ENGR 2250

Division: Natural Science and Mathematics
Department: Engineering and Computer Science
Course: ENGR 2250
Title: Analog Circuits
Catalog Description:

ENGR 2250 is designed for engineering majors in their preprofessional program. This course presents the fundamentals of analog D.C. and A. C. circuits, including an introduction to circuit analysis techniques using Kirchhoff's Laws, node voltages, mesh currents, and Thevenin and Norton equivalent circuits. Both first order RL and RC circuits, and second order RLC examples are included. Also treated are sinusoidal steady state response, complex power in A.C. circuits, polyphase circuits, and magnetically coupled networks.

General Education Requirements: N/A
Semesters Offered: Fall
Credit/Time Requirement: Credit: 3; Lecture: 3; Lab: 0
Clock/Hour Requirements: 0
Offered for Non-Credit: No
Prerequisites: Calculus II (MATH 1220)

Corequisites: Analog Circuits Lab (ENGR 2255)

Justification:

This course is designed as a component of the standard preprofessional curriculum in engineering, which enables the student to transfer with junior level status into a four year engineering program. Similar courses are offered in university engineering schools. ENGR 2250 is to be taken during the sophomore year of the preengineering curriculum and will prepare the student for subsequent course work. It serves as the first course for students in electrical engineering, and as a service course for students in other engineering fields.

Student Learning Outcomes:

Upon successful completion of this course, students will:

- be able to apply previously studied math and physical principles to solve problems related to analog circuits
- have developed the skill to formulate and manipulate the mathematical models which describe circuit behavior
- demonstrate the ability to analyze analog circuits using methods and skills common to electrical engineers
- have developed a sound basis in engineering circuit theory so that he or she may be prepared to take subsequent courses in electrical engineering.

Content:

This course will include:

- circuit principles
    - Ohm's Law and Kirchhoff's Laws
    - nodal and loop analysis
    - Thevenin's and Norton's Theorems
    - the operational amplifier
- circuits containing resistors, capacitors, and inductors
    - RL and RC time constants
    - transient response and forced response
    - both transient and forced response in RLC circuits
- AC circuit analysis
    - sinusoids and phasors
    - impedance and admittance
    - steady state power calculations
    - power factor corrections for industrial loads
- magnetically coupled networks
    - linear transformers
    - ideal transformers
    - reflected impedance
- polyphase circuits
    - Wye connected versus delta connected loads and sources
    - power calculations

General Education Outcomes:

6) Apply computational skills to a variety of contexts.
Mathematical and computational skills are essential to the success of an engineering student. The student must be able to perform calculations both manually and through the use of computational software.

7) Apply scientific reasoning to a variety of contexts.
Engineering consists of the application of scientific knowledge in order to design devices and systems with a practical purpose. Thus, students must be able to utilize the discoveries of science in the solution of engineering problems.

Key Performance Indicators:

- Daily homework assignments(15-20%), quizzes(5-8%), midterm tests(50-60%), and and a final exam will be administered -- all related to the above outcomes. These will be evaluated and recorded.

Representative Text and/or Supplies:

- Nilsson, Riedel, *Electric circuits,* current edition, Prentice-Hall.
- J. D. Irwin, *Basic Engineering Circuit Analysis,* current edition, Wiley.

Optimum Class Size: 20
Maximum Class Size:

Signatures:

I hereby submit this course syllabus:

Garth O. Sorenson, MS, Associate Professor

I hereby find this course consistent with the goals and resources of the Engineering and Computer Science Department:

Garth O. Sorenson, MS, Associate Professor, Chair

I hereby find this course consistent with the goals and resources of the Natural Science and Mathematics Division:

Dan Black, EdD, Associate Professor, Dean

I have discussed the need for library resources related to this class with the person submitting the syllabus:

Lynn Anderson, MLIS, Technical Services Librarian (Main Campus)

Michelle Olsen, MLS, Campus Librarian (Richfield Campus)