APh 9a Solid-State Electronics for Integrated Circuits

Prof. Axel Scherer (x4691, etcher@its.caltech.edu)

Th 10am, F 1pm, 070 Moore (tentative)

Homework Policies:

- On-time homework:
  - turn them in during lecture hours.
- Late homework:
  - turn them in to the IN box outside of Prof. Scherer's assistant's office on the 2nd floor of Sloan Annex (Room 212).
  - 10% deduction on your grade for each day after the due date.

  There will be no extensions except for emergencies (in which case, you should contact Prof. Scherer).
- Graded homework can either be picked up in class, or in the OUT box outside of Prof. Scherer's assistant's office (Room 212) in Sloan Annex.
- The grade for passing differs every year, so turn in ALL your homework even if you are taking the class Pass/Fail. You will get an "E" (incomplete) if you miss homework, and you will have to make it up before ADD DAY of the following term.

Lab Policies:

- Attendance to ALL labs is REQUIRED to pass the course (you will get an "F" if you miss labs, for both Freshman and upperclassman).
- You CANNOT change lab sessions after the labs have started.
  There will be no exceptions unless there is a medical or other emergency.
- You need to have your pre-lab ready before your lab session (see attached pre-lab format).
- There will be NO MAKE-UP labs at the end of the term. So you will get an "F" if you miss labs, unless there is an emergency (in which case, you should discuss with your TA to determine a time to make it up).

Exams:

- There will be a 1-hour in-class written exam for the midterm and a 3-hour take-home final (dates will be announced in class).
- The exams will be open your own notes, blue lab manual, and the class textbook.

Grading Policies:

- Attendance to ALL labs will determine that you will not get an "F", but will not guarantee that you will automatically pass the course if you are taking it Pass/Fail (homework and exam grades will be taken into account as well).
- Homework: 50%
  Midterm: 20%
  Final: 20%
  Lab: 10%

How to make up an "E":

- You will be asked to do research on a topic (assigned by Prof. Scherer) that is related to semiconductor devices and write a detailed report by Add Day of the following term.

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Pre-lab Format:

Purpose of the lab: State the device that you will be making, and the materials (eg. GaAs or Si substrate, n-or p-doped, or undoped, the type of metal you'll be depositing, etc) you'll be using to make it.

Description of the device: explain how the device works (in words, and maybe some equations as well).

Procedures: state briefly in words the fabrication process, and draw schematic diagrams (cross-sectional views) next to the description.

Measurements: what type of measurements you will be doing (e.g. IV characteristics, CV curves, etc), and what programs in the HP analyzers you will be using to take each of the measurements.

Calculations: these are found at the end of each lab in the blue book (not all labs require calculations). For the ones that do, you need to figure out what equations to use for the calculations.

Lab Write-ups:
You will need to turn in your pre-lab, measurements (plots), and calculations at the following lab session. Extensions may be given with your TA's approval.

Lab Schedule:
Labs will begin during the week of October 9, 2000.
(all are 1-week labs unless stated otherwise)

- Lab 1: Light-emitting diode lab (p.61 in blue book) – week of Oct 9
  Reading: PN diodes (p.48)
- Lab 2: Schottky-diode lab (p.80) – week of Oct 16
  Reading: Schottky diodes (p.67)
- Lab 3: MOS-capacitor lab (p.95) – week of Oct 23
  Reading: MOS capacitors (p.84)
- Lab 4,5: PN-diode lab (p.109) – this is a 2-week lab – weeks of Oct 30 & Nov 6
  You will need an artwork for this lab (see p.108 for example: a transistor mask, but you will only need the p-diffusion and contact masks for the p-n diodes). Ask your TA for more details.
- Lab 6: Transistor lab (mask-making only) – week of Nov 13
  Reading: Transistors (p. 98); see p.108 for example of MOSFET artwork.

N.B. You MUST have your pre-lab ready BEFORE your lab session!
You can contact your lab TA before your session if you have any questions.

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Tentative homework and exam schedule:

Homework assignments are usually given out in class on Fridays, and due back in class the following Friday. See penalty for late homework on page 1. Homework will be graded by the Thursday after the due date and will be returned in class along with solution sets.

HW 1:	out on 9/29, due on 10/6, graded by 10/12
HW 2:	out on 10/6, due on 10/13, graded by 10/19
HW 3:	out on 10/13, due on 10/20, graded by 10/26 (solution sets will be given out on 10/20 after class)
Midterm:	1-hr in class on 10/27, graded by 11/2 (homework 1-3 included)
HW 4:	out on 11/3, due on 11/10, graded by 11/16
HW 5:	out on 11/10, due on 11/17, graded by 11/30
Final:	3-hr take home; out on 12/1, due on 12/6, graded by 12/11 (homework 1-5 included)

Week of 11/20 – no class and no labs due to Thanksgiving recess on 11/23-24

Collaboration policy of homework:

You may freely discuss the homework problems with one another verbally, but you may not look at or communicate the written solution of the problem of another person before the homework is turned in. Any action against this policy is a violation of the Honor Code, and will be reported to the Institute's Board of Control Committee.

Homework, midterm, final exam, and labs are all mandatory. You will receive an "E" (or "F" for labs) if you miss any of them.

Upperclassman must take this course on Grades. Only Freshmen can take it on Pass/Fail.