

P123 Schedule Fall 2009

REV 0; August 28, 2009.

CALENDAR

Note: **Homeworks** are due on **MONDAYS**, as noted: outside Sci Cen 110b (you'll find a mailbox with slot, outside the main entrance). ("PS" indicates problem set due: 5pm, P123 'mailbox')

MIT People may submit by email to "HarvardPhysics123@gmail.com" with a title like "HWD2 - Hedy Lamarr." Late submission has to be accompanied by a reminder email to the grader and all worksheets should be contained in a single file preferably in pdf format. For scanned files, please use appropriate resolution and contrast, and check that the final file is not hard to read. Harvard people are *not* invited to use fax or email for submissions.

The lab numbers listed in parentheses show the way the labs were numbered last term; this numbering scheme fits the lab numbers in the published Student Manual. These otherwise-inexcusable numbers ("10b"?) may help steer you to the relevant class-notes and worked examples, in the Manual.

Odds and Ends

- *Midterm*: we give it on a Monday evening (October 19), so that students in the two sections can take it at one time.
- A *MONDAY class*: we'll make up for the holiday on Wednesday, Nov. 11 (Armistice Day¹) by holding a class Monday, Nov. 9, at the usual hour. We know it's kind of mean to steal your holiday, but if we don't, then the two sections would get out of sync: their classes on a given topic no longer would fall within a single week.
- *A Note on Reading Period Talks*:
Two *Lectures*, to combined groups: construction techniques; GPS, cellphones, TV (analog and digital); & other topics not treated in Lab exercises. Dates to be announced. (Each talk will be given once to a combined group).
- *Review Session*
We will hold a review session on an evening shortly before the exam; we'll consult you to find a good date.

¹This is the anniversary of the end of the first World War. Also known as "Veterans Day".

<u>MON</u>	<u>TUES</u>	<u>WED</u>	<u>THU</u>	<u>FRI</u>
<u>September</u>				
(no PS)	8-L2	2-intro. meetx 9 <i>(a quiz or two, on Labs 2 & 3?)</i>	3-Lab 1 10-L3	4-Lab 1 11
14-PS1	15-L4(Q1)	16	17-L5(QII)	18
21-PS2	22-L6/8(opI)	23	24-L7/9(opII)	25
28-PS3	29-L8/10a(op III)	30		
<u>October</u>				
5-PS4	6-L10/10c(PID)	7	1-L9/10b(Op IV) 8-L11/11a(regltrs)	2 9
12-PS5	13-L12/11b(FETs)	14	15-L13: PROJECT	16-PROJECT
19-PS5	20-D1/13(L16)	21	22-D2	23
MIDTERM: Mon. eve, Oct. 19				
26	27-D3	28	29-D4	30
<u>November</u>				
2	3-D5 (Digital Project)	4	5- μ 1	6
9-CLASS <small>(MONDAY class makes up for Wed. holiday.)</small> PS6 due	10- μ 2 (L20)	11- HOLIDAY	12- μ 3 (L21)	13
16-PS7	17- μ 4	18	19- μ 5	20
23-PS8	24- μ 6	25	26, 27: Holiday	
30-PS9				
<u>December</u>				
7-PS10	1- μ 7 (projects) 8-lecture	2 9	3-lecture 10	4-(Reading Period:) 11

DATE, TOPIC & LAB

(Tue, Wed; Thu, Fri)

SEPTEMBER

1. *Thu., Fri.*, 3,4 Overview; DC Circuits (no quiz)
2. 8,9 AC Circuits; capacitors
3. 10,11 Diode Circuits
4. 15,16 Transistors I: bipolar
5. 17,18 Transistors II: diff amp, etc.
6. 22,23 Op Amps I: Intro: Idealized
7. 24,25 Op Amps II: Departures from Ideal.
8. 29,30 Op Amps III: Benign positive feedback: Oscillators

OCTOBER

9. 1,2 Op Amps IV: Active Filter; Nasty positive feedback: unwanted oscillations, and other *noise*
10. 6,7 Op Amps V: PID Control Loops: stabilizing a more complex feedback loop
11. 8,9 Power Supplies; regulators
12. 13,14 MOSFETs

13 15,16 Analog Project/Design Lab: infrared transmission of audio signal

MIDTERM TEST will be held on Monday evening, October 19

14 20,21 Digital vs Analog; Gate Innards

15 22,23 Applying Combinational Logic: PALs & GALs I; Flip-Flops

16 27,28 Counter Applications; Memory; State Machines; PALs II: in state machines

17 29,30 Analog↔Digital Interfacing

NOVEMBER

18 3,4 Digital Project Lab

19 5,6 Microcomputers I: Overview: generic computer, and one based on our particular processor
Lab μ 1: add processor

20 9,10 Micro II: I/O Hardware
Note MONDAY class, Nov. 9, to make up for Wednesday holiday (Armistice Day: end of the Great War, 1918)
Lab μ 1 (cont.)², start Lab μ 2: I/O hardware & test programs

21 12,13 Micro III: Bit operations; Stack & subroutines
Lab μ 2, μ 3: Bit operations; Interrupt

22 17,18 Micro IV: Interrupts; ADC, DAC; modify waveforms
Lab μ 4: Analog ↔ Digital & Microcomputer

23 19,20 Micro V: Moving pointers
Lab μ 5: 'Storage Scope' (moving pointer) & Timers or Serial peripherals

24 24,25 Micro VI: Standalone Micro; peripheral interfacing
Lab μ 6: do something of your own with standalone microcontroller

THANKSGIVING BREAK

DECEMBER

25 Dec. 1,2 Micro VII: serial buses
Lab μ 7: projects/something of your own devising

READING PERIOD

26. 3 Lecture, to combined group (topics to be announced)
Lab μ 7: continued: projects

27. 8 Lecture, to combined group; and free lab
Lab μ 7: continued: projects

Review Session: shortly before final exam. Date and place to be announced.

(syl_909.tex ; August 28, 2009)

²This is one of the few times in the course when we want to say aloud that you may need a second session to finish a lab: Lab μ 1 is another long lab, and some people will be slowed down by interesting *bugs*. That's OK: don't be depressed if you use much of this session to finish Lab μ 1. From this point on, our day-by-day lab schedule is only an estimate: we know you will proceed at different rates, depending on luck (who gets the hard bugs) and on experience (who already understands assembly-language programming).