

ECE 320 Fundamentals of Electrical Engineering

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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: MWF 10:00 am – 10:50 am, North Lawn Hall, room 1018

Office hours: 10:50 am – 11:20 am 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**)
3. Capacitor and inductor, DC transients (**Quiz**)
4. Steady-state AC circuit analysis (phasor, impedance)
5. AC power

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.
2. *Course pack* from University Supply Store

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. If a student misses both midterm exam and quiz, the student can choose which test will be made up via the Final Exam. The other test grade will be a 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.

Rules for all in-class exams and quizzes

1. All quizzes and tests must be completed in class and all in-class work must be individual work. No assistance from classmates or anyone outside of class is allowed in any form. If ODS testing services are used, the test must be scheduled to be taken during the same time as the rest of the class.

2. Calculators cannot have internet or wireless access of any kind. You will not be allowed to share calculators.
3. Phones, watches, earphones, or any other personal electronic device is not allowed. All these devices must be turned off and placed out of sight during class. If such device is found during an in-class test, it will be treated as academic misconduct.
4. After the start of an in-class test, students are not allowed to leave the room for any reason. Once you leave the room, your test is over. No restroom or water breaks will be allowed. So, plan accordingly.
5. During an in-class assignment, students may be asked to sit in a specific location, may be moved from one seat to another, asked to stand up, asked to roll up their sleeves, and asked to empty their pockets to verify they are not concealing electronic devices. Failure to abide by these requests will constitute academic misconduct. The instructor can also take photos and video of the class during an assignment that can and will be used to enforce the academic integrity of the classroom (these videos will not be used for any other reason).

Academic Misconduct Policy

Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing or intentional help or attempt to help, or conspiracy to help, another student. All students in attendance at The University of Alabama are expected to be honorable and to observe standards of conduct appropriate to a community of scholars. The University of Alabama expects from its students a higher standard of conduct than the minimum required to avoid discipline. When enrolled at The University of Alabama, students are expected to abide by the Academic Honor pledge. Additionally, at the discretion of the course instructor, each student will be expected to sign an Honor Pledge which reads as follows:

"I promise or affirm that I will not at any time be involved with cheating, plagiarism, fabrication, or misrepresentation while enrolled as a student at The University of Alabama. I have read the Academic Honor Code, which explains disciplinary

procedures that will result from the aforementioned. I understand that violation of this code will result in penalties as severe as indefinite suspension from the University.”

See the Academic Misconduct Policy for more information (<https://catalog.ua.edu/undergraduate/about/academic-regulations/student-expectations/academic-misconduct-policy/>). The Academic Misconduct Disciplinary Process will be followed for all academic misconduct cases.

Grading

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| Homework, weekly (including pop quizzes) | 20% |
| Quiz | 15% |
| Midterm exam | 25% |
| Final Exam | 40% |