

EEL4213L - Energy Conversion Lab

Three Credits, Two hours, Engineering Topic.

Instructor: Dr. Imtiaz Parvez.

Textbook: Electromechanical Energy Devices and Power Systems. Zia A Yamayee & Juan L. Bala, Jr.

Specific Course Information:

Fundamental understanding of electrical power systems, transformers, AC circuits, DC machines, synchronous machines, and induction motors.

Specific Goals for the Course

a. Specific outcomes of instruction

Upon successful completion of this course, the student will:

- 1.To make a connection between the theoretical elements of power system components and the practical aspects of their technical performance, thus complementing the Power Systems I course.
- 2.To enhance the skills of writing professional lab reports.
- 3.To encourage cooperation and teamwork among students, thus reinforcing the social aspect of learning that is implicit in the practice of scientific inquiry.

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

In this course the student will have to show

- (a) an ability to apply knowledge of mathematics, science, and engineering (X)
- (b) an ability to design and conduct experiments (simulations), as well as to analyze, interpret data (X)
- (c) an ability to design a system, component, or process to meet desired needs (X)
- (d) an ability to function in multi-disciplinary teams (N/A)
- (e) an ability to identify, formulate, and solve engineering problems (homework) (X)
- (f) an understanding of professional and ethical responsibility (N/A)
- (g) an ability to communicate effectively (through project reports) (N/A)
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context (N/A)
- (i) a recognition of the need, and an ability to engage in life-long learning (N/A)
- (j) a knowledge of contemporary issues (N/A)
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (X)
- (l) a knowledge of probability and statistics (N/A)

Brief list of the topics to be covered

- 1.Transformers ratios
- 2.Open circuit and short circuit Test of Transformer
- 3.Transient Stability Analysis (Time-domain)
- 4.Wound rotor asynchronous machine operating in both phase-shifting transformer & frequency converter mode
- 5.Determining the asynchronous machine's steady state model parameters -

Induction motor with no-load

6.Parameter identification for the steady-state synchronous machine model

7.Synchronous generator, not connected to the grid, feeding a passive load

GRADING:

Course Requirements	Weight
Reports	30%
Midterm Examination	30%
Attendance & Participation	30%
Final Exam	10%
Overall Grade	100%

Conversion of Numerical Grade to Letter Grade

Letter Grade	GPA
A	4
A-	3.67
B+	3.33
B	3
B-	2.67
C+	2.33
C	2
C-	1.67
D+	1.33
D	1
D-	0.67
F	Failure
F0	Failure based on non-attendance