UNC Charlotte, Department of Electrical and Computer Engineering
Syllabus for ECGR2181 - Logic System Design I - Fall 2009

Section 001
Instructor: James M. Conrad, Associate Professor of ECE
Office and office hours: Woodward 210C, M&W 3:15-4:30p.m. & when the door is open
Email: jmconrad@uncc.edu

Section 002
Instructor: Andrew Schmidt, Instructor of ECE
Office and office hours: Woodward 200 (may change), Th 3:15-4:30p.m.
Email: aschmi16@uncc.edu

Lecture: Section 001: M/W 9:30 - 10:45 am, Woodward 140.
                   Section 002: T/Th 2:00 - 3:15 pm, Woodward 140.
Recitation: F **9:00** – 10:45 a.m., Woodward 125.

Lab Assistants: Siddhartha Datta, Woodward Hall 200, hours and emails posted on website
                          Rahul Sharma, Woodward Hall 200, hours and emails posted on website
Website: http://www.coe.uncc.edu/~jmconrad/ECGR2181-2009-08
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. Gain knowledge of the operation and significance of digital systems.
2. Utilize Boolean algebra to define combinational circuit function.
3. Develop an understanding of the tradeoffs in combinational logic.

4. Develop a basic understanding of sequential circuit design and finite state machines.
5. Gain hands-on experience with CAD tools.
6. Gain experience with a project including, design, simulation, analysis, and documentation.

Students should be able to demonstrate the following competencies and knowledge:
1. An ability to design a digital logic system that meet a written set of requirements. (ABET: c)
2. An ability to identify, design, and implement a digital logic system that solves a real world problem using engineering processes. (ABET: e)
3. An ability to use design processes, techniques, skills, and computer tools to solve a real-world problem. (ABET: k)

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 ten to thirteen assignments, of which the highest ten 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.
- **PAPERCLIP** all pages together, put you name on every page.
- 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 thirteen "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: Friday, October 2, regular recitation class time (room TBA)

- Mid-semester exam #2: Friday, November 13, regular recitation class time (room TBA)

- Final exam:
  Section 001: Wednesday, December 16, 8:00 – 10:30 a.m., Woodward 140.
  Section 002: Tuesday, December 15, 2:00 - 4:30 p.m., Woodward 140.

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 course website. 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.

Instructor and Student Conduct

Syllabus Revisions: The standards and requirements set forth in this syllabus may be modified at any time by the course instructor. Notice of such changes will be by announcement in class and/or by email to your UNCC email address.

Disability Services/Special Needs: If you have a documented disability and require accommodation in this course, contact the Disability Services office, located in Fretwell building, room 230. Phone 704/687.4355 (voice/TDD). Information about available services can be found at: http://www.ds.uncc.edu . Students in this course seeking accommodations to disabilities must first consult with the Office of Disability Services and follow the instructions of that office for obtaining accommodations. Please initiate this process and inform me during the first two weeks of class.

Diversity: UNC Charlotte strives to create an academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socioeconomic status.

Cell Phones, PDAs and Such: Please note that portable phones, pagers, and late arrivals are disruptive to the instructor and to your peers. The use of cell phones, beepers, or communication devices is disruptive and is therefore absolutely prohibited during class. Turn off your cell phone while in class. If I catch you using these devices, your final grade will be reduced by 10 points for each and every transgression. Except in emergencies, students using such devices must leave the classroom for the remainder of the class period. This penalty will be at the sole discretion of the instructor.

Laptop Computers: I know that some of you may wish to take notes directly on your computer and I have no problem with that. If however, you choose to access your email, search the web, play solitaire or other games, or instant messenger your friends during class, you will have 10 points deducted from your final grade for each and every transgression. This penalty will be at the sole discretion of the instructor.

Communication: I will try and answer emails and phone calls received during the hours of Monday – Friday, 9 am to 4 pm within 24 hours. If you email and/or call at any other times, it is strictly a random chance that I'll respond in a timely manner. You should check your UNCC email and the course website every day as these are the primary ways that I will communicate with you when not

in class. When communicating with me via email, please put in the subject line the course number so I can readily identify who you are. *If your communication via email is rude, has grammatical, and/or spelling mistakes, I will not respond at all.* If I have not responded to your email within 24 hours as stated within the conditions above, perhaps you need to resend it and/or reword it. You are to conduct yourselves in a professional manner at all times.

Orderly, Productive and Professional Classroom Conduct: I will conduct this class in an atmosphere of mutual respect. I encourage your active participation in the classroom. Each of us may have strongly differing opinions on the various topics of class discussions. Remember that not everyone shares these beliefs and opinions and these maybe statements about personal beliefs, values, and opinions rather than fact. The conflict of ideas is encouraged and welcomed. The respectful and open-mindedness of ideas of others, including mine, is similarly welcomed. However, I will exercise my responsibility to manage the discussions so that ideas, comments, and arguments can proceed in an orderly, productive, and professional manner. You should expect that if your conduct during class seriously disrupts the atmosphere of mutual respect I expect in this class, you will be asked to leave the class, will not be permitted to participate further, and will have your final grade deducted by 10 points for each and every occurrence.

Turnitin.com: As a condition of taking this course, some required assignments maybe subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. No student papers will be submitted to Turnitin.com without a student's written consent (http://www.legal.uncc.edu/turnitinconsentform.pdf) and permission. If a student does not provide such written consent and permission, the instructor may: (i) require a short reflection paper on research methodology; (ii) require a draft bibliography prior to submission of the final paper; or (iii) require the cover page and first cited page of each reference source to be photocopied and submitted with the final paper.