**ELEN 3025 Instrumentation Laboratory**

**Class schedule:** 1 hour lecture and 3 hours lab equivalent to two credits

**Course Coordinator:** Susan C. Schneider

**Course Materials:**

* Stanley Wolf & Richard Smith, Student Reference Manual for Electronic Instrumentation Laboratories, 2nd ed., Prentice Hall, 2004
* John Essick, Hands-on Introduction to LabVIEW for Scientists and Engineers,3rd. ed., Oxford University Press, 2016.
* ELEN 3025 Parts Kit
* Meterman 15XP DMM, or equivalent
* College of Engineering, Laboratory Notebook (optional, but highly recommended)
* Texts from EECE 3010 and ELEN 2020
* Microsoft OneNote
* Supplies: Cable Kit, EECE Tool Kit, EECE Auxiliary Parts Kit, and needle nose pliers

**Course Information**

Develops familiarity with typical electronic instruments and terminology. Combines theory with experience to analyze and design electrical networks. Learning experimental technique and documentation.

**Prerequisites:** EECE 3010, ELEN 2020, and EECE 2015.

**Elective in** COEN Hardware area (depth only – taking this **and** ELEN 3035 counts as a single breadth course)

**Contribution to Professional Component:**  Engineering Science 50% and Engineering Design 50%.

**Course Goals:**

* Apply theory from previous courses including EECE 3010, EECE 2010, and ELEN/COEN 2020.
* Become familiar with automated Data Acquisition software including LabVIEW.
* Design and conduct experiments.
* Analyze and interpret data.
* Prepare written documentation including formal written reports.

**Course Objectives:**

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

* Build, test, troubleshoot, and evaluate simple analog and digital circuits. These circuits will include active electronic components such as diodes, transistors, operational amplifiers, and digital gates.
* Use the available equipment including the DMMs, Oscilloscope, Function Generator, Computer, and Power Supply.
* Use computer software such as Multisim, Excel, and LabVIEW to design and evaluate specified circuits and applications.
* Explain the differences in design specifications and actual performance.
* Write a report that effectively communicates the objective, the design procedure, the experimental results, and the conclusion for a particular laboratory assignment.

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

Course Topics

Lab 1: DC Measurement Fundamentals & Error Analysis

Lab 2: AC Measurement Fundamentals & Error Analysis

Lab 3: Steady-State and Transient Analysis

Lab 4: Active Filter Design

Lab 5: Diode Applications

-------: Practical Exam

Lab 6: Linear Power Supply

Lab 7: DAQ-1 Introduction

Lab 8: DAQ-2 DC Measurement (Diodes)

Lab 9: DAQ-3 DC Measurement (Transistors)

Lab 10: Transistor Amplifier Design - 1

Lab 11: DAQ-4 Transistor Amplifier Design – 2 and AC Measurement (Bode Plot)

Lab 12: (topic to be determined, if schedule permits)