ELEG 3903 – Circuits and Machines

Credits and Contact Hours

Three credit hours, 45 hours of instructor contact

Instructor's Name

Robert Saunders

Textbook

Fundamentals of Electrical Engineering and Technology, Authors: William D. Stanley; John R. Hackworth; Richard L. Jones, Published by Cengage

Specific Course Information

a. Catalog Description:
   Basic electrical principles and circuits; Introduction to sinusoidal steady-state analysis of electric circuits, active, reactive, and complex power; balanced three-phase circuits; Steady-state analysis of electric machines and transformers. Introduction to power electronics for machine speed control and alternative.

b. Prerequisite: MATH 2564 and PHYS 2074

c. Service course

Specific Goals for the Course

1. Specific outcomes of instructions:
   After completing this course, engineering students should:
   - Be able to determine the electrical basic terminal characteristics, efficiency and voltage regulation of electric machines and transformers.
   - Understand speed regulation and torque characteristics of electric machines.
   - Understand difference between motor and generator operation.
   - Understand different motor types and controls.
   - Understand the basic operating principles of power electronics converters.

Lecture Topics (class time: 75 minutes)

- Introduction to Circuit Theory (1 class)
- Circuit Elements (4 classes)
- Simple A.C. Resistive Circuits (3 classes)
- Techniques of Circuit Analysis (2 classes)
- Inductors and Capacitors (2 classes)
- A.C. Power and power factor (3 classes)
- Single and Three phase Transformers (8 classes)
- Three Phase Synchronous Generators (3 classes)
- Induction Motors (5 classes)
- Other motor types (5 classes)
- Introduction to Solid State control of Motors (5 classes)
- Introduction to Alternate Energy and Storage (4 classes)