

1. *Course number and name*

**ENGR 206: Electric Circuits and Instrumentation**

2. *Credits and contact hours*

1 credit hours

3. *Instructor's or course coordinator's name*

Instructor: Jonathan Song,

Course coordinator: Tom Holton, Professor of Electrical and Computer Engineering

4. *Text book, title, author, and year*

Hu, S. C. *Circuits and Instrumentation Laboratory Manual*

5. *Specific course information*

a. *brief description of the content of the course (catalog description)*

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. Introduction to PSpice.

b. *prerequisites or co-requisites*

ENGR 205 (Electric Circuits) (can be taken concurrently)

c. *indicate whether a required, elective, or selected elective course in the program*

Required for Computer, Electrical and Mechanical Engineering

6. *Specific goals for the course*

a. *Specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.*

- To become familiar with the operations of basic laboratory instruments through hands on experimentation.
- To develop a better understanding of the concepts in linear electronic circuits by observing and interpreting the behaviors of real circuits.

- To acquire a rudimentary knowledge of a computer based circuit analysis software, PSpice. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.* The student will demonstrate an ability to work with power supplies.
- The student will demonstrate an ability to work with signal generators.
- The student will demonstrate an ability to work with multimeters.
- The student will demonstrate an ability to work with oscilloscopes.
- The student will demonstrate the ability to measure voltage, current, time, and relative phase angles in an electric circuit.
- The student will demonstrate knowledge of loading effects and instrumentation errors in physical measurements.
- The student will demonstrate a skill to implement simple linear circuits from schematic diagrams.
- The student will demonstrate knowledge of simple linear circuits by relating observed results to theory.
- The student will demonstrate the ability to present technical information in a written form.
- The student will demonstrate basic knowledge of PSpice for steady state and transient analysis of simple circuits.

a. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.*

Course addresses ABET Student Outcome(s): b, k, g.

7. *Brief list of topics to be covered*

- Laboratory Procedures and Safety.
- Digital Multimeter and Power Supply.
- Kirchhoff's Laws.
- Circuit Analysis and Equivalent Circuits.
- AC Measurements
- Oscilloscopes
- Characteristics of Waveforms
- Time-Domain Analysis
- Frequency-Domain Analysis

- Operational Amplifiers
- PSpice analysis of RC circuits