PHYSICS 457
PRINCIPLES OF ELECTRONICS

INSTRUCTOR: Barbara Neuhauser
Thorton 540 (academic office)
415-338-1468 Thornton 106 (research office)
barbijn@sfsu.edu

E-MAIL CONTACT: You may e-mail me about administrative matters. Please do NOT e-mail questions about homework; I have to draw diagrams and wave my hands when I answer physics questions. Please use this subject in your e-mail messages: "PHYSICS 457: your name"

OFFICE HOURS: MWF 10:10 am - 10:45 am in TH 540 (tentative)
Tuesday 1:00 pm – 2:00 pm in TH 106 (tentative)
Wednesday 5:00 – 6:00 pm in TH 231 (after lab)
and by appointment

PREREQUISITES: PHYSICS 230 (General Physics with Calculus II)
PHYSICS 232 (Laboratory for Physics 230)

REQUIRED TEXTS: The Art of Electronics (2nd ed.) by P. Horowitz and W. Hill (Cambridge)
Student Manual for The Art of Electronics by T.C. Hayes and P. Horowitz (Cambridge)

LECTURE NOTES: Early in the semester students will be able to purchase a spiral-bound set of lecture notes from the Physics and Astronomy Club

COURSE OBJECTIVES: This course covers the design and analysis of analog electronic circuits using discrete bipolar and field effect transistors and also integrated circuit operational amplifiers. Students are expected to master basic concepts in the following areas and to be able to apply the concepts in the laboratory:

- Passive linear and nonlinear circuit components
- Network analysis techniques
- Phasors (on "stun", not "kill")
- Diodes (ideal, pn junction, Zener)
- Bipolar junction transistors (BJTs)
- Field effect transistors (FETs)
- Operational amplifiers
- Oscillators
- Noise characteristics

LECTURES: Students are expected to attend ALL lectures and to ARRIVE ON TIME for the lectures. Please TURN OFF your cell phone during the lecture !!! A tentative lecture and laboratory schedule will be provided during the first week of classes. Lectures will discuss appropriate portions of the textbooks and provide extensive supplemental material. Students are expected to bring the set of lecture notes to class so that they can focus on the presentation. Relevant questions that can be answered briefly are welcomed during the lectures. Longer discussions of topics must be deferred to scheduled office hours.

LABORATORY: Students are expected to attend ALL laboratory sessions. Students must ARRIVE ON TIME for the labs and stay for the ENTIRE lab period unless they finish taking data early,
which has rarely happened in this course. Preparation is essential if the lab work is to be completed during the scheduled periods!!

CHRONIC LATE ARRIVAL AT LAB SESSIONS AND/OR A SINGLE UNEXCUSED ABSENCE FROM A LAB SESSION WILL RESULT IN THE STUDENT BEING DROPPED FROM THE COURSE. Do NOT schedule travel plans that conflict with laboratory sessions.

Usually laboratory data will be taken during SCHEDULED SUPERVISED SESSIONS or during SUPERVISED make-up sessions. On rare occasions the instructor and student may make explicit written plans for unsupervised lab work by the student.

Lab reports are due at the beginning of the laboratory period one week after the lab work has been completed. Sloppy lab reports may not be graded. FAILURE TO HAND IN THE FIRST LAB REPORT ON TIME WILL RESULT IN THE STUDENT BEING DROPPED FROM THE COURSE. Failure to hand in the remaining lab reports on time may result in a 25% penalty. Failure to complete the assigned labs will result in a grade of Incomplete for the course.

HOMEWORK:

Problem sets will be assigned each Friday (tentatively) and will be due at the beginning of the lecture on the following Friday (tentatively). Students are expected to state briefly but clearly the justification for each major step in the solution to a problem. Sloppy homework sets may not be graded. Students may discuss with each other general approaches to the problems, but each student should work out the detailed solutions by him/herself without using solutions obtained from any source.

FAILURE TO HAND IN THE FIRST PROBLEM SET ON TIME WILL RESULT IN THE STUDENT BEING DROPPED FROM THE COURSE. Failure to hand in the remaining problem sets on time may result in a 25% penalty.

EXAMINATIONS:

QUizzes:
A “take-home quiz” will be handed out on most Fridays and will be due at the beginning of the following lecture. Topics include lab preparation calculations and/or simple exercises related to recent lecture topics. Each student should work out the detailed solutions by him/herself without discussing the quiz with anyone or using solutions obtained from any source.

Midterms:

Monday, 2 March 2015 (tentative); Lectures 1-15
Friday, 17 April 2015 (tentative); Lectures 16-30

Each midterm exam will be taken in-class, closed book and closed notes. If the instructor’s workload has sufficient flexibility, each exam will be graded and returned for you to correct as an open-P457-text-book, open-P457-lecture-notes, do-it-yourself take-home exam. Your score will be the average of the two scores.
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FINAL EXAM: Friday, 22 May 2015, 10:45 am – 1:15 pm (Lectures 1 – 43)

- The final exam will be taken in-class, closed book and closed notes
- The final exam MUST be taken at the scheduled time to avoid assignment of a grade of zero.
- Do NOT make travel plans that conflict with this schedule!
- No make-up final exam will be given except in the case of documented illness or personal crisis.

GRADE: A student must earn at least 50% of the total possible points in order to receive a grade of C- or better

HOMEWORK: 20 % All homework sets will be included.
QUIZZES: 10 % All quizzes will be included.
MIDTERM EXAMS: 15 % each
LAB: 25 % All lab work must be done or else a grade of Incomplete will be given
FINAL EXAM: 15 %

CHEATING ON LAB REPORTS, HOMEWORK, QUIZZES, OR EXAMS WILL RESULT IN FORMAL DISCIPLINARY ACTION BEING TAKEN AGAINST THE STUDENT.


STUDENTS WITH DISABILITIES:

Students with disabilities who need reasonable accommodations are encouraged to contact the instructor. The Disability Programs and Resource Center (DPRC) is available to facilitate the reasonable accommodations process. The DPRC is located in the Student Service Building and can be reached by telephone (voice/TTY 415-338-2472) or by email (dprc@sfsu.edu).
STUDENT SURVEY FORM

Please fill out this form and hand it in at the beginning of the second lecture.

Name: ____________________________________________
(family)                                        (given)

Major: ________________________________

Address: _______________________________________
________________________________________________

Telephone: __________________________ e-mail: ______________________

Summary of undergraduate and graduate Physics and Engineering courses already taken:

<table>
<thead>
<tr>
<th>Course</th>
<th>Date Completed</th>
<th>Grade (optional)</th>
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Comments or questions: __________________________________________________________

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