

**ENGR 212L: Linear Circuit Theory**  
**Department of Engineering, Trinity College, Spring 2019**

**Instructor:** Dr. Taikang Ning, Professor of Engineering

**Office hours:** Wed 10:30-11:55 AM or by appointment @MECC-343

**Lectures:** Tue & Thurs. 9:25AM -10:40 AM @MC-102

**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 (9<sup>th</sup> Edition)

**Grading:** Midterm Exam 30%, Final Exam-30%, Quizzes: 10%, Assignments 10%, and Labs 20%; Students are expected to spend a minimum of 8-9 hours per week to become familiar with course materials

<u>Week</u>	<u>Lecture Topics</u>
1. 1/22 1/24	Base units and derived units of electric circuit variables Linear circuit elements: resistor (R), capacitor (C) and inductor (L)
2. 1/29 1/31	Resistors, Kirchoff's current law (KCL), current and voltage division Node analysis of electric circuits
3. 2/5 2/7	Mesh analysis of electric circuits Circuit analysis using MATLAB & PSpice
4. 2/12 2/14	Simplification of electric circuits with Thevenin's theorem Finding an equivalent circuit using Norton's theorem
5. 2/19	Basic properties of operational amplifiers (OP-AMP)
6. 2/26 2/28	Frequently applied OP-AMP circuits design, <b>Quiz #1</b> First order linear resistor-inductor (RL) and resistor-capacitor (RC) circuits,

7. 3/5 Complete response of RL and RC circuits  
3/7 Solving the 1<sup>st</sup> order LDEs using the Laplace transform
8. 3/12 **Midterm Exam**  
3/14 Natural responses of resistor-inductor-capacitor (RLC) circuits
9. 3/26 Forced responses of RLC circuits  
3/28 Solving the 2<sup>nd</sup> order LDEs with the Laplace transform
10. 4/2,4 Fourier transform in circuit analysis
11. 4/9,11 Sinusoidal analysis of linear circuits; frequency response
12. 4/16 Calculation of frequency response of RLC circuits  
4/18 Low-pass, high-pass, and band-pass filters, **Quiz#2**
13. 4/23,25 Active filter design using OP-AMPs
14. 4/30 Review of course materials

### Calendar Reminder

- Trinity days: 2/21-2/22
- Spring Vacation: 3/18-3/22
- Last day of class: 5/1
- **Final Exam: 5/10 9:00 AM**

**Students with Academic Accommodations-** Trinity College is committed to creating an inclusive and accessible learning environment consistent with the Americans with Disabilities Act. If you have approval for academic accommodations, please provide notification electronically using SARC Online during the first two weeks of the semester or a minimum of 10 days prior to utilizing your accommodations. Following notification, students are required to meet with faculty to further discuss implementation of accommodations. If you do not have approved accommodations, but have a disability requiring accommodations, or have questions about applying, please contact Lori Clapis, Coordinator of Accessibility Resources at [Lori.Clapis@trincoll.edu](mailto:Lori.Clapis@trincoll.edu), 860-297-4025 or refer to the Student Accessibility Resources (SARC) website: <https://www.trincoll.edu/StudentLife/StudentAccessibilityResources/students>.