Sloan 354

TA's office hours: MW 2-3pm or by appointment

Credits: 3

Structure:

Three one-hour lectures per week, 2~4 lab assignments, one digital design project, 10~15 homework assignments, two midterm exams and one final exam.

Topics:

(1) CMOS Circuit design methodologies: Different circuit design styles, comparative analysis. (6)

(2) Implementation methods: Custom & Semicustom design, Standard-cell based design, and Array based design, Layout, Place& Route, Power grid and clock design. (6)

(3) FPGA: Comparison between standard ASICs and FPGAs. Different FPGA families, their advantages and disadvantages (8)

(4) RTL design & synthesis: VHDL & Verilog. Design of Simple Processors, Network routers and other important Digital blocks. Emphasis on synthesis, Synthesis through scripts, use of Synopsys Design Compiler. (14)

(5) Design for Testability (DFT) techniques: Fault models, Fault equivalence, BIST, LFSR, MISR, Scan design, JTAG, IDDQ Test, SoC Test, P1500. (8)

Textbooks:

FPGA-BASED System Design by Wayne Wolf, Prentice Hall, 2004, ISBN 0-13-142461-0

Other References:

(1) Analysis and Design of Digital Integrated Circuits by Hodges, Jackson and Saleh, Third Edition, McGraw hill, ISBN 0-07-228365-3

(2) Essentials of Electronic Testing for Digital, Memory and Mixed-Signal VLSI Circuits by M. L. Bushnell and V. D. Agrawal, Boston: Springer, 2005, ISBN 0-7923-7991-8

(3) The Designer's Guide to VHDL by Peter J. Ashenden, Morgan Kaufmann, ISBN 1558606742

(4) Fundamentals of digital logic with verilog design by Brown & Vranesic, McGraw hill, ISBN 0-07-283878-7

Grading:

Homework Assignments	20%
Midterms	20% (10% each)
Lab Assignments	20%
Project	10%
Final Exam	30%

Assignments:

There will be a number of homework assignments and lab assignments. Students are expected to work individually on the homework assignments. The lab assignments can be done in a group of two.

Reasonable accommodations are available for students who have a documented disability. Please notify the instructor during the first week of class of any accommodations needed for the course. Late notification may cause the requested accommodations to be unavailable. All accommodations must be approved through the Disability Resource Center (DRC) in Administration Annex room 205, 335-1566, email:drc@mail.wsu.edu in Pullman.