ENGR 212L: Linear Circuit Theory
Department of Engineering, Trinity College, Spring 2026

Instructor: Dr. Taikang Ning, Professor of Engineering

Office hours: Tue 11-11:50AM & Wed 10-10:50 AM or by appointment @MECC-343

Lectures: Tue & Thurs. 9:25AM -10:40 AM @MECC-246

Course outline: This course covers the basics of linear circuit theory. Topics include: node and mesh analysis of linear circuits, natural and forced responses of first-and second-order resistor-capacitor-inductor (RLC) circuits, operational amplifiers, passive and active filter design, and three-phase circuit in power systems. Laplace transform and Fourier series will be used to facilitate solving linear circuit equations. Laboratory experiments are included in this course to improve hands-on experience in circuit design and analysis.

Textbook: *Introduction to Electric Circuits* by J.A. Svoboda and R.C. Dorf (9th Edition)

Grading: Midterm Exam 30%, Final Exam-35%, Assignments 10%, Labs 25%;

Week	**Lecture Topics**
1. 1/20,22	Base units and derived units of electric circuit variables Linear circuit elements: resistor (R), capacitor (C) and inductor (L)
2. 1/27,29	Resistors, Kirchoff's current law (KCL), current and voltage division Node analysis of electric circuits
3. 2/3,5	Node Analysis Mesh analysis of electric circuits
4. 2/10,12	Mesh Analysis of electric circuits
5. 2/17	Simplification of electric circuits; theorem Thevenin's and Norton's equivalent circuits
6. 2/24,26	Basic properties of operational amplifiers (OP-AMP)

7. 3/3,5 Commonly used OP-AMP circuits
First order linear resistor-inductor (RL) and resistor-capacitor (RC) circuits,

8. 3/10,12 Time responses of RL and RC circuits
Midterm Exam 3/12

9. 3/24,26 Solving the 1st order LDEs using the Laplace transform
Natural responses of resistor-inductor-capacitor (RLC) circuits

10. 3/31,4/2 Forced responses of RLC circuits
Solving the 2nd order LDEs with the Laplace transform

11. 4/7,9 Fourier transform (FT)- time domain to frequency domain

12. 4/14,16 Frequency response of linear circuits for sinusoidal inputs

13. 4/21,23 Calculation of frequency response of RLC circuits
Low-pass, high-pass, and band-pass filters

14. 4/28 Active filter design using OP-AMPs

Calendar Reminder

- Trinity Days: 2/19,20
- Spring Vacation: 3/14-22
- Last day of class: 4/29
- **Final Exam: 5/6 @9AM**

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