

**J. Sargeant Reynolds Community College
Course Content Summary**

Course Prefix and Number: EGR 251

Credits: 3

Course Title: Basic Electric Circuits I

Course Description (including lecture hours, lab hours, total contacts)

Teaches fundamentals of electric circuits. Includes circuit quantities of charge, current, potential, power and energy. Teaches resistive circuit analysis; Ohm's and Kirchoff's laws; nodal and mesh analysis; network theorems; RC, RL and RLC circuit transient response with constant forcing functions. Teaches AC steady-state analysis, power, three- phase circuits. Presents frequency domain analysis, resonance, Fourier series, inductively coupled circuits, Laplace transform applications, and circuit transfer functions. Introduces problem solving using computers. Part I of II. Lecture 3 hours per week.

General Course Purpose

This is a second-year course in the Engineering AS degree program.

Course Prerequisites/Corequisites (*Entry-level competencies **required** for enrollment*)

Prerequisites: MTH 174 and PHY 241 or equivalent.

Course Objectives

Upon completing the course, the student will be able to:

- a. demonstrate various methods of analyzing electric circuits
- b. identify the basic laws of electrical engineering and apply these laws to the time-domain analysis of electric circuits
- c. analyze AC circuits using phasor analysis
- d. design and analyze basic operational amplifier circuits
- e. apply the Laplace transform to the frequency-domain analysis of electric circuits

Major Topics to be Included

1. Introduction to passive and active elements
2. Resistive circuits
3. Independent and dependent sources
4. Nodal and mesh analysis
5. Introduction to operational amplifiers
6. Simple RC and RL circuits
7. Second-order circuits
8. Sinusoidal excitation and phasors
9. AC steady-state analysis
10. AC steady-state power
11. Single-phase Transformers
12. Laplace Transforms

Effective Date of Course Content Summary (Month, Date Year): May 2009