

EENG 5550 Hardware Design Methodologies for ASICs and FPGAs  
Spring 2018  
Time: (M, W) 1:00 - 2:20 pm  
Meeting Place: NTDP B227

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### **Course Description:**

When students design circuits, they often think only about the functionality of the circuit, not considering how their circuit will be implemented in real hardware. This course fills that gap, teaching students how to code their designs in such a way that the hardware implementation is efficient and achieves their design goals in an elegant manner. When students complete this course, they have a good control of what happens behind the scenes when a synthesis tool creates a design from a specification in a hardware description language.

This course teaches hardware design methodologies through the use of industry tools. Students use design automation tools to design, simulate, and synthesize designs for standard cell-based ASICs and FPGAs using hardware description languages (e.g. VHDL and Verilog). Students will study the synthesis concept to understand how hardware functions written in these hardware description languages are synthesized. Techniques for design optimization, simulation, and synthesis of combinatorial functions, data paths, and finite state machines are covered in depth. Students will be exposed to the differences between design flows for standard cell-based ASICs and FPGAs.

### **Pre-requisite:**

EENG 2710 (Digital Logic Design)

### **Required Text:**

J. Bhasker, *A VHDL Synthesis Primer: Second Edition*, Star Galaxy Publishing, ISBN 0-9650391-9-6

### **Course Material:**

Blackboard Learn

### **Grading:**

- Homework / Lab Assignments: 20%
- Reading Assignments / Class Participation / Class Assignments: 10%
- Quizzes: 10%
- Exam: 20%
- Paper Presentation: 10%
- Final Project: 30%

**Disabilities Accommodation:**

The University of North Texas complies with Section 504 of the 1973 Rehabilitation Act and with the Americans with Disabilities Act of 1990. The University of North Texas provides academic adjustments and auxiliary aids to individuals with disabilities, as defined under the law. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring accommodation, please see the instructor and/or contact the Office of Disability Accommodation at 940-565-4323 during the first week of class.

**Additional Policies and Procedures:**

Cell Phones: Please remember to turn off phones prior to class.

Extra Help: PLEASE DO NOT WAIT UNTIL THE LAST MINUTE. If you are having trouble with this class, please come by my office during office hours. I am also available by email at [gayatri.mehta@unt.edu](mailto:gayatri.mehta@unt.edu).