ELE 330: ELECTRONIC CIRCUITS (required)

Credit: 4 hours.

Catalog Description: Unified treatment of the applications of semiconductor devices, including p-n junctions, bipolar transistors, and field effect devices. Topics include device modeling, biasing, input impedance, output impedance, voltage gain, current gain, and power gain and Op. Amp. Design and analysis of single and multiple stage amplifiers. Lecture, discussion three periods per week; laboratory session two periods per week.

Prerequisites: ELE 210U and MATH 336.

Textbooks(s) and/or Other Required Materials: Introduction to Electronic Circuit Design, by Spencer and Ghausi.

Topics Covered:

1. Introduction to linear circuit analysis (3 hours), Ch. 1
2. Electronic Devices (6 hours), Ch. 2
3. Diode circuits (5 hours), Ch. 12
4. Small-signal Linearity (3 hours), Ch. 6
5. DC Biasing (5 hours), Ch. 7
6. Low-frequency small signal analysis (10 hours), Ch. 8
7. Amplifier frequency response (5 hours), Ch. 9
8. Transistor level Digital circuits (4 hours), Ch. 15
9. Mid-terms Exam (2 hours)
10. Final Examination (2 hours)
11. Laboratory (18 hours)
   Total (63 hours)

Class/Laboratory Schedule:

Lecture: 2.5 hours/week
Lab: 2 hours/week

Course Objectives and Relationship to Program Outcomes:

1. Addresses the fundamental concepts of Electronic Circuits. (Outcome A, B, C, I, K).
2. Provides methods for the design of amplifiers and power supplies. (Outcome B, C, E, I, K).
3. Covers many examples of amplifier designs and power supplies. (Outcome A, B, C, E, H, I, K).
4. Performs several circuit experiments at lab sessions. (Outcome A, B, C, E, G, K).

The lab assignments for this course allow the student to use test equipment to observe the operation of semiconductor devices in common circuit applications. Several laboratory sessions are utilized in instructing the students on proper operation of the oscilloscope, function generator.
and frequency counter for use in laboratory experiments. The student will utilize diodes, transistors and operational amplifiers in a variety of circuits. Most circuits are simulated using PSPICE before being built and tested in the laboratory. The student is required to compare measured results to the response obtained in analysis. A list of specific laboratory assignments follows:

1. Series, Parallel and Series/Parallel Circuits (2 classes)
2. RC Circuits and the Oscilloscope (2 classes)
3. Operational Amplifiers (3 classes)
4. Clippers, Clampers, Voltage Doublers and Diode Logic (3 classes)
5. Comparing Four Types of Transistor Biasing (2 classes)
6. Power Supplies Using Zeners and BJTs (2 classes)
7. FETs (2 classes)

**Coverage (and level) of ABET Outcomes:** A (2), B (3), C (2), E (2), F (1), G (1), H (1), I (2), J (1) and K (1).

**Contribution of Course to meeting the Professional Component:**

Engineering Topics: 100%

**Date:** June 2004.