

UNC Charlotte, Department of Electrical and Computer Engineering

Syllabus for ECGR2181 - Logic System Design I - Fall 2008

Instructor: James M. Conrad, Associate Professor of ECE

Lecture: M/W 8:00 – 9:15, Woodward 140. **Recitation:** T 8:00 – 9:15 a.m., Woodward 140.

Email: jmconrad@uncc.edu

Office hours: M&W 9:15-10 a.m., M&W 3:15-4:30p.m. & when the door is open

Lab Assistant: Bin Huang, Sid Datta, Woodward Hall 200, hours and emails posted on website

Website: <http://www.coe.uncc.edu/~jmconrad/ECGR2181-2008-08>

Check the web site frequently!

Textbook



Frank Vahid, *Digital Design*, John Wiley Books, 2007. Save money, buy a used book. ISBN 0-470-04437-3. Also used for ECGR3181.

Catalog Description

Introduction to Boolean algebra; mixed logic; design of combinational circuits; introduction to sequential systems; MSI building blocks; includes laboratory design projects. Prerequisite: MATH 1241 (Calculus I); Co requisite: ECGR 2155 (Logic and Networks Laboratory) or permission of department.

Purpose of Course

This course provides hands-on experience with the design of digital-based logic systems at the gate level. It also provides hands-on experience with state-of-the-art CAD tools in the areas of logic synthesis and simulation.

At the conclusion of the course, students should have the following competencies:

1. Knowledge of the significance of digital systems in today's society as well as the cost issues associated with logic systems design.
2. Improved skills in teamwork
3. An understanding of tradeoffs in combinational logic.
4. Basic understanding of sequential circuit design.
5. Hands-on experience with CAD tools.
6. Experience with a medium-size project including, design, simulation, analysis, and documentation.

Computer Assignments

A moderate amount of time and thought will be required for computer assignments (labs). Because

almost all of us learn by doing, the computer assignments will probably be the most effective method for learning the material, and will help you on homework and exams. It is important that you participate fully in the computer assignments -- do not just let your partner do all the work. (If you do, you will be unprepared for the tests!) Do not just passively and monotonously follow the computer assignment write-up-- ask some of your own questions and then find out the answers with your computer. To learn, you need to do it and you need to creatively think about what you are doing!

Homework

Homework is another example of learning by doing. Although not as exciting as a lab, homework is essential to learning the concepts in this course. Homework will be in the form of reading assignments and problem sets, with a due date 1-3 lectures after it is assigned. **No late homework will be accepted.** Homework must be turned in at **the beginning of lecture (before I begin lecturing)**. Homework must be done individually (you will learn the most from this). Any evidence of group participation will be interpreted as academic dishonesty. There will be 12 assignments, of which the highest 10 will be used in your final grade. Here are some guidelines for homework assignments:

- You will typically get better grades on homework if they are typed
- Do not repeat the question on the homework sheet.
- Do not put a printout of the assignment sheet anywhere in your turned-in homework.
- Staple all pages together
- Do not fold the assignment when you turn it in.
- Hand in a hard copy of your homework
- Check the class web site for a MS Word file which is a template for homework. Replace the information in the header with your particular information.

If you have a dispute with how an assignment is graded, you should follow this procedure:

1. Get the solution to the assignment off the class web site and examine it. You may have just got the problem wrong.
2. If you really believe that your answer is correct (matches the answer given in the solution), contact the TA who graded your assignment and discuss it with them. They will listen to your concern, and act on it, at their discretion. In any case, they will sign the homework verifying that they saw it again.
3. If you are still not satisfied with the resolution, you may bring the homework to me for review. I will not review homework that has not been seen and signed by the TA.

We record all "disputed" points in a separate column. We contend that "disputed" points never add up to a change in your final grade, and we will examine this when final grades are assigned. Note that TA addition errors should follow the above procedure, but will not be figured in the "disputed" column.

