

Cleveland State University
Department of Electrical and Computer Engineering

EEC 474/572 Power Electronics II
Fall Semester 2002

Catalog Description: **EEC 474/572 Power Electronics II.**

Prerequisite: EEC 470. Advanced Course in Power Electronics: switching function representation of converter circuits (DC-DC, AC-DC, DC-AC and AC-AC).

Textbook

Class Notes

Reference:

N. Mohan, T. M. Undeland and W. P. Robbins, **Power Electronics: Converters, Applications and Design**, Second Edition, McGraw-Hill, 1995.

Coordinator:

Dr. A. V. Stankovic, Assistant Professor.

Course Objectives:

To deepen understanding of power converters in both theoretical and practical aspects.

Expected Outcomes

Upon completion of this course, students should be able to:

1. Design power electronics converters.

2. Solve complex problems related to different applications of power electronics converters.

Fulfills the Following Electrical Engineering Program Objectives and outcomes:

Objectives:

- 1) practice electrical engineering in power electronics.
- 2) define and diagnose problems, and provide and implement electrical engineering solutions in industry, business, and government.
- 3) communicate effectively with technically diverse audiences.
- 4) develop their knowledge beyond the undergraduate level and to keep current with advancements in electrical engineering.

Outcomes:

- (a) an ability to apply knowledge of mathematics, science, and engineering to general electrical engineering and, in particular, to power electronics.
- (b) an ability to design a system, component, or process to meet desired needs.
- (c) an ability to identify, formulate, and solve electrical engineering problems.
- (d) a recognition of the need for, and an ability to engage in life-long learning.
- (e) an ability to use the techniques, skills, and modern engineering tools necessary for electrical engineering practice.

Contribution of Course to Meeting the Professional Component:

Math & Basic Science: 1 credits; Engineering Topics: 3 credits; General Education: 0 credits

Prerequisite by Topic:

Basic knowledge of power electronic converters such as:

1. AC/DC
2. DC/AC
3. DC/DC
4. Fourier analyses.

Week	Topics:	Reading
1 (Aug 26-30)	Review of Basic Power Electronic Circuits; AC/DC Converters, DC/DC Converters	Chapter 6, 7
2 (Sep 2-6)	Labor Day Holiday September 2 Review of Basic Power Electronic Circuits; Chapter 8 DC/AC Converters	
3 (Sep 9-13)	Switching Function Description of Power Converter Circuits	Class Notes
4 (Sep 16-20)	Power Converter Circuits Analyzed by Switching Functions; DC/DC Converters	Class Notes
5 (Sep 23-27)	Quiz Test #1 Lab #1 DC/DC Converters	
6 (Sep 30-Oct 4)	Lab #1 DC/DC Converters	
7 (Oct 7 –11)	Lab #1 DC/DC Converters Power Converter Circuits Analyzed by Switching Functions; DC/AC Converters	Class Notes
8 (Oct 14-18)	Columbus Day Holiday – October 14 Power Converter Circuits Analyzed by Switching Functions; DC/AC Converters	Class Notes
9 (Oct 21-25)	Midterm Test #2 Power Converter Circuits Analyzed by Switching Functions; DC/AC Converters	Class Notes

10 (Oct 28-Nov 1)	Lab #2 DC/AC Converters	
11 (Nov 4-8)	Lab #2 DC/AC Converters	
12 (Nov 11-15)	Veteran's Day Holiday-November 11 Power Converter Circuits Analyzed by Switching Functions; AC/DC Converters	Class Notes
13 (Nov 18-22)	Power Converter Circuits Analyzed by Switching Functions; AC/DC Converters	Class Notes
14 (Nov 25-29)	Project Presentations	
15 (Dec 2-6)	Project Presentations	

Grading:

15% - Quizzes
30% - Midterm
40% - Final
15% - Projects and Lab Experiments

Homework:

Has to be turned in on time.

Laboratory Projects:

Two Lab Experiments.

Computer Usage:

PSpice
Software: MATLAB

Prepared by:

Dr. A. V. Stankovic Date: 08 25 2002

There will be no make up quizzes, mid-term and final exams unless a student turns in a written excuse from a physician or an employer.