Electrical Engineering 572: Power Electronics

Course Description: 3 cr. U/g. power diodes and transistors; MOSFETs, SCRs; IGBTs; ac/dc rectifiers; dc/dc converters; dc/ac inverters; dc power supplies. Prereq: sr st; eleceng 335(c) or 332(p).

Textbook: Power Electronics: Converters, Applications, and Design, N. Mohan, T. M. Undeland, W. P. Robbins, John Wiley and Sons, Inc., ISBN: 0-471-22693-9.

Prerequisites by Topics:

- Concepts of linear circuits
- Concepts of solid state circuits
- Circuit analysis

Course Learning Outcomes:

- Students will be able to analyze single- and three-phase rectifier circuits.
- Students will be able to analyze single-phase ac/ac converters.
- Students will be able to analyze dc/dc converters and dc power supplies.
- Students will be able to analyze single-and three-phase inverters.
- Students will be able to use circuit analysis software (PSpice, Psim, or MATLAB) to simulate power electronic converters.
- Students will have an introductory knowledge of advanced power electronic concepts such as resonant and multi-level circuits.

Topics Covered:

- Basic concepts of power analysis and harmonic calculation
- Ac/dc converter circuits
- Ac/ac converter circuits
- Dc/dc converter circuits
- Dc/ac converter circuits

Class/Laboratory Schedule: 42 lectures

Contribution of Course to Meeting the Professional Component:

This course contributes to the engineering sciences component of the curriculum. Students learn fundamental electrical engineering science concepts related to electronic power conversion.

Relationship to Program Objectives:

Program Outcome	Explanation
iii.	Students will perform modeling and analysis of power electronic converters.
iv.	Students will solve open-ended problems in course projects.

vi,vii.   Students will use PSpice, Psim, or MATLAB to analyze power electronic circuits.

Prepared by: Adel Nasiri, November 01, 2007.

Methods of Assessment:

- Graded homework
- Graded examinations
- Graded term project
- Course evaluation by students
- Instructor judgment

Resources Commonly Available:

- Instructor
- PSpice, Psim, and MATALB software

Desirable Student Competencies:

- Algebra, phasor analysis