

**The University of Texas at Tyler**  
**Department of Electrical Engineering**

**Course: EENG 5317-040 – 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:** Tariq Masood

**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<sup>1</sup>:** 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]

<sup>1</sup>Numbers in brackets refer to method(s) used to evaluate the course objective.

Relationship to Program Outcomes (only items in dark print apply)<sup>2</sup>: 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].

<sup>2</sup>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: Tariq Masood

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