Department of Electrical Engineering  
The Ohio State University  

Syllabus, EE 261: Introduction to Logic Design  

Winter 2008  

Catalog description: Introduction to combinational switching theory, Boolean algebra, and clocked sequential networks.

Course Prerequisites: Math 152, Physics 132, En Graph 167 or Cptr/Inf 221 or Cptr/Inf 201, and a minimum CPHR of 2.00.

Prerequisites by topic: basic math and algebra, basic physics, and elementary programming concepts.

Meeting times:  
- MWF, 4:30-5:30 pm, HI 0031X

Midterm Exam: TBA

Final Exam: TBA

Professor: Aleix M. Martinez, Dreese Lab 460, 688-8225  
aleix@ece.osu.edu  
Office Hours: Mondays, Wednesdays and Fridays, noon – 1:30p.  
Tuesdays and Thursdays 2:30pm – 4:30pm.  
Other hours by appointment (email).

Course Web site: http://www.ece.osu.edu/~aleix/261.html

Xilinx support: Jarupan Boangoat,  
bea@ece.osu.edu  
Office Hours: MW 1:30 am – 4:30 pm.  
TR 10:00 am – 12:00 pm


References (supplemental reading):  
Computer Laboratories: 817 Dreese Labs (12 PCs) & 283 Caldwell (8 PCs). The Dreese lab is open 9am-6pm weekdays; the Caldwell lab is open 9am-9pm weekdays. If you have a PC at home you are encouraged to install the Xilinx ISE student edition software on it.

Course Objectives:

- Students will learn the number representations used in today's digital systems and their arithmetic properties and conversion techniques.
- Students will learn to analyze and synthesize networks of combinatorial, digital logic elements.
- Students will learn to analyze and design digital, clocked sequential circuits.
- Students will be introduced to the use of modern computer tools for digital design verification.
- Students will be introduced to modern programmable logic devices.

This course is intended to serve as a basic introduction to switching theory and thereby provide the student with the fundamental material needed to understand topics in higher level courses dealing with discrete systems. The course comprises three topics. The first deals with the number representations used in today's digital systems and discusses their arithmetic properties and conversion techniques. The second topic deals with combinational switching theory. Here the student learns to analyze and synthesize networks of digital elements in which no feedback is present. The third subject, in which feedback is present, is clocked sequential networks and their analysis and design. An introduction to modern programmable logic devices is also presented.

At the completion of the course the student should be able to design simple digital circuits such as adders, counters, multiplexers, and simple controllers and thus more thoroughly appreciate and assimilate the material in succeeding courses related to digital electronics, communication, and control.

Topics and Coverage:

- Binary codes and Arithmetic
- Boolean and Switching algebras
- Gates; physical implementation
- Combinational logic design techniques
- Sequential circuits: analysis and design
- VLSI circuits: RAM, ROM, PLDs, etc.

Grading:

- Quizzes and homework: 20% total. All quizzes are weighted equally.  
  *Quizzes are closed-book, no calculators.*
- One midterm examination: 25%
• Final examination: 35%
• Examinations are comprehensive, but will emphasize more recent material. *Examinations are closed-book, no calculators.*
• Computer projects (3): 20%
• Most homework problems will be optional and solutions will be posted on the website or discussed in class.

• **GRADING ERRORS:** If you suspect a grading error, you are required to report it to the instructor, in detail and in writing (email is fine), within one week of the day the item was returned to the class.

**Make-up policies:**

• *Quizzes may not be made up.*
• *The final examination may only be taken at the scheduled time. You must not make travel plans that conflict with the final exam schedule.*
• The midterm examination may be made up only due to illness on the day of the exam (a doctor’s note is required) or by advance arrangement (a written request one week in advance of the exam is required). The instructor reserves the right to deny any advance request for a make-up exam.

*Academic misconduct:* Any incidents of academic misconduct will be handled in accordance with established university policy and the Department’s Honor Code. All the work you submit in the course must be exclusively your own. The instructor will explicitly authorize any allowable group work in advance. Informal study groups for discussion of homework and computer problems, as well as quiz and exam preparation, are encouraged.

*General Course Information:* You are responsible for all the assigned sections in the text and course materials and all lectures content. If you miss class, it is your responsibility to obtain assignments and other information given on the days you missed. You can contact the instructor to obtain such materials.

There will be three small projects requiring the use of computer aided design software (Xilinx ISE; a student edition is enclosed in the textbook). The first project (entitled Using Xilinx for digital simulation) serves as a tutorial and will be handed out in class and will also be available on the ECE 261 class home page. You should follow the step-by-step tutorial and become familiar with Xilinx ISE.

Project reports should be neatly done on 8 1/2 by 11 sheets with all pages stapled together, in order, with a single staple in the upper left corner. Computer output should also be on 8 1/2 by 11 sheets and annotated with comments for easy interpretation. All diagrams should be drawn with a logic template and straight edge or with computer tools. All text must be typewritten. Project reports are to be submitted by the specified deadline. Students not submitting a project by the deadline will receive a zero. With these project reports, the student should learn to present the results of a scientific and engineering investigation in a neat, concise, organized, and professional manner.
If you have questions on course materials the instructor will be available for consultation during office hours. Please try to get answers before serious difficulties in your understanding of course material arise.