The University of Texas at Tyler
Department of Electrical Engineering

Course: EENG 5317 – Power Electronics

Syllabus

Catalog Description:

AC-DC converters; Inverters, AC voltage controllers; DC-DC Converters; Speed torque characteristics of motors and loads; Adjustable speed drives; Introduction to HVDC. Prerequisite: EENG 4310 Electric Power Systems. Three hours of lecture per week.

Prerequisites: EENG 4310 (or equivalent)

Credits: 3 (3 hours lecture, 0 hours laboratory per week)

Text(s): M. H. Rashid, Power Electronics: Circuits, Devices, and Applications, Prentice Hall, 4th ed., 2014.

Additional Material: Instructor's Lecture Notes

Course Coordinator: Hassan El-Kishky

Topics Covered: (paragraph of topics separated by semicolons)

Intro to Power Systems
Uncontrolled Rectifier Circuits
Power Quality and Transformer Utilization Factor
Energy Recovery Techniques
Full Converters (Controlled Rectifier Circuits)
Semi-Converters
Effect of Source Inductance
Inverters
AC Voltage Controllers
Characteristics of Motors and Loads
Thyristor Commutation Techniques
DC-DC Choppers
Intro to HVDC

Evaluation Methods: (only items in dark print apply):

1. Examinations / Quizzes
2. Homework
3. Report
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Objectives[1]: By the end of this course students will be able to:

1. Analyze uncontrolled rectifier circuits [1,4,5]
2. Analyze and design (conceptual) diode circuits and rectifiers [1,4,5]

3. Analyze and design (conceptual) single-phase controlled rectifier circuits (converters) [1,4,5]
4. Analyze three-phase controlled rectifier circuits [1,4,5]
5. Analyze AC voltage controllers and static switches [1,4,5]
6. Analyze DC choppers [1,4,5]
7. Analyze and design simple AC and DC drives controllers [1,4,5]
8. Analyze simple HVDC system [1]

[1] *Numbers in brackets refer to method(s) used to evaluate the course objective.*

Relationship to Program Outcomes (only items in dark print apply)[2]: This course supports the following Electrical Engineering Program Outcomes, which state that our students will:

1. Breadth and Depth: Students will be able to apply knowledge at a graduate level in two of the following areas: electronics, power systems, controls, advanced engineering. [1-8]
2. Modern Engineering Tools: Students will be able to use modern engineering tools for analysis and design as applied to engineering problems. [2,3]
3. Advanced Engineering Mathematics: Students will be able to apply principles of advanced engineering mathematics including probability and statistics to engineering. [1-8]
4. Systems Design: Students will be able to apply systems design approaches including modeling and simulation of interacting sub-systems to complex engineering problems.
5. Design Methods: Students will be able to demonstrate application of design methodology by comparing and evaluating solutions to engineering problems.
6. Communication Skills: Students will demonstrate effective oral, visual and written communication skills from a technical perspective [7].

[2] *Numbers in brackets refer to course objective(s) that address the Program Outcome.*

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:	0	hours
Engineering Sciences and Design:	3.0	hours
General Education Component:	0	hours

Prepared By: Hassan El-Kishky Date: 01/09/2018