

ECE 320 Fundamentals of Electrical Engineering

Instructor: Dr. Dawen Li, Associate Professor

Office: 2005 NERC

Phone: (205) 348-9930

Email: dawenl@eng.ua.edu

Course level: Undergraduate students in engineering outside ECE major

Pre-requisite: PH 106 for basic knowledge of electricity and magnetics

Co-requisite: MATH 238 through differential equations

Lectures: TR 11:00 am – 12:15 pm, North Lawn Hall, room 2006

Office hours: TR 12:15 pm – 12:45 pm, or per appointment

Course description

This course is designed to teach engineering students who are not ECE majors the fundamental concepts and methods of time-domain and steady-state circuit analysis, electronics, and electromechanics. Topics covered include circuit fundamentals, transient analysis, AC circuit and power, frequency response, operational amplifiers, and electric machines. This course will help engineering students learn the language of ECE colleagues and prepare them to work effectively in multi-disciplinary teams.

Topics to be covered (tentative, subject to change):

Part I: Electric Circuits

1. Fundamentals (KCL, KVL)
2. Resistive network (node voltage and mesh current methods, equivalent circuits) (**Midterm exam 1**)
3. Capacitor and inductor, DC transients (**Quiz**)
4. Steady-state AC circuit analysis (phasor, impedance)
5. AC power (**Midterm exam 2**)

Part II: Electronics and Electromechanics

6. Frequency response
7. Operational amplifiers
8. Principles of electromechanics
9. Introduction to electric machines (**Final exam**)

Required textbook and course pack

1. Giorgio Rizzoni and James Kearns, *Principles and Applications of Electrical Engineering*, 6th Edition, McGraw-Hill, 2015, or 5th Edition, 2007.
2. *Course pack* from University Supply Store

Reference book (on reserve in Rodgers Science & Engineering Library):

Allan R. Hambley, *Electrical Engineering: Principles and Applications* (5th Edition), Prentice Hall, 2010

Homework and exam policy

Homework discussion in small groups is encouraged. However, each student must work through problems individually. No late homework will be accepted. Exams will be completed individually during class time, and will be closed book. If an examination is missed due to a University approved activity or documented emergency/illness, the grade of comprehensive final exam will be used in place of the missing exam score. Missed examinations due to unexcused absences receive the grade of zero. No makeup exams will be provided for any circumstances. Pop quizzes are possible to maintain class attendance and participation. Pop quizzes will count as a homework assignment in the grading process.

Grading

Homework, weekly (including pop quizzes)	10%
Quiz	10%
Midterm exam 1	25%
Midterm exam 2	25%
Final Exam	30%