

ECE 4250/7250 VHDL and Programmable Logic Devices

Fall 2018

GENERAL INFORMATION

Class Hours: MWF 09:00 to 09:50,

Room: THOMAS & NELL LAFFERRE E3511

Instructor: Dr. Khaza Anuarul Hoque

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Office hours Friday 11:00am to 12:00pm. Any other day by appointment only.

Teaching Assistant: Omar Alkorjia

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Office hours W and Th 10:00 to 12:00

Catalog Description:

Design techniques including module definition, functional partitioning, hardware design language description and microprogramming; design examples include arithmetic units, programmable controller and microprocessors. Credits 4, includes a laboratory.

Prerequisite: ECE 3210

Course Learning Objectives:

1. Explain the FPGA technology - how FPGA works and how FPGA is configured.
2. Write and simulate VHDL and explain the results.
3. Design arithmetic computational units and simple processors.
4. Design general algorithmic state machines.
5. Use FPGA software tool to synthesize and configure designs onto an FPGA board.
6. Complete an assigned design project.

Textbook:

Digital Systems Design Using VHDL, Charles H. Roth Jr. and Lizzie Kurian John 3d Edition, Cengage Learning, Boston, MA, 2018

Course Topics:

1. Review of Logic Design Fundamentals.
2. Introduction to VHDL
3. Design with Programmable Logic Devices and ROM.
4. Design for Fixed-point Arithmetic Operations
5. Data Path Construction, State Diagram Development for Control Section

6. Timing analysis
7. FPGA Technology
8. Floating-Point Arithmetic Design
9. Special Topics
10. Hands-on Experience (8 labs plus a project)

Class and work:

This is a problem-solving course. The more you practice solving problems the more proficient you will be come. In large measure, your major contributions will be made by your ability to define, decompose and solve problems.

Exams: There will be 2 exams. One midterm and one final.

Laboratory: The 4th credit in this class reflects the lab. There will be approximately 8 laboratories given throughout the semester. These will be in the form of a design that you will develop and simulate and download to the development board. A Teaching Assistant will help you with all aspects of the design.

Grading: The table below shows the points possible within each category. Curving will be applied to the final grade in order to determine the final letter grade. Under such curving policy, if the actual average of the class is lower than 70/100, the same class average will be shifted to an average of 70/100. After that, the university standard letter-grade scale will be applied. That is: 100-91 will be assigned "A+/A/A-"; 90-81 will be assigned "B+/B/B-"; and so on.

Exams or assignments	Undergraduate Percent	Graduate Percent
Laboratory	25%	20%
VHDL Project	15%	10%
Graduate Project	N/A	10%
First Exam	20%	20%
Second Exam	25%	25%
Homework	15%	15%

ADA Assurance: If you anticipate barriers related to the format or requirements of this course, if you have emergency medical information to share with me, or if you need to make arrangements in case the building must be evacuated, please let me know as soon as possible.

If disability related accommodations are necessary (for example, a note taker, extended time on exams, captioning), please establish an accommodation plan with the [MU Disability Center](#), S5 Memorial Union, 573-882-4696, and then notify me of your eligibility for reasonable accommodations. For other MU resources for persons with disabilities, click on "Disability Resources" on the MU homepage.

Academic Dishonesty: Academic integrity is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards breaches of the academic integrity rules as extremely serious matters. Sanctions for such a breach may include academic sanctions from the instructor, including failing the course for any violation, to disciplinary sanctions ranging from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, collaboration, or any other form of cheating, consult the course instructor.