Instructor: Terry Mancilla
tem@sfsu.edu

ENGR 206 Electric Circuits and Instrumentation (1 unit)
Prerequisite: ENGR 205 (may be taken concurrently)
Introduction to electrical measurements and laboratory instrumentation. Verification of circuit laws and theorems. Basic operational amplifier circuits. AC steady-state behavior and frequency response. Transient characteristics of first-order circuits. Extra fee required.

References:
1. Electric circuits textbook used in ENGR 205
2. Technical and operating manuals for various instruments used in the lab.

Prerequisites by Topic:
1. Electrical quantities and units
2. Ohm's and Kirchhoff’s laws
3. Linearity and superposition
4. DC circuit analysis
5. Characteristics of waveforms
6. AC circuit analysis
7. Operational amplifiers
8. Frequency-domain analysis
9. Transient behavior of simple circuits
10. Working knowledge of desktop computers

Course Objectives*:
1. To become familiar with the operations of basic laboratory instruments through hands-on Experimentation. [A.3, B.3]
2. To develop a better understanding of the concepts in linear electronic circuits by observing and interpreting the behaviors of real circuits. [A.3, A.5, B.2]
* Indices in brackets refer to the objectives and outcomes of the School of Engineering.

Topics:
1. Laboratory Procedures and Safety
2. Digital Multimeter and Power Supply
3. Kirchhoff's Laws
4. Circuit Analysis and Equivalent Circuits
5. AC Measurements
6. Oscilloscopes
7. Characteristics of Waveforms
8. Time-Domain Analysis
9. Frequency-Domain Analysis
10. Operational Amplifiers
Professional Component:
Engineering Design 100%
Engineering Science 0%

Evaluation:
1. Lab reports......40%
2. Quizzes...........30%
3. Attendance.......40%

Performance Criteria*:
Objective 1:
1.1 The student will demonstrate an ability to work with power supplies. [1, 2, 3]
1.2 The student will demonstrate an ability to work with signal generators. [1, 2, 3]
1.3 The student will demonstrate an ability to work with multimeters. [1, 2, 3]
1.4 The student will demonstrate an ability to work with oscilloscopes. [1, 2, 3]
1.5 The student will demonstrate ability to measure voltage, current, time, and relative phase angles in an electric circuit. [1, 2, 3]
1.6 The student will demonstrate knowledge of loading effects and instrumentation errors in physical measurements. [1]

Objective 2:
2.1 The student will demonstrate a skill to implement simple linear circuits from schematic diagrams. [1, 2, 3]
2.2 The student will demonstrate knowledge of simple linear circuits by relating observed results to theory.[1]
2.3 The student will demonstrate ability to present technical information in written form. [1]

Numbers in brackets refer to evaluation methods used to assess student performance.

Class/Laboratory Schedule:
One 2 hour 45 minute lab session/week