

University of Toledo

Electrical Engineering Technology

Master Syllabus

Course Title: Electric Power Systems

Course Code & Number: EET-4350

Credit Hour Total: 4

Weekly Contact Lecture Hours: 3

Lab Contact Hours: 2

Prerequisite: EET 1020, ENGT-3020

Texts: Schaum's Outlines – Electric Machines and Electromechanics, 2nd edition, Syed Nasar, 1997
Schaum's Outlines – Electric Power Systems, 1st edition, Syed Nasar, 1981

Course Coordinator: Evans

A. Course Description

This course constitutes a study of AC-DC machines, including transformers, power transmission and the regulations governing them as specified by industry and the National Electrical Code.

B. Related Program Outcomes:

ABET/Student Outcomes

- a. An understanding of the analytical and laboratory skills associated with electrical engineering technology, as evidenced by analyzing machine models under different loading conditions in homework and exams.
- b. An ability to apply current knowledge and adapt to emerging applications of mathematics, science and technology, as evidenced by the use of mathematical equations to analyze electronic machines and transformers in homework and exams.
- c. An ability to conduct, analyze and interpret experiments concerning electrical engineering technology, as evidenced by data collection and analysis in lab reports.

EET Program Outcomes

None

C. Course Objectives:

1. To study the importance and relevance of Maxwell's equations.
2. To study the construction and operation of DC motors and Generators.
3. To study the selection and control of DC motors.

4. To study the construction, characteristics and selection of induction motors.
5. To study the electrical characteristics of transformers.
6. To study the classification and selection of solenoids.
7. To study the operation and selection of servo and stepper motors.
8. To use the knowledge of math and science in studying the loading conditions of machines and transformers.
9. To enhance creativity through innovative project designs.
10. To Integrate real life applications and latest technology into labs and projects.
11. To connect motors and generators in the laboratory and make performance measurements.
12. To graph experimental data from motor tests and present the results in a written and/or oral report.
13. To have a better understanding of the importance of fault calculations and one-line diagrams.

D. Course Outline – Major Content Areas

- Maxwell's Equations
- RMS Derivation
- AC Steady State
- AC Power
- Magnetic equations
- Transformers
- Solenoids
- Motor Circuits
- AC Motor fundamentals
- DC Motor fundamentals
- Servo and stepper motors
- One-line and power distribution
- Power transmission

E. Major Laboratory Topics

- Magnetic Saturation.
- DC Generators.
- DC Motors.
- Efficiency of DC machines.
- Motor Speed Control.
- Synchronous Alternators.
- AC Voltage Regulation.
- Transformers
- Three Phase Transformers.
- Induction Motors.
- Stepper Motors