# COURSE OUTLINE  
(v. 1.01 1/5/2007)

**PHYSICS 116B: INTRODUCTION TO DIGITAL ELECTRONICS - WINTER 2007**

Class meets  MWF 1:10-2:00 PM in 158 Roessler  
Labs meet  M or W 3:10-6:00 PM in 152 Roessler.

<table>
<thead>
<tr>
<th>Week</th>
<th>Monday</th>
<th>Topics/Notes</th>
<th>Lab</th>
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<tbody>
<tr>
<td>1</td>
<td>(Jan 1)</td>
<td>Intro; comparator, Schmitt trigger, etc.</td>
<td>No lab Week 1. Lab schedule is offset Weeks 3-8</td>
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<td><strong>First day of class</strong> is Wednesday, Jan. 3</td>
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<td>2</td>
<td>Jan 8</td>
<td>Pulse circuit analysis; Laplace transform</td>
<td>10: Schmitt Trigger</td>
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| 3    | Jan 15  | *M.L. King holiday on Monday*  
Logic gates and Boolean algebra  
*(Monday classes meet on Wed., Jan 17)* | 11: Relaxation Oscillator  
(M: Jan 17, W: Jan 24)  
(Labs meet different weeks) |
|      |         |                                                          | |
| 4    | Jan 22  | Combinational circuit design  
Logic circuits: TTL, CMOS, ECL  
25 Min. Quiz 1 Friday, Jan. 26 | 12: Combinational logic  
(M: Jan 22, W: Jan. 31) |
| 5    | Jan 29  | Flip-flops and counters | 13: Inside Digital IC’s  
(M: Jan 29, W: Feb 7) |
| 6    | Feb 5   | Sequential circuits  
**Exam** Friday, Feb. 9 | 14: Sequential Logic  
(M: Feb 5, W: Feb 14) |
| 7    | Feb 12  | Analog to Digital and  
Digital to Analog Conversion | 15: A/D, D/A conversion  
(M: Feb 12, W: Feb 21) |
| 8    | Feb 19  | *Presidents’ Day holiday on Monday*  
Data Bus, memory, microcomputers | *(Wed. lab does Lab 15)* |
| 9    | Feb 26  | **25 Min. Quiz 2** on Fri., March 2  
M68000 Assembly Language, I/O | 16: Tristate Busses and Memory |
| 10   | Mar 5   | Intro. to sampled signals | 17: M68000 Assembly Language |
| 11   | Mar 12  | **Last 116B class** is Wed., March 14 | 18: Basic M68000 I/O |

**Final Exam:** Saturday, March 17, 8:00 AM – 10:00 AM
Instructor: David Pellett  
Office: Rm. 337 Physics  
Office Hours: TBA in Rm 152 Physics or by appointment.  
E-mail: pellett@physics.ucdavis.edu  
Telephone: (530) 752-1783  
Class web site: http://www.physics.ucdavis.edu/Classes/Physics116/Physics116.html

Lab TA: Solomon Obolu  
Office: Rm. 436 Physics  
E-mail: obolu@physics.ucdavis.edu  
Office Hours: TBA

Texts:  
Bobrow, Fundamentals of Electrical Engineering, 2nd ed.  
Horowitz and Hill, The Art of Electronics, 2nd ed.

References:  
Ford and Topp, Macintosh Assembly System (lab copies to loan)  
Motorola, M68000 Family Microprocessor User’s Manual  
Motorola, M68000 Family Programmer's Reference Manual

Grading: 9% Quiz 1, 18% MT, 9% Quiz 2, 25% Lab(required, on time), 10% HW,  
29% Final.

Assignment 1 (problems due Friday, 1/12/07):  
Read Bobrow, Ch. 10: Sec. 10.5; Ch. 3 (response of circuits to pulses: particularly secs 3.3 and 3.4); Ch. 5: 5.5-5.7 (Laplace transform circuit analysis); Ch. 7: 7.3 (BJT cutoff and saturation; emitter-coupled Schmitt trigger; switching time).  
Problems: Ch. 10: 10.68, 10.73, 10.78(a), 3.29 (assume the voltages and currents have reached their steady-state values before the switch is opened), 3.42 (assume the voltage across the capacitor and the current through it are zero just before the pulse arrives; you can use Thevenin’s theorem here for the voltage source and two resistors).