**ELEN 4220 - Power Electronics for Renewable Energy Systems**

**Class Schedule:** 3 Credit course, meeting the equivalent of 3-50 minute class periods per week.

**Course Coordinator**: Dr. Nathan Weise

**Course Materials:**

**Required:** Power Electronics: Converters, Applications and Design by N. Mohan et al, 3rd Ed., Wiley, 2002.

**Course Description:**

Fundamental concepts, techniques, and methods for design and analysis of power electronic systems. Modeling of semiconductor switching devices for use in power electronic systems. Practical aspects and power electronic conversion techniques for rectifiers, DC-to-DC converters, DC-to-AC inverters and their applications in power electronic systems.

**Prerequisites**: ELEN 2020, ELEN 3020

**Selected Elective** in Power and Energy Systems area.

**Contribution to Professional Component**:

Engineering Science 50%

Engineering Design 50%

**Course Goals:**

To enable the student to get a good understanding of the fundamental concepts, techniques, and methods for design and analysis of power electronic systems, including those used in renewable energy systems.

**Course Objectives:**

*By the end of this course, you should be able to ....*

* Model of semiconductor switching devices for use in power electronic systems.
* Understand the practical aspects and power electronic conversion techniques for:
  + - Rectifiers, DC-to-DC converters, DC-to-AC inverters and their applications in power electronic systems

**Contribution to Program Objectives**:

Partial fulfillment of Criterion 3 objectives A, B, C, E, G, K.

**Course Topics:**

* Fundamental concepts 20 %
* Techniques for design and analysis of power electronic systems 20%
* Rectifiers design, analysis and applications 15%
* DC-to-DC converters design, analysis and applications 15%
* DC-to-AC inverters design, analysis and applications 30%