1. *Course number and name*

**ENGR 205: Electric Circuits**

1. *Credits, contact hours, and categorization of credits in Table 5-1 (math and basic science, engineering topic, and/or other).*

3 Credits; three 50-minute lectures per week; engineering topic

1. *Instructor’s or course coordinator’s name*

Stephanie Claussen

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

J. Nilsson and S. Riedel, Electric Circuits, 11th edition

1. *Specific course information*
2. *brief description of the content of the course (catalog description)*

Circuit analysis, modeling, equivalence, circuit theorems. Operational amplifiers. Behavior of circuit elements. Transient response of 1st-order circuits. AC response, phasor analysis, AC impedance.

1. *prerequisites or co-requisites*

[PHYS 230](http://www.sfsu.edu/~bulletin/courses/21056.htm): General Physics with Calculus III

MATH 245: Elementary Differential Equations and Linear Algebra (may be taken concurrently)

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

Required for Civil, Electrical, Mechanical and Computer Engineering programs.

1. *Specific goals for the course*
2. *specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.*

The student will be able to:

* Analyze and solve resistive circuits powered by DC sources by applying Kirchoff’s laws, Ohm’s law, parallel/series combinations of resistors, voltage and current division, node-voltage, mesh-current, delta-wye transformations, superposition, and Thevenin’s/ Norton’s theorem.
* Determine which is the most efficient approach (of those described in Objective 1, above) for solving a circuit.
* Analyze an operational amplifier circuit (using both ideal and non-ideal models) to relate the output voltage, *vo*, to the voltage signal source(s) (*vs*, etc.).
* Solve for voltage across and current through inductors and capacitors using the voltage-current relationships for these elements.
* Calculate the response of first-order (RL/RC) circuits using the corresponding differential equations.
* Manipulate complex numbers (add/subtract/multiply/divide/and convert between different forms of complex numbers).
* Calculate the sinusoidal steady-state response of RLC circuits in the frequency domain utilizing phasors and the circuit analysis techniques mentioned in Objective 1.
* Apply the maximum power transfer theorem to determine the power transfer from a source to a load in ac and dc circuits.
* State the electrical hazards as defined by the NFPA, recognize the effects of electrical shocks, determine necessary and safe operating conditions when working with electricity, and perform circuit analysis on circuits with ideal transformers.
1. *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): 1, 2

1. *Brief list of topics to be covered*
* Electricity, signals, and circuits
* Circuit analysis techniques
* Network theorems and circuit modeling
* Dependent sources, ideal transformers, amplifiers
* Op amps and basic instrumentation applications
* Energy-storage elements
* Natural, forced, transient, and steady-state responses
* Phasor algebra, impedance, and AC circuit analysis
* Power calculations