

Mechanical Engineering
ME 6 Basic Electrical and Electronic Circuits
Required

Course Description

Introduction to basic electrical circuits and electronics. Includes Kirchoff's and Ohm's laws, power calculations, circuit elements, first and second order circuits, phasor analysis and opamp circuits.

Course Prerequisite

Physics 3-3L and Mathematics 3C

Text, References & Software

Fund. of Electric Circuits, by C. Alexander & M. Sadiku

Course Learning Outcomes

- 1) Apply knowledge of linear differential equations and basic device physics to circuit design.
- 2) Ability to conduct electronics experiments using laboratory equipment, analyze data.
- 3) Ability to design simple op-amp circuits to implement amplifiers and sensors interfaces.
- 4) An understanding of professional and ethical responsibility in lab team environments.
- 5) An ability to communicate effectively with lab reports.

Topics Covered

1. Kirchoff's and Ohm's laws. DC analysis.
2. Circuit elements: independent and dependent sources, R,L,C
3. Thevenin/Norton equivalent circuits
4. First order circuits
5. Operational amplifiers and application circuits
6. Impedance; low pass, high pass filters
7. second order circuits
8. AC analysis and frequency response
9. introduction to phasors

Credit units of class/laboratory Schedule:

3 units of lecture/1.hr 40 minutes/week.

1 unit lab 3 hours/week

Course Assignments

Weekly homework and lab reports

Contribution of course to meeting requirements of Criterion 5 – Curricular Requirements

This course contributes to item (b), in that it counts as four (4) units of an engineering science topic appropriate to the student's field of study, mechanical engineering.

Relationship to Program Objectives

This course most closely ties into program outcome #1, that a student should possess a solid foundation in, and be able to apply the principles of, mathematics, science, and engineering to solve problems and have the ability to learn new skills relevant to the discipline. This course prepares students to integrate basic electronic components in mechanical systems. In particular they learn the function of electronic devices and interfaces to sensors.

This course prepares students to work with laboratory equipment in graduate laboratories and provides students with a solid background in basic circuits theory and devices to that they can take the FE examination.

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