

King Fahd University of Petroleum and Minerals
Electrical Engineering Department

EE460: Power Electronics

Dr. Mahmoud Kassas
First Semester 2009-2010 (091)

A. Course Information

Text Book:	Power Electronics: Circuits, Devices and Applications” 3 rd edition, by Rashid, M. H.				
	Name, Email address	Office	Phone	Class meeting (59-2018)	Sections
Instructors:	Dr. Mahmoud Kassas <i>mkassas@kfupm.edu.sa</i>	59/1081	2271	Su-Tu 08:30- 09:45AM	1
Grading:	Attendance, Assignments and Quizzes 15% (2%, 3%, & % 10)	Projects 10%	Two Majors 30%		Final 25%
	First Major	Second Major	Projects Due Dates	Final	
Exams Dates:	Wednesday Nov. 11, 2009	Wednesday, Jan. 13, 2009	Tuesday Jan 26, 2010 At 8:30AM	Wednesday Feb. 3, 2010 At 7:00PM	
Exams Times:	2:00-3:30 pm	8:00-9:30 pm			
Exams Places:	2018	2018			
Important Dates:	Last day to drop the course without a permanent record	Last day to drop the course with “W” grade		Last day to drop all courses with “W” Thru Registrar’s office.	
	Oct. 14, 2009	Nov. 11, 2009		Dec. 23, 2009	
Field Trip	To be arranged later				

Course Objectives:

After successfully completing the course, the students will be able to:

- Understand the theory and methods for analysis and design of power electronics circuits,
- Applications of solid-state devices for the control and conversion of electric energy.
- Know how to use design and simulation software such as Pspice and Matlab.

Outcome Coverage:

- (a) *An ability to apply math, science and engineering knowledge.* The homework, project, quizzes and exams require direct applications of mathematical, scientific, and engineering knowledge to successfully complete the course.
- (b) *An ability to design and conduct experiments, as well as to analyze and interpret data.* The homework and project require student to design, conduct simulations using Pspice or MATLAB and analyze simulation data.
- (c) *An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.* The design in the project must be checked against real world operating limits.
- (d) *Identify, formulate and solve engineering problems.* Students must be able to identify and model the system; analyze and solve control problems.
- (e) *An ability to communicate effectively.* Students are required to write a comprehensive report on the project.

- (f) *An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.* Students taking the course will learn how to use power electronics techniques and software tools such as Pspice and MATLAB for solving practical control problems.

Important Remarks:

- **Attendance:** 1/3 point will be deducted for each unexcused absence, starting from the first absence. Any student that exceeds 20% of the schedule class meeting without any official excuse will receive a grade **DN** in the course.
- **Official excuses:** All official excuses must be submitted to the instructor no later than one week of the date of the official excuse. The instructor may not accept a late excuse.
- **Academic Dishonesty:** According to the university regulations, if the instructor for any instance of academic dishonesty discovers any student, the instructor may give a failing (F) grade to the student and report it to the dean of the college.
- **Homework:** The homework assignment is to be solved completely by the students. However, homework solution will not be collected. Instead, quiz related to the homework problems is expected on Wednesdays, in the week following the homework assignment date. Homework solution can be found on the network link: [WebCT](#)

Office Hours: Sunday-Tuesday **10:00-11:00AM**, Monday **1:10-2:00PM** or by appointment.

KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS
ELECTRICAL ENGINEERING DEPARTMENT

EE 460 – Power Electronics

Tentative Schedule [091]

DATE	TOPICS	SECTIONS	HW	LABORATORY
Week 1 Oct. 3-7	Introduction to Power Electronics & Semiconductor Diodes	2.1, 2.3, 2.4, 2.5, 2.10	Ch. 2-1, 10, 12(b,c,d)	
Week 2 Oct. 10-14	Diode Circuit & Rectifiers	3.2, 3.3, 3.4,	Ch 3 1, 5, 7, 9,	Lab 0: PSpice and COM3LAB KIT Tutorial
Week 3 Oct. 17-21	Diode Circuit & Rectifiers	3.7, 3.10	Ch 3 11, 15, 21	Lab 1: Single phase half wave rectifier
Week 4 Oct. 24 - 28	Thyristors	7.2, 7.3, 7.7, 7.5, 7.9,7.10	Ch 7 1, 3	Lab 2: Three-phase bridge rectifier, (Pspice)
Week 5 Oct. 31 – Nov. 4	Controlled Rectifiers	10.4	Ch10 1, 2, 7, 8,	Lab 3 Three-phase bridge rectifier. (Experiment)
Week 6 Nov. 7 - 11 Major - I	Controlled Rectifiers	10.9	Ch 10 22, 23	
Week 7 Nov. 14 - 18	AC Voltage Controllers	11.2, 11.4,	Ch 11 1, 3, 6,	Lab 4: Single-phase controlled bridge rectifier
Week 8 Dec. 5 – Dec. 9	AC Voltage Controllers	11.5, 11.12	Ch 11 8, 9, 28	Lab 5: Three-phase controlled bridge rectifier (Pspice)
Week 9 Dec. 12 - 16	Power Transistors	4.2, 4.3, 4.7	Ch 4 1, 2, 11	Lab 6: Three-phase controlled bridge rectifier (Experiment)
Week 10 Dec. 19 - 23	DC-DC Converters	4.7, 5.2,	Ch 4 2, 3,	
Week 11 Dec. 26 - 30	DC-DC Converters	5.3, 5.4	Ch 5 4, 6	Lab 7: Single-phase AC voltage controller (Pspice)
Week 12 Jan. 02-06	PWM Inverters	6.2, 6.3, 6.4	Ch 6 2, 3,	Lab 8 Single-phase ac-voltage controller (Experiment)
Week 13 Jan. 9-13 Major-II	PWM Inverters	6.5, 6.6,	Ch 6 4,5,	Lab 9: Design of a DC chopper
Week 14 Jan. 16 – 20	PWM Inverters	6.8, 6.10, 6.11	Ch 6 6	Lab 10: Three-phase voltage source inverter
Week 15 Jan. 23 – 27	Resonant Pulse Inverters	8.2.1, 8.2.2	Ch 8 1, 3	Lab Final