**ECE 2000: Electrical and Computer Engineering Principles**

***Credits and contact hours:*** 3 Credits (Flipped Format: One 75-minutes lecture per week plus online course modules on HuskyCT)

***Instructor:*** David Tonn

***Textbook:*** G. Rizzoni and J. Kearns, Principles and Applications of Electrical Engineering, McGraw-Hill, 6th Edition, ISBN 978-0-07-352959-2.

a. *Other supplemental materials*: Selected reference materials/articles posted online

***Specific course information*:**

a. *Catalog Description*: Basic concepts of circuit analysis as applied to electronic circuits and electromechanical devices, including measuring instruments.

b. *Prerequisite*: PHYS 1402Q or 1502Q or 1230 or 1530, which may be taken concurrently. Recommended preparation: MATH 2410Q. This course and ECE 2001/W may not both be taken for credit. Intended for non-ECE majors.

c. *Required, elective, or selected elective:* Required for ME Majors, elective for other non-ECE majors.

***Specific goals for the course*:**

a. *Specific outcomes of instruction*: Students will be able to

- Apply the fundamental laws of circuit analysis (e.g. Ohm's Law, Kirchhoff's Laws) to the analysis of AC and DC series and parallel circuits
- Apply intermediate methods of circuit analysis (e.g. Node Analysis, Thevenin's Theorem) to AC and DC circuits
- Communicate the principles of basic RC and RL filters
- Communicate the basic principles of ideal operational amplifier circuits and practical limitations of actual amplifier circuits
- Explain the proper safe usage of digital multi-meters and oscilloscopes for measurement of electrical parameters
- Apply principles of circuit analysis to magnetic circuits for computing forces produced in moving coil, reluctance based, and permanent magnet based electromechanical actuators
- Apply principles of circuit analysis to the steady state analysis of DC motors

b. *ABET Criterion 3 Student Outcomes addressed by the course*:

**(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics**

Students learn to recognize the various kinds of components used in basic electronics and analyze them by applying techniques from mathematics, science and engineering.

**(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors**
n/a

**(3) an ability to communicate effectively with a range of audiences**
n/a

**(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts**
n/a

**(5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives**
n/a

**(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions**
n/a

**(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.**
The course is offered in a hybrid/flipped format and students use web-based modules for the theoretical treatment of the material.

***Topics covered:***

- Basic principles of DC circuit analysis
- Node Analysis, Superposition, Thevenin's and Norton's Theorems
- Capacitors and Inductors
- Principles of AC steady state analysis
- Principles of RC and RL filters
- Principles of transient analysis
- Operational amplifiers and practical amplifier limitations
- Principles of magnetic circuits
- Forces in linear electromechanical actuators
- Principles of DC motor analysis
- Concepts of AC motor operation