MOHAWK VALLEY COMMUNITY COLLEGE

UTICA AND ROME, NEW YORK

COURSE OUTLINE

Electrical Circuits II

ES292

I. CATALOG DESCRIPTION:

ES292 ELECTRICAL CIRCUITS II C‑2, P‑2, CR‑3

This course covers the complete response of first and second order electrical circuits using the classical solution of differential equations and the Laplace Transform methods. It analyzes circuits containing operational amplifiers. Diodes and their applications in rectifiers and wave shaping circuits are studied. Simple transistor biasing is learned.

Prerequisites: ES291 Electrical Circuits 1. Corequisite: MA260 Differential Equations.

II. MATERIALS: Electric Circuits, Nilsson and Riedel, Current Edition

III. STUDENT LEARNING OUTCOMES:

At the conclusion of the course, the students will be able to:

1. Analyze the Behavior of Circuit Configurations and Operational Amplifiers
2. Understand Frequency Response and Filter Design
3. Perform Circuit Analysis Using Laplace Transforms
4. Apply Fourier Series Analysis Techniques
5. Understand Two-Port Networks

IV. DETAILED COURSE OUTLINE:

1. Operational Amplifiers
   1. Inverting-Amplifiers
   2. Summing-Amplifiers
   3. Noninverting-Amplifiers
   4. Difference-Amplifiers
2. Laplace Transform
   1. Functional Transforms
   2. Operational Transforms
   3. Inverse Transforms
3. Circuit Analysis with Laplace
   1. s Domain
   2. Transfer Function Analysis
   3. Impulse Function Analysis
4. Frequency Selective Circuits and Active Filters
   1. Low-Pass Filters
   2. High-Pass Filters
   3. Bandpass Filters
   4. First-Order Filters
   5. Op Amp Filters
   6. Higher-Order Filters
5. Fourier Series and Transform
   1. Fourier Series Analysis
   2. Power and RMS Calculations
   3. Amplitude and Phase Spectra
   4. Laplace and Fourier Transforms
   5. Fourier Transform Properties
   6. Circuit Applications
6. Two-Port Circuits
   1. Terminal Equations
   2. Two-Port Parameters
   3. Two-Port Analysis
   4. Interconnected Two-Port Circuits

V. LABORATORY

The two-hour practicum will be used to investigate physical circuits of the type described in lecture, utilize a variety of measuring devices, and simulate circuits computationally.