

# ECE 2500 Digital Logic

Syllabus for Spring, 2012. Lecture T&R 8:30 am Rm D-109.

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Hours: T&R 10:30 to 11:30 a.m.

## Course Objective

The purpose of this course is to learn and develop techniques for designing digital logic circuits found in the chips used in computers and handhelds, such as the iPod and iPhone. Specifically, we will study the technologies and design methods used in the development of microprocessors, memories, USB drives, CD/DVD drives and LCD displays. We will also be using computer-assisted VHDL design tools commonly used in logic circuit design industry.

## Materials Used in Class:

1. **Text:** *Introduction to Logic and Computer Design*, 1<sup>st</sup> Ed., by Alan Marcovitz, McGraw-Hill, 2007. We do not use the CD in the back of the textbook.
2. **On-line homework registration:** Go to <http://www.mharis.com> and press the *Student* button. On the following screen, enter **844-7B-E86** in the Section Enrollment Code box. In subsequent screens you will be asked to create an account (email address, password, security question, etc.). Enter the SEC again. A payment screen may appear on right [*Don't have a Code?*] Press the *Buy Online* button to pay a \$15 fee. (Good for 1 year.)
3. **Lab notebook** (permanent bound --spiral or hardbound), pages lined with square grid; alternating white and yellow or blue paper (yellow/blue paper used for copies to be turned in to the lab instructors).
4. **Wireless Western:** A web site has been provided for this course containing syllabus, lecture notes, weekly prelab assignments and quizzes. Students with laptop computers may access these materials anytime, as well as participate in on-line in-class activities during lecture. The website is at: <http://homepages.wmich.edu/~johnson/ece250>

**Exams and Quizzes:** There will be two hourly exams, plus a two-hour final exam. The date of these exams are: **Tuesday, February 14<sup>th</sup>** and **April 10<sup>th</sup>**; with the **FINAL EXAM** being **Tuesday, April 24<sup>th</sup>, 8:00 am in the morning**. Exams are closed book/notes/calculator and consist entirely of multiple-choice questions, and are computer graded. The exam questions are similar in subject to that found on the weekly web quizzes. The final is comprehensive over all course material; including the first two exams and all web quizzes. Students are *required* to attend all exams as scheduled; failure to do so will in a zero score for any examination not attended (if an emergency arises, you must contact the instructor *before* any examination)

**Lab work:** 11 experiments and two lab assessment exercises. (13 total lab meetings) Many laboratory experiments require prelab work in the form of written calculations in your lab notebook or computer simulations. If you don't show up for a lab, you forfeit the points associated with the entire lab that week, and generally cannot later make up the lab. Exceptions will be made only for those individuals who contact their lab instructor *before* the lab, giving an adequate reason why they cannot attend that day. Contact your lab instructor at his/her office hours for help with lab calculations. Note: you must also achieve a passing grade in the lab in order to pass the entire course.

**Homework:** HW problems are submitted on-line (see point 2 above). HW problems change each time they are viewed and may be done more than once to improve score, until due date. Start early to earn best scores.

**WMU Honesty Policy:** Attempting to obtain credit for work (lab, hw, exams) done by somebody else is illegal and punishable in this class. You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate (pp. 274-276) [Graduate (pp.25-27)] Catalog that pertain to Academic Honesty. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse.

**Grading:** Grades will be determined on the basis of the following guaranteed grade scale:

Exam I	20%	93 - 100	A
Exam II	20%	87 - 92	BA
Homework	10%	80 - 86	B
Lab Work	25%	74 - 79	CB
Final Exam	25%	68 - 73	C
	100%	63 - 67	DC
		58 - 62	D
		0 - 57	E

## GENERAL COURSE SCHEDULE FOR ECE 2500, Spring 2012

Revised Feb 18

Week	Lecture Topic	Reading	Lab Exercise <sup>1</sup>
<i>January</i>			
10 12	iPods & The Digital World	1.1-1.3*	NO LABS
17 19	More DW, Boolean	2.2-2.4, 2.7-2.8	1 CD/DVD drives
24 26	Algebra, Logic Circuits	2.6	2 Microprocessor Logic
<i>February</i>			
31 2	Minterms and K-maps	2.5, 3.1	3 Logic Design: Adders
7 9	Maxterms and more K-Maps	3.2-3.4*	4 Logic Design: 7-Seg
14 16	<b>Exam I (February 14)<sup>2</sup></b>	none	5 Properties of Mobile Dev
21 23	Important CLCs, ROMs	4.2-4.5	6 Standard Logic Blocks
<i>March</i>			
28 1	PLDs, RAMs, iPhones	4.6, 5.1-5.2	<b>7 Lab Assessment#1<sup>3</sup></b>
6 8	<b>SPRING BREAK</b>		NO LABS
13 15	Apps, Latches, Flip/Flops	5.3	8 Smartphone Apps
20 22	Sequential Logic Circuit Design	6.1-6.3*	9 Latches, Counters & Memos
27 29	More SLC Design	6.4*	10 F/F & Sequential Logic
<i>April</i>			
3 5	Important SLCs	7.1-7.3*	11 Advanced SL Design
10 12	<b>Exam II (April 10)<sup>2</sup></b>	none	12 ALU Register Design
17 19	Finish and Review		<b>13 Lab Assessment#2<sup>3</sup></b>

**FINAL EXAM is Tuesday (April 24<sup>th</sup>), 8:00 am in same room.**

### Notes:

1. Lab exercises available weekly on-line on the ECE 2500 homepage. Many labs require prelab work.
2. If WMU should officially close due to bad weather (or any other problem) on a date of an exam, the exam shall take place at the *next* lecture time.
3. A *lab assessment* is a one hour open book/notes lab exam taken on an individual basis. The assessment involves written calculations as well as hands-on lab work. If you are working in a group of two, one of you will arrive at the beginning of the lab period to take your assessment; the partner will then arrive one hour afterwards to take his/hers. The assessments are worth four times the points of a regular lab.

\* Much more detail is provided in the lecture notes than in text; don't miss these lectures.