

March 24, 2010

**University of Nebraska – Lincoln
Course Announcement, Fall 2010**

**CSCE 434/834: VLSI Design
Class Number: 11658
11:30-12:20, MWF, AVH-112
Instructor: Sharad Seth**

Prerequisite: CSCE 230 (Computer Organization) or permission.

Contact me if you are interested in learning more: seth@cse.unl.edu, 352 Avery Hall, Ph: 472-5003.

Here is a [link](#) to the somewhat outdated catalog description of the course. Further information about this course will appear at the following course website:

<http://cse.unl.edu/~seth/434/>

VLSI circuits are almost forty years old and courses in VLSI at the senior and graduate levels date back to thirty years when the first classic textbook by Mead and Conway appeared and made the design process accessible to students without extensive background in electrical engineering. However, because the design process depends strongly on the fabrication technology, the courses have evolved in contents and emphases with the changes in the technology. Whereas, early designers built circuits under strong constraints on the *silicon real estate*, using components involving tens to hundreds of gates, now they routinely integrate processor, memory, and accelerator cores as systems-on-a-chip (SOCs) or multicore processors under stringent constraints of power, testability, reliability, and time-to-market.

This introductory course on VLSI design will reflect these underlying changes in the design environment and prepare students for more advanced courses in computer architecture, microprocessors, embedded systems, and communications. The intended audience can be any of the following:

- CS students who may join the design team of a complex device requiring hardware-software co-design. The course will provide enough understanding of the design issues so as to improve the level of communication with the hardware designers.
- CE students who wish to learn the considerations and constraints involved in the system-level design.
- CS, CE, or EE students wishing to go on for higher studies in the areas mentioned above.

The emphasis in the course will be on system-level design using tools that largely hide the circuit-level design issues. The latter will be covered in the first part of the course so that students quickly come up to speed in designing combinational and sequential blocks used as components in processor and application-specific circuits. Students will be asked to realize same designs under different constraints of power, speed, and area to gain a better understanding of the tradeoffs involved. Students will also carry out and report on a semester-long design project. The project work may be carried out in small groups of students with complementary backgrounds and strengths.

Textbook: *CMOS VLSI Design: A Circuits and Systems Perspective, 4/E*, Neil Weste and David Harris, ISBN-10: 0321547748 ISBN-13: 9780321547743, Publisher: Addison-Wesley: 2011 Format: Cloth; 864 pp.

Supplementary book (not required): *Digital Integrated Circuits: A Design Perspective, 2/E*, J. M. Rabey, A. Chandrakasan, and B. Nikolic, Prentice Hall, 2003.