

## CPEN 315 - Digital System Design Spring 2008

**Instructor:** Dr. C. Gerousis  
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**Office Hours:** I will be available in my office for consultation and questions during the hours shown below.

M: 11:00 am – 12:00 pm  
R: 11:00 am – 12:00 pm  
F: 11:00 am – 12:00 pm  
*and by appointment only.*

**Web:** <http://www.pcs.cnu.edu/~gerousis>

**Text:** *Logic and Computer Design Fundamentals* by M. Morris Mano and Charles R. Kime, 4<sup>th</sup> Edition, 2008.

### Prerequisite Courses

PHYS 202, General Physics II and CPEN 214, Digital Logic Design

### Prerequisites by Topic

- Fundamental physics of electricity (Voltage, Current, Resistance, Basic Laws)
- Fundamentals of programming (exposure to a high level language)
- Combinational circuit design
- Sequential circuit design

### Goals

Primary goals of the course are:

- Develop problem solving ability through analysis and design of digital systems.
- Develop an understanding of computer organization.

### Catalog Description

Digital design methodology and techniques; control and timing; machine organization, instruction sequencing, and data for flow control; control unit implementation by means of hardware and microprogramming; synchronization of I/O operations with interface design.

*Students are responsible for their own learning*, through reading and studying the text, reviewing the lectures, and doing homework problems. I strongly advise that you read the upcoming material before it appears in lecture; the material will make much more sense that way.

### Exams

There will be 2 exams during the semester and a final exam at the end of the semester. The final exam will be cumulative and will be given during the scheduled final period. All exams will be closed book and closed notes, although you will be allowed to bring a 3x5 index card with notes.

*Warning* – Any indication that the work on a homework assignment or an exam is not entirely your own will result in a failing grade for that work.

### **Homework**

A collection of problems will be assigned roughly each week and collected the following week. Solutions to selected problems can be found at the following web- site:  
[http://www.writphotec.com/mano4/problem\\_solutions.html](http://www.writphotec.com/mano4/problem_solutions.html)

### **Additional comments about homework:**

- Cooperative group study on the homework is encouraged, but simply copying someone else's work is unethical and will leave you unprepared for exams. Much insight can be gained by studying with one or more groups.
- Usually the biggest contributor to excessive time spent on homework is failure to read the lecture notes and/or text for understanding prior to attempting the problems.

### **Course Topics**

Review of combinational & sequential circuit design. (Chapters 1-6)  
Registers and Register Transfers (Chapter 7)  
Memory (Chapter 8)  
Computer Design Basics (Chapter 9)  
Instruction Set Architecture (Chapter 10)  
CPU Design (RISC/CISC) (Chapter 11)  
Input/Output and Communication (Chapter 12)  
Memory Systems (Chapter 13) [*if there is time left*]

### **Laboratory**

A collection of software and hardware labs (about 6) will be assigned during the semester. For the hardware labs, we will use the prototyping board and IC's to build and test logic circuits. For the software labs, we will use Verilog HDL, a Hardware Description Language for electronic design and gate-level simulation.

## Grading

The final course grade will be determined as follows:

Homework	20%
Midterm Exam 1	20%
Midterm Exam 2	25%
Final Exam	35%

## Late Lab/Homework Policy

In general, late homework and labs will not be accepted except in cases of documented illness or emergency. If you need to miss a class or a lab for a *legitimate reason*, you need to let me know before hand.

## Academic Integrity

The students and faculty of Christopher Newport University have instituted a strict honor code:

*On my honor, I will maintain the highest possible standards of honesty, integrity and personal responsibility. That means I will not lie, cheat, or steal and as a member of this academic community, I am committed to creating an environment of respect and mutual trust.*

This class will be run under the aegis of this honor code. This means that, as a student, you are expected to abide by this policy. Specifically, this means that you agree not to cheat in this class. Academic integrity means that you will be honest and straightforward in conduct in the class, you will treat your classmates and instructors with respect.

## Disability Accommodation

If you believe you have a disability, you should make an appointment to see me to discuss your needs. In order to receive an accommodation, your disability must be on record in Disability Services located in the Academic Advising Center, Room 125, Administration Building, (594-8763).