UTSA
Electrical Engineering Department
EE 4113 – Electrical Engineering Laboratory II
Syllabus
Fall 2008
Part A – Course Outline

Required course in Electrical and Computer Engineering

Catalog description:
EE 4113 Electrical Engineering Laboratory II (1-6) 3 hours credit.
Prerequisites: EE 3113, EE 3463, EE 4313.
Complex electronic circuit subsystem design; improving measurement system performance; introduction to automatic test equipment, the design process, and simple system design; and technical communication.

Prerequisite:
1. EE 3113 Electrical Engineering Laboratory I (requires a grade of C or better)
2. EE 3463 Microcomputer Systems I (requires a grade of C or better)
3. EE 4313 Electronic Circuits II (requires a grade of C or better)

Textbook:
1. The Art of Electronics, 2nd ed., by Paul Horowitz and Winfield Hill, Cambridge University Press, 1997, ISBN 0-521-37095-7.

References:
1. Microelectronic Circuit Design, 2nd edition, by Richard C. Jaeger and Travis N. Blalock, McGraw-Hill, ISBN 0-07-250503-6.
2. Electronics, 2nd edition by Allan R. Hambley, Prentice Hall, 2000, ISBN 0-13-691982-0.
3. Orcad PSpice for Windows, Volume I: DC and AC Circuits, 3rd edition, by Roy W. Goody, Prentice Hall, 2001, ISBN 0-13-015796-1. This text is an excellent introduction to the basics of OrCAD/Cadence PSpice, though it refers to an earlier version.
4. Orcad PSpice for Windows, Volume II: Devices, Circuits, and Operational Amplifiers, 3rd edition, by Roy W. Goody, Prentice Hall, 2001, ISBN 0-13-015797-X. Excellent reference describing the simulation of active devices with PSpice.
5. OrCAD/Cadence Demo Software. The department has a multi-user license for Cadence software which can be run from departmental computers. If you wish to run PSpice software at home, you may download the software from Cadence at https://www.cadence.com/products/orcad/pages/downloads.aspx. (Warning: It is 683MB.) You can alternatively request a CD from the same site.
6. Complete PCB Design Using OrCAD Capture and Layout, by Kraig Mitzner, Newnes, 2007, ISBN 978-0-7506-8214-5. Although OrCAD Layout is now obsolete, the OrCAD Capture information is still relevant. In addition, it gives one of the best introductions to the PCB design process I have ever found.

Major Prerequisites by Topic:
1. Familiarity with analog and digital test and measurement equipment.
2. Familiarity with common analog and digital circuits.
3. Familiarity with circuit-simulation software (PSpice).

Course Objectives: (Letters in brackets refer to the program outcomes of the EE Department)
1. Become adept at complex circuit design, construction, and test. [a, b, c, e, i, k]
2. Familiarity with printed circuit board design, construction, and test. [b, c, e, k]
3. Successful technical communication. [g]

Topics:
1. Circuit design, simulation, prototyping, ant test of a baseband filtering and amplification circuit.
2. Circuit design, simulation, prototyping, and test of an RF mixing, filtering, and amplification circuit.
3. Printed circuit board design, layout, construction, and test.
4. Circuit test using automatic data acquisition and test equipment.
5. Lectures on: real-world components, EMI/EMC, noise abatement techniques, grounding, and other topics relevant to the circuit design engineer.

Class/Laboratory Schedule:
One 50-minute lecture session/week
Two 2-hour and 45-minute lab sessions/week

Contribution of Course to Meeting Professional Component of EE ABET Requirements
Knowledge of engineering sciences.

Relationship to Electrical Engineering Department Program Outcomes:
This course primarily contributes to the Electrical Engineering program outcomes:
(b) An ability to design and conduct experiments, as well as to analyze and interpret data.
(c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
This course secondarily contributes to the Electrical Engineering program outcomes:
(a) An ability to apply knowledge of mathematics, science, and engineering.
(e) An ability to identify, formulate, and solve engineering problems.
(g) An ability to communicate effectively.
(i) A recognition of the need for, and an ability to engage in, life-long learning.

