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

Reference:


Coordinator:

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.
<table>
<thead>
<tr>
<th>Week</th>
<th>Topics:</th>
<th>Reading</th>
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<tbody>
<tr>
<td>1</td>
<td>Review of Basic Power Electronic Circuits; AC/DC Converters, DC/DC Converters</td>
<td>Chapter 6, 7</td>
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| 2    | Labor Day Holiday September 2  
Review of Basic Power Electronic Circuits; Chapter 8  
DC/AC Converters | |
| 3    | Switching Function Description of Power Converter Circuits | Class Notes |
| 4    | Power Converter Circuits Analyzed by Switching Functions; DC/DC Converters | Class Notes |
| 5    | Quiz Test #1  
Lab #1 DC/DC Converters | |
| 6    | Lab #1 DC/DC Converters | |
| 7    | Lab #1 DC/DC Converters  
Power Converter Circuits Analyzed by Switching Functions; DC/AC Converters | Class Notes |
| 8    | Columbus Day Holiday – October 14  
Power Converter Circuits Analyzed by Switching Functions; DC/AC Converters | Class Notes |
| 9    | 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  
Veteran’s Day Holiday-November 11  
(Nov 11-15)  
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
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.