

ELEG 3303 - ELECTROMECHANICAL ENERGY CONVERSION

Spring Semester, 2000

Catalog Data: ELEG 3303 Electromechanical Energy Conversion. 3 credit hours.
1995-96 Introduction to electromechanical systems involving electric machines. Steady state analysis of transformers, induction machines, synchronous machines, and DC machines. Introduction to control of electric machines using power electronics. Speed control of DC machines. Prerequisite: ELEG 2113 and PHYS 2073 (or ELEG 3903 and consent).

Textbook: Turan Gönen, Electrical Machines, Power International Press, 1998.

References: D. Zorbas, Electric Machines: Principles, Applications and Control Schematics, West Publishing Co., 1989

G. R. Slemon, Electric Machines and Drives, Addison-Wesley Publishing Co., 1992.

Coordinator: Juan Carlos Balda, Professor of Electrical Engineering

Goals: This course is designed to introduce undergraduate electrical engineering students to applications of electromechanical energy conversion involving dc machines, transformers, induction machines, and synchronous machines so that they will be able to apply and use these equipment.

Prerequisites by Topic:

1. DC circuit analysis
2. Complex numbers
3. AC circuit analysis
4. Three-phase circuits
5. Dynamics of mechanical systems

Topics:

1. DC Machines (7 classes*)
2. Transformers (6 classes)
3. Induction Machines (6 classes)
4. Synchronous Machines (6 classes)

Computer Usage:

Laboratory Projects:

See the description of ELEG 3301L – Electromechanical Energy Conversion Lab

Estimated Content:

Engineering Science: 3 credits or 100%

* Two 80-minute classes per week

Prepared by: _____ Date:

ELEG 3301L ELECTROMECHANICAL ENERGY CONVERSION LAB

Fall Semester, 2000

Catalog Data: ELEG 3301L Electromechanical Energy Conversion Lab. 1 credit hour.
2000-2001 This course is the associated laboratory component of ELEG 3303 - Electromechanical Energy Conversion. The following topics are covered: three-phase measurements, no-load, short-circuit and load tests of transformers, no-load, blocked-rotor and load tests of induction machines, no-load and load characteristics of dc machines and synchronous machines, and speed control of induction machines. Co-requisite: ELEG 3303.

Textbook: Instructor notes.

References: Turan Gönen, Electrical Machines, Power International Press, 1998.

Coordinator: Juan Carlos Balda, Professor of Electrical Engineering

Goals: This course is designed to complement the theoretical concepts covered in ELEG 3303 by performing a series of associated laboratory experiments.

Prerequisites by Topic:

1. Three-phase circuits
2. Transformers
3. Induction machines
4. Synchronous machines
5. DC machines

Laboratory Experiments:

1. DC generators.
2. DC motors.
3. Three-phase measurements.
4. Single-phase transformers: no-load, short-circuit and load tests.
5. Induction motors: no-load, blocked-rotor and load tests.
6. MATLAB/Simulink™ experiment: start up of an induction motor.

Computer Usage:

MATLAB/Simulink™

Estimated Content:

Engineering Science: 1 credit or 100%

Prepared by: _____ Date: _____