**ELC 383/Electronics II**

(occasionally)

#### 2010-11 Catalog Data: ELC 383/Electronics II 1 course unit

*Prerequisite:* ELC 251

The continuation of ELC251 covering the analysis and design of electronic circuit and systems including topics such as – amplifier design, advanced electronic building blocks, diode rectification, line-frequency AC-DC converters, regulated DC supplies, and frequency-controlled inversions.

**Textbook:**

Microelectronic Circuits, 6th Edition by Abel S. Sedra and Kenneth C. Smith, Wiley 2003

Power Electronics: Converters, Application, and Design by Ned Mohan, Wiley 1995

**Course Objectives:\***

Objective 1: To analyze and design IC amplifier stages using field-effect transistor (FET) technology. [a, c, e, k, l]

Objective 2: To analyze and design various basic power electronic converters. [a, e]

Objective 3: To examine the practical application of amplifiers and power electronics. [a, e, k]

**Topics Covered:**

1. Review of Electronics I
2. Design of IC Amplifier Stages
   1. Transistor-Level Design
3. Basics of Power Electronics
4. Rectifiers
   1. Basic DC Power Supply
5. AC-DC Converters
   1. Firing Angle and Voltage Regulation
6. DC-DC Converters
   1. Buck, Boost, Buck-Boost, Cuk, H-Bridge
7. Inverters
   1. H-Bridge
   2. Control via Pulse Width Modulation
   3. Basic Motor Control Concepts
8. Research and Advanced Topics
   1. Harmonic Cancellation

**Evaluation:**

A. Quizzes/Examinations

B. Homework

C. Design Project Reports

**Performance Criteria:\*\***

Objective 1: Students will be able to analyze and design single stage IC amplifiers. [A, B]

Objective 2: Student will be able to design basic power electronic converters. [A, B, C]

Objective 3: Students will be able to examine real-life problems and formulate electronic-based solutions. [A, B, C]

**Contribution of course to meeting the professional component:**

Engineering Science: 70%

Engineering Design: 30%

**Prepared by:** Anthony Deese, Ph.D., Assistant Professor **Date:** October 2011

\*Lower case letters in brackets refer to the student outcomes of the Electrical/Computer Engineering Program

\*\*Upper case letters in brackets refer to the evaluation methods used to assess student performance