

Northeastern University
Department of Electrical and Computer Engineering
ECE G100/U684 Power Electronics

ECE G100/U684 Syllabus

Instructor:

Alex Stankovic, 303 Dana, 373-3007, astankov@ece.neu.edu

Subject text:

J.G. Kassakian, M.F. Schlecht, G.C. Verghese, *Principles of Power Electronics*, Addison–Wesley, 1991. (available at the NU bookstore).

Class Hours:

TF 3:25-5:05 pm,

Office Hours:

TF 5-6 pm, or by appointment.

Grading policy:

For the undergraduates, there will be a midterm exam (50 % of the total grade) and a final exam (50 % of the total grade) in this course. For graduate students, in addition to the midterm and final (which will be graded separately, each counting 33%), each student will make a 15-20 minute class presentation of a term project, mostly a topical review of the literature (toward the end of the course). All undergraduate students who get an equivalent grade B+ or better at the midterm examination will have the option to complete a term project *instead* of the final. All projects are to be completed individually, and possible team projects require explicit permission from the instructor.

Homework:

There will be weekly and biweekly homeworks in this course. They will be graded, and returned to you. Although the homework does not contribute directly to your final grade, it is essential in building understanding of the course material and preparing for the examinations. I am asking you to do the homeworks by yourself, and collaboration with other students is not allowed. Late problem sets will not be accepted. Under no circumstances are you allowed to use solutions from the previous years.

Tentative Schedule

Week 1: Introduction and an overview (Ch. 1 and 2).

Week 2: Basic functions and circuit topologies (Ch. 2).

Week 3: High-Frequency Switching Converters (Ch. 6)

Week 4: High-Frequency Switching Converters and Intro to Rectifiers (Ch. 6 & 3).

Week 5: Rectifier Circuits, Bridge and Polyphase Rectifiers (Ch. 3 and 4).

Midterm exam

Week 6: Phase Controlled Converters (Ch. 5)

Week 7: Variable Frequency DC/AC Converters and Harmonic Reduction (Ch. 8).

Week 8: Resonant Converters (Ch. 9).

Week 9: AC/AC Converters and Magnetic Components (Ch. 10 and 20).

Week 10: Introduction to Power Converter Dynamics and Control (Ch. 11)