

J. Sargeant Reynolds Community College
Course Content Summary

Course Prefix and Number: EGR 123

Credits: 2

Course Title: Introduction to Engineering Design

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

Introduces the fundamental knowledge and experience needed to understand the engineering design process through the basics of electrical, computer, and mechanical systems. Includes the completion of a project in which a specified electromechanical robot kit will be analyzed, assembled and operated. Students will present project results orally and in writing. Lecture 1 hour. Laboratory 2 hours. Total 3 hours per week.

General Course Purpose: Introductory course in the Engineering AS degree program.

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

Corequisite: MTH 173

Course Objectives (Each item should complete the following sentence.)

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

- a. demonstrate an understanding of the engineering design process, including the basics of electrical schematics and block diagrams.
- b. construct, analyze, test and debug the series of subsystems that comprise a programmable robot.
- c. keep records detailing their project's theory, process and results.
- d. present project results both orally and in writing.

Major Topics to be Included

- a. Overview of the engineering design process
- b. Basic circuit laws for analyzing simple circuits
- c. Behavior of solid-state devices, such as diodes and transistors in circuits
- d. Characteristics of transducers
- e. Speakers and motors
- f. Karnaugh maps and Boolean algebra
- g. Implementation of Boolean expressions using logic gates such as AND, OR, NAND and NOR
- h. Electromechanical transfer of power from motor to wheels
- i. Electrical schematics and block diagrams

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