Evaluation:
1. Group lab demonstrations
2. Individual written report
3. Exams (3)
4. Homework and lab exercises
5. Attendance

Performance Criteria: (Numbers in brackets refer to evaluation methods used to assess student performance)
Objective 1
1.1 Students will demonstrate an ability to successfully design, construct, and debug complex electronic circuits. [1, 3, 4, 5]
Objective 2
2.1 Students will demonstrate an ability to successfully design, construct, and debug printed circuit boards. [1, 3, 4, 5]
Objective 3
3.1 Students will demonstrate an ability to clearly convey technical information in report form. [2]

Course Content:
Engineering Science	0%
Engineering Design	100%

Relationship to Other Courses:
This is a required upper-division course. It is a pre-requisite for EE 4813.

Coordinator:
Dr. Lars K. Hansen, Senior Lecturer, Electrical and Computer Engineering.

Syllabi Preparation and Review:
This syllabi was revised by Dr. Lars Hansen, September 2008.

Part B – General Course Information and Policies

Fall 2008:

Instructor: Lars K. Hansen
Office: BSE 1.548
Office Hours: Monday, Wednesday, and Friday 11:00-11:50, or by appointment.
Phone: 458-5938
Email: lkhansen@idworld.net
Web page: Course materials will be posted on WebCT. We will be using the new version, WebCT CE 6.
Lecture Room and Hours: EB 2.04.02, F 12:00-12:50
Laboratory and Hours: EB 3.04.64; Section 1 MW 8:00-10:45; Section 2 MW 2:00-4:45

Grading Policy:

1. Group lab demonstrations 32%
2. Individual written report 10%
3. Exams 33%
4. Homework and lab exercises 20%
5. Attendance 5% (Note that attendance can also implicitly affect the group lab demo grades, too.)

Exam Schedule:

Exam 1: Friday, September 26; Exam 2: Friday, October 24; Exam 3: Friday, November 21.

Missed Exams:

Those with a valid written excuse for missing a single exam may pro-rate the points among the remaining exams.

Lab Groups:

Lab groups perform the labs and demonstrations. Form a lab group by the start of Lab 1. Group size cannot exceed three.

Attendance:

Students are given some latitude in scheduling their lab time. However, certain in-lab activities will require all students to be present. These required activities will be announced in advance and a role call will be taken. Also, since students work in groups, it is important that all members contribute to the group. This includes attendance at lab group activities. Serious cases involving frequently missing group lab time will result in receiving fewer points for the group activity than the other members of the group, *including the project demonstration points!*

Equipment Needed:

1. (Most of an) EE Lab 1 Lab Kit, in particular the protoboard, scope probe, DMM, and tools.
2. A few resistor and capacitor values that may not be in the Lab 1 kit. The Radio Shack 500-piece ¼-watt carbon-film resistor assortment is especially recommended.
3. Major project components such as IC's and connectors will be provided free of charge by the department.

Note the required equipment is per group, so the cost may be shared among group members.

Written Report:

The format of the individual written report will be discussed in a subsequent handout. The report will be due during finals week in lieu of a final exam.

Academic Dishonesty:

As an entity of The University of Texas at San Antonio, the Department of Electrical and Computer Engineering is committed to the development of its students and to the promotion of personal integrity and self-responsibility. The assumption that a student's work is a fair representation of the student's ability to perform forms the basis for departmental and institutional quality. All students within the Department are expected to observe appropriate standards of conduct. Acts of scholastic dishonesty such as cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designated to give unfair advantage to a student, or the attempt to commit such acts will not be tolerated. Any case involving academic dishonesty will be referred to the Office of Student Judicial Affairs who will investigate the charge and set a preliminary meeting with the student to discuss disposition. Consequences of academic dishonesty may be as severe as dismissal from the University.