Catalog Description: EEC 474 Power Electronics II.

Pre-requisite: EEC 470.
Advanced Course in Power Electronics: switching function representation of converter circuits (DC-DC, AC-DC, DC-AC and AC-AC), resonant converters, adjustable torque drives, field oriented induction motor control, residential and industrial applications, utility applications, power supply applications.

Textbook: Class Notes


Coordinator: Dr. A. V. Stankovic, Professor of Electrical Engineering and Computer Science

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: 2 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.

Topics:
1. Review of basic Power Electronics Concepts 8
2. Switching Function Representation 6
3. Switching Function Representation of DC/DC Converters 6
4. Switching Function Representation of DC/AC Converters 6
5. Switching Function Representation of AC/DC Converters 6
6. Discussions 3
7. Midterm 2
8. Power Electronics applications 8
Total 45

Homework: Has to be turned in on time.
(3 projects and 3 homework assignments)

Computer Usage: PSpice
Software: MATLAB
Saber

Prepared by: Dr. Ana V. Stankovic
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