ES 332 Electrical Engineering

Fall, 2020
Fidel
MWF*, 11:00– 11:50*

Instructor: Rene Arechiga
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Office Hours: MW 2:00 – 4:30 or by appointment

Course Description:

Catalog Description Electrical Engineering,
3 cr, 3 cl hrs **Prerequisites:** PHYS 122; MATH 132
Introduction to the fundamentals of electronics and circuits for applications (e.g., instrumentation, control Electrical Engineering, 3 cr, 3 cl hrs Prerequisites: PHYS 122; MATH 132 Introduction to the fundamentals of electronics and circuits for applications (e.g., instrumentation, control systems and power systems) encountered by engineers. Techniques for analysis to determine voltages, currents and power are based on Kirchhoffs Laws, and include mesh and nodal analysis. Devices considered are resistors, inductors, capacitors, independent sources, dependent sources, diodes, operational amplifiers, digital to-analog converters and analog-to-digital sed will contain constant (DC) sources, switched sources and sinusoidal (AC) sources, for which appropriate techniques will be developed and applied to determine responses in voltage, current and power.

List of main topics:

1. Introduction to digital logic: Gates, Boolean algebra, Truth tables, and Karnaugh map reduction of Boolean expressions
2. Review of resistive circuit concepts
3. Node voltage and mesh current analysis
4. Review solution of simultaneous equations
5. Superposition
6. Thevenin and Norton equivalent circuit development
7. Operational amplifier, ideal model, simple model using dependent voltage source input and output resistance. Simple Op-Amp circuit analysis
8. ADC and DAC
9. Definition of inductance and capacitance. Circuit equations involving L and C including initial conditions
10. Definition of Laplace transform. Development of Laplace transform properties
11. Application of Laplace transform to solution of RLC circuit problems
12. Sinusoidal steady state analysis of RLC circuits using e jt time dependence

13. Average power for sinusoidal voltages and currents. Effective (RMS) values
14. Three phase, power factor, reactive power, maximum power transfer15. Introduction to motors

Mode of Instruction: face-to-face.

Course Requirements:

Text:

Elementary Linear Circuit Analysis (Second Edition).

Leonard S. Bobrow, Oxford University Press 1987.

Lectures:

- The lectures are Monday, Wednesday and Friday from 11:00 – 11:50 in FIDEL

Tentative Homework/Quizzes/Exams:

- The homeworks will be assigned one per week. There will be a short quiz every other Friday. There will be two or three partial exams and a final.
- **Office Hours (TBD)** > W and Th from 3 to 4:30 pm, or by appointment.
- **Proposed grade distribution:**
  Homework: 20%
  Weekly quizes: 10%
  Partial exams: 40%
  Final exam: 30%

Academic Honesty: New Mexico Tech's Academic Honesty Policy for undergraduate and graduate students is found in the student handbook, which can be found at: http://www.nmt.edu/student-handbook. You are responsible for knowing, understanding, and following this policy.

Reasonable Accommodations:
New Mexico Tech is committed to protecting the rights of individuals with disabilities. Qualified individuals who require reasonable accommodations are invited to make their needs known to the Office of Counseling and Disability Services (OCDS) as soon as possible. To schedule an appointment, please call 835-6619.

Counseling Services:
New Mexico Tech offers mental health and substance abuse counseling through the Office of Counseling and Disability Services. These confidential services are provided free of charge by licensed professionals. To schedule an appointment, please call 835-6619.

Respect Statement: New Mexico Tech supports freedom of expression within the parameters of a respectful learning environment. As stated in the New Mexico Tech Guide to Conduct and Citizenship: "New Mexico Tech's primary purpose is education, which includes teaching, research, discussion, learning, and service. An atmosphere of free and open inquiry is essential to the pursuit of education. Tech seeks to protect academic freedom and build on individual responsibility to create and maintain an academic atmosphere that is a purposeful, just, open, disciplined, and caring community."

COVID-19 Safety Issues for Face-to-Face Instruction: Students must follow campus-wide safety protocols, including mandatory use of face coverings and maintaining a minimum of 6 ft social distance from other students and faculty. Students should not enter the classroom earlier than 10 minutes prior to start of class, and should exit the classroom within 10 minutes of the end of class. Students who fail to comply are subject to disciplinary procedures. [*Only needed for F2F classes.*]

Title IX Reporting:
Sexual misconduct, sexual violence and other forms of sexual misconduct and gender-based discrimination are contrary to the University's mission and core values, violate university policies, and may also violate state and federal law (Title IX). Faculty members are considered "Responsible Employees" and are required to report incidents of these prohibited behaviors. Any such reports should be directed to Tech's Title IX Coordinator (Dr. Peter Phaiah, 20D Brown Hall, 575-835-5187, titleixcoordinator@nmt.edu). Please visit Tech's Title IX Website (www.nmt.edu/titleix) for additional information and resources.