

ELC 135
ELECTRICAL MACHINES I

COURSE DESCRIPTION:

Prerequisites: ELC 112 or ELC 131

Corequisites: None

This course covers magnetic circuits, transformers, DC/AC generators, and a review of the three-phase circuit fundamentals, including power factor. Topics include magnetic terms and calculations, transformer calculations based on primary or secondary equivalent circuits, and generator regulation and efficiency calculations. Upon completion, students should be able to perform regulation and efficiency calculations for DC/AC single- and three-phase transformer and generator circuits. Course Hours Per Week: Class, 2. Lab, 2. Semester Hours Credit, 3.

LEARNING OUTCOMES:

A student that successfully completes this course will be able to:

- a. Understand characteristics of AC theory.
- b. Understand the operating characteristics of AC and DC motors and generators.
- c. Understand the fundamentals of transformer operation and connection.
- d. Understand motor starting and speed control characteristics.

OUTLINE OF INSTRUCTION:

- I. Review of Ohm's Law and fundamental principles of AC & DC circuit components
 - A. Voltage, current and resistance
 - B. Volt-amps, watts and vars
 - C. Resistors, inductors and capacitors
 - D. Magnetic induction
- II. DC generators and motors
 - A. Principles of DC generation
 - B. Series wound, shunt wound and compound wound motors
- III. AC generators and motors
 - A. Principles of AC generation
 - B. Single phase motors: split phase, capacitor start and capacitor run
 - C. Three phase motors: synchronous, squirrel cage and wound rotor
 - D. Universal motors

- IV. Transformer fundamentals
 - A. Principles of transformer action
 - B. Single phase, three phase, isolation, instrument and autotransformers

REQUIRED TEXTBOOK:

Herman, Stephen L. Delmar's Standard Textbook of Electricity. 3rd ed. 2004.

STATEMENT FOR STUDENTS WITH DISABILITIES:

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from a disability services counselor within the first two weeks of class. Likewise, students who potentially require emergency medical attention due to any chronic health condition are encouraged to disclose this information to a disability services counselor within the first two weeks of class. Counselors can be contacted by calling 686-3652 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1309.