

ELEG 4323 – SWITCH MODE POWER CONVERSION

Credits and Contact Hours

Three credit hours, 45 hours of instructor contact

Instructor's Name

Simon S. Ang, PhD, PE, Professor of Electrical Engineering

Textbook

“Power-Switching Converters-Third Edition,” Simon S. Ang and Alejandro Oliva, 2010

Specific Course Information

- a. Catalog description
Basic switching converter topologies: buck, boost, buck-boost, Cuk, flyback, resonant; pulse-width modulation; integrated circuit controllers, switching converter design case studies; SPICE analyses of switching converters, state-space averaging and linearization; and switching converter transfer functions.
- b. Pre-requisites or co-requisites: ELEG 3223 and ELEG 3123
- c. Required or Technical Elective: None

Specific Goals for the Course

1. Specific outcomes of instructions

The objective of this course is to introduce basic concepts in switch mode power conversion, with the main objective that the students will be able to design a working switching converter according to specifications.

2. Indicate the student outcomes listed in Criterion 3 addressed by the course

- (a) Students are required to apply mathematics in analyzing switching converter circuit performance.
- (c) Students are required to design switching converter circuits to meet performance specifications.
- (e) Students are required to solve engineering problems related to switching converters.
- (1) Students are required to apply mathematics through differential equations in analyzing and designing switching converter circuits.

List of Topics

1. Introduction to switching converters (2 classes)
2. Basic switching converter topologies (12 classes)
3. Control scheme of switching converters (6 classes)
4. Simulation of switching converters (3 classes)
5. Resonant converters (7 classes)
6. Dynamic analysis of switching converters (9 classes)
7. Other topics (2 classes)