

ECT 358/358L: Microprocessors II

Fall Semester 2007

Class Time

MWF 12:00-12:50, KL-306
M 1-3:50, KL-352

Instructor Contact Information

Instructor: Mark Patterson
Office: KL491F
Phone: 229-2962
Email: Mark.Patterson@notes.udayton.edu
Office Hours: 10-11 MWF, 1-4 W, 1-3 F
Class Website: <http://academic.udayton.edu/MarkPatterson/ECT358/ect358.htm>

Bulletin Description

Advanced microprocessors study including development tools and software with regards to interfacing equipment in applications.

Introduction

Welcome to the second half of Microprocessors. The purpose of this class is to teach you to design and use advanced digital processors. This class will change the focus from microcontrollers and assembly to Verilog HDL and embedded processors. There are embedded processors in equipment almost everywhere. These processors play all sorts of roles from digital signal processors to closed loop controllers. This course explores the different uses of the FPGA and the language used to program it. The course will also cover the practical use of FPGA's in everyday life and how they are used in real world situations. As with most Engineering Technology courses, the class will be lab oriented so that you will have the opportunity to apply the techniques and information learned in the classroom.

Course Outcomes

- 1.1 - Students should demonstrate a competency in engineering and technology knowledge, techniques, skills, and modern design and simulation tools in the solution of problems typically encountered in practice. (a)
- 1.2 - Students should have the ability to identify, analyze, and solve moderately complex technical problems at the sub-system and system levels to include analog electronics, digital electronics, and software. (f)
- 1.4 - Students should demonstrate the application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers to the building, testing, operation, and maintenance of electrical/electronic(s) systems (OAa).

- 1.6 - Students should demonstrate the ability to analyze, design, verify (through the application of simulation tools) and implement control systems, instrumentation systems, communications systems, computer systems, or power systems (OBa).
- 1.10 - Students should demonstrate the ability to perform Boolean mathematics, analyze mixed – logic digital circuits, and create a mixed – logic digital circuit from a mathematical model both in discrete and in array formats (2a, b, c).
- 1.11 - Students should demonstrate the ability to conduct timing analyses to determine race conditions, bus conflicts, and system performance and resolve conflicts. (2a, b, c).
- 1.16 - Students should demonstrate understanding of the internal architecture and operation of contemporary microprocessors. (a, b)
- 1.17 - Students should demonstrate the ability to analyze, design, construct, and debug microprocessor/microcontroller based control circuits including memory and its addressing, interrupt handling, and a variety of interface and control I/O. (a, b, c, d)
- 1.18 - Students should demonstrate the ability to conduct a software design and program a contemporary microprocessor at the assembly language and high-level language level (a, b, c, d).
- 1.19 - Students should demonstrate understanding of the basic hardware architecture of industry standard microcomputers including CPUs, standard busses, memory (including cache), mass storage devices, Systems-on-a-Chip and their implementation, I/O devices, and network interfaces. (a, b)
- 1.24 - Students should demonstrate the ability to combine microprocessor or microcontroller hardware and software technology, with moderately complex analog and digital I/O, and with basic mechanisms in the creation of an electromechanical system. (a, b, c, d)
- 1.26 - Students should be able to apply basic software design principles including input, output, data types, pseudo-code, case statements, loops, subroutines, etc. in the creation of a structured software program. (a, b)
- 4.1 - Demonstrate that they can participate effectively on multidisciplinary team projects, work cooperatively with others, and deal with conflict. (e)
- 4.2 - Take a leadership role as necessary to accomplish the team's objectives. (e)

Homework

Homework will be assigned on a weekly basis. It is to be completed individually, though interaction with ones fellow students is encouraged. The homework assignments will be turned in on Friday before 3 PM of the week that they are assigned. No late homework will be accepted without extenuating circumstances and prior approval.

Laboratory Work

A laboratory programming assignment dealing with a function of a FPGA will be assigned each week. These labs are to be individually completed in the time frame shown. A well documented lab report must be kept to record all pertinent data, and in which to draw results and report on the findings of the lab work. The lab assignments will be turned in on Friday before 3 PM of the week that they are assigned. No late labs will be accepted without extenuating circumstances and prior approval.

Exams

There will be a midterm and a final exam. The final exam will be given in class on the day indicated in the class bulletin. (Dec 14, Friday, 12:20-2:10)

Quizzes

Quizzes will be used as a means of providing quick feedback. Quizzes will usually be given right at the start of class. They will be short (5 min) and will typically be multiple choice or similar. The quizzes will be considered as part of the homework grade. There will be no make-up for missed quizzes.

Grading

ECT 358 Grading

Homework & Quizzes	40 %
Midterm Exam	30 %
Final Exam	30 %

ECT 358L Grading

12 Labs	50%
Midterm Practical	25%
Final Practical	25%

Prerequisites: ECT 357 and ECT 361

Text:

Ciletti. Advanced Digital Design with Verilog HDL, 1st edition, Prentice Hall, 2002.
ISBN 0-13-089161-4

In addition to reading the text and manual, you are encouraged to check out other books from the library and myself if you need to better understand a particular topic.

Credits and Contact Hrs. (Lecture/Laboratory): 3/1 credits, 35/35 contact hours.

Students with disabilities

If any student in this class has a need for special testing arrangements, note taking, or other accommodations please feel free to discuss this with the instructor.