Quizzes

There will be ten to twelve "pop" quizzes given throughout the semester, of which the highest ten will be used in your final grade. These will be to reward students who consistently show up to class, but will be more than just attendance points.

Exams

There will be two mid-semester exams and one final. **No calculators, notes or books** may be used on exams. Exams will include material from the lecture, the readings, homework, and laboratories.

Exam dates (preliminary):

- Mid-semester exam #1: October 1, regular class time and room
- Mid-semester exam #2: November 12, regular class time and room
- Final exam: Monday, December 15, 8:00 – 11:00 a.m., Woodward 140 (regular class room)

Missed exams: Attendance at all exams is mandatory. Only legal or debilitating medical excuses will be accepted (read: prison time, major blood loss, etc.), provided that they are accompanied by the appropriate official documentation. Makeup exams are more difficult than the exams they replace; few have passed. Failure to satisfy these criteria will result in a zero grade for the exam.

Missing Class/Assignments

Throughout the semester, a student may miss classes/assignments/exams due to many reasons. Most of the reasons will not be accepted as an "excused" absence. That is why a few of the quizzes and homeworks are dropped when determining your final grade. Plus, you can always email your homework. For example:

Throughout the semester, a student may miss classes/assignments/quizzes/exams due to many reasons. Most of the reasons **will not** be accepted as an "excused" absence. For example:

- ECGR or other class exam review sessions: All class and exam times take precedence over any review sessions.
- University sponsored activity: All class and exam times take precedence over any University-sponsored activity.
- Business trips: If you miss an assignment/quiz because you were on a business trip, you miss out on the assignment/quiz points.
- Illness: If you miss an assignment/quiz because were ill, you miss out on the assignment/quiz points.

Grading Percentages

15% Computer Assignments
10% Homework
20% Quizzes
15% Exam 1
15% Exam 2
25% Final Exam
100% Total

Course Lectures

I use transparencies to teach this class. These can be downloaded and printed from the web. Course topics are:

- Logic Design Fundamentals
- Binary Number System and Codes
- Logic Circuit Voltage Levels and Correlation with Binary Numbers
- Boolean Logic/Algebra
- Design of Combinational Circuits
- Logic Synthesis Techniques for Combinational Circuits
- Schematic Capture and Logic Simulation
- Basic Combinational Building Blocks
- Timing Considerations
- Introduction to Sequential Circuits
- Flip-flops
- Basic Registers
- Counters
- Sequential Circuit Timing Analysis
- Tools: CAD software (Project Applications)

Academic Dishonesty

All the provisions of the University code of academic integrity apply to this course. In addition, it is my understanding and expectation that your signature on any test or assignment means that you neither gave nor received unauthorized aid.

Please read the discourse on cheating and ECGR 2181 on the web page. For homework and laboratory projects, while discussion is allowed, direct copying is not and students must turn in individual submissions. Realize that mastery of the material in the homework and lab assignments will be essential for a good performance on the exams!

All UNC Charlotte students have the responsibility to be familiar with and to observe the requirements of The UNC Charlotte Code of Student Academic Integrity (see the Catalog). This Code forbids cheating, fabrication or falsification of information, multiple submission of academic work, plagiarism, abuse of academic materials (such as Library books on reserve), and complicity in academic dishonesty (helping others to violate the Code). Any further specific requirements or permission regarding academic integrity in this course will be stated by the instructor, and are also binding on the students in this course. Students who violate the Code can be punished to the extent of being permanently expelled from UNC Charlotte and having this fact recorded on their official transcripts. The normal penalty is zero credit on the work involving dishonesty and further substantial reduction of the course grade. In almost all cases, the course grade is reduced to "F." If you do not have a copy of the Code, you can obtain one from the Dean of Students Office or access it online at www.legal.uncc.edu/policies/ps-105.html. Standards of academic integrity will be enforced in this course. Students are expected to report cases of academic dishonesty they become aware of to the course instructor who is responsible for dealing with them.

Course Calendar

Refer to the web page: <http://www.registrar.uncc.edu/calendar.htm> for the academic calendar.