

Electronics Laboratory II: Digital Electronics

(General information; first edition, January 2, 2008)

- Professor:* Robert B. Meyer
Office: physics building, room 97–240, phone: x62870
e-mail: meyer@brandeis.edu
Office Hours: Mon: 11-12, Wed.: 11-12, Thurs.: 11-12
- T. A.:* Ed Barry
Office: physics building, room 97–201 (just walk in), phone: x62869
e-mail: edb@brandeis.edu
Office Hours: to be announced
- Texts:* *Introductory Electronics for Scientists and Engineers* by Robert Simpson.
- Material:* The purpose of the course is to learn about digital electronics, and designing and building digital electronic circuits. It concentrates on lab work, with appropriate reading and homework. It requires general knowledge of electronics, as learned in Physics 29a. We will learn the basics, and work with a large scale programmable logic device (CPLD). This requires learning a combination of digital logic design skills, and building and testing electronic circuits. In addition, programming the CPLD in ABEL will be an essential part of the course. The course will include a period of time at the end for individual final projects, usually based on interfacing the CPLD with interesting input and output, to “do something”.
- Other books:* For reference, there are many good books on electronics. Especially interesting for motivation and a clear introduction to the basics of digital logic and computation is the book by Feynman, *Feynman Lectures on Computation*, in which the first few chapters are a good overview of what we are doing and why! The text by John Wakerly, *Digital Design, Principles and Practice* (4th ed., or earlier ones) appears to be a great book, and it is supported by an excellent web site (www.ddpp.com) that you might take a look at. The excellent books often used as texts and references for this course are *The Art of Electronics* by Horowitz and Hill, and the accompanying Student Manual of lab exercises.
- Homework:* There will be some homework in addition to lab work. This will be graded as part of your final grade.
- Exams:* There will be a take-home **midterm exam** in the course to cover the basics of digital electronics design in mid-March. There will not be a final exam, but instead a final project.
- Grading:* Each student will keep a laboratory notebook in which lab work is clearly summarized. These will be checked periodically, and used as part of the final grade, along with the homework, the midterm, and the project.
- Disabilities:* **If you are a student with a documented disability on record at Brandeis University and wish to have a reasonable accommodation made for you in this class, please see me immediately.**

Syllabus, Spring 2008

Class	Date	Class, Reading, Lab
1 W	Jan 16	Intro to logic, gates, tools; read text pp. 528-558, 575-582; build CMOS gates
2 W	Jan 23	Combinational logic; read text pp. 644-648; Lab 1
3 M	Jan 28	Combinational logic; Lab 2
4 W	Jan 30	CPLD, ABEL, read text pp. 470-683; Lab 3
5 M	Feb 4	Lab 3
6 W	Feb 6	Sequential Logic; flip-flops; read text pp. 597-641; Lab 4
7 M	Feb 11	Counters; Lab 4
8 W	Feb 13	State Machines; Examples
9 M	Feb 25	Memory, use of buses; Lab. 9
10 W	Feb 27	Lab 5: Drink Dispenser
11 M	Mar 3	Lab 5: Drink Dispenser
12 W	Mar 5	Lab 6: keyboard
13 M	Mar 10	Lab 7: Calculator
14 W	Mar 12	Lab 7: Calculator
15 M	Mar 17	DAC; ADC; read text pp. 700-746; Lab 8
16 W	Mar 19	Microcomputers read text ch. 16 for general knowledge
17 M	Mar 24	Begin Projects
18 W	Mar 26	Projects
19 M	Mar 31	Projects
20 W	Apr 2	Projects
21 M	Apr 7	Projects
22 W	Apr 9	Projects
23 M	Apr 14	Projects
24 W	Apr 16	Projects
25 M	Apr 28	Projects
26 W	Apr 30	Projects