

ECE 405- Electrical Engineering Principles

Tentative Course Outline

Fall 2024

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Office Hours: Mondays and Fridays 11:00-12:00 or by appt.

Days	Times	Location
M	2:30 PM - 3:50 PM	TIER LECT 2
R	2:30 PM - 3:50 PM	TIER LECT 1

Textbook: Fundamentals of Electrical Engineering, 2nd Edition, By Giorgio Rizzoni ISBN 10: 0073380563,

Other Learning Resources: Massive Open Online Courses (MOOCs) are free online courses available for anyone to enroll. You can search for courses with a title similar to “electrical Circuit analysis”, you may find a course that fits best your learning style. For example, a quick search resulted in the following two courses from Georgia Tech.:

<https://www.coursera.org/learn/linear-circuits-dcanalysis> This will be referred to as **CLI**

<https://www.coursera.org/learn/linear-circuits-ac-analysis> This will be referred to as **CL2**

A quick Youtube search also shows similar courses from Caltech:

https://www.youtube.com/watch?v=H00Z2qa_a0c&list=PLc7Gz02Znph_HU1I9STgC4Nv0aG_jdb8Z&index=2.

Tentative Weekly Schedule:

Homework problems will be assigned on a weekly basis.

Dates M- Monday R= Thur.	Topics CLI = Coursera Lesson from Linear Circuits 1 CL2 = Coursera Lesson from Linear Circuits 2	Sections/ Pages	Coursera Modules
R 9/5	Introduction, circuit components, Coursera course, Matlab	Pages from Chapter 1	CL1 1.1
Week 1 and 2: 9/9 to 9/19	Fundamentals of Electric Circuits: current, voltage, power, current division (CL 2.6), voltage division (CL 2.5), resistive circuits.	Chapters 1 HW1: due 9/16, HW2: due 9/23.	CL1: 1.2 to 1.5; 2.5 and 2.6
Week 3 and 4, 9/23 to 10/3	.Network Analysis, the node voltage method, Mesh-Current Methods. HW3 due 9/30, HW 4 due 10/7	Chapter 2 Sec. 2.1, 2.2, and 2.3	CL1 3.3, 3.4
Week 5 and 6 10/7 to 10/17	Circuit Analysis: superposition, Power Sources and Transformation Methods, Thevenin's Equivalent, Maximum Power Transfer. HW5 due 10/14.	Chapter 2 Sec. 2.4, 2.5, and 2.6	CL1: Module 4
Monday 10/21	Test I		
Week 7 and 8 R 10/24 to 10/31	Inductance, Capacitance, Properties of the inductor, properties of the capacitor, series and parallel combinations of inductance and capacitance, mutual inductance. Learning resource for capacitors: coursera.DC (Week 5, Lesson 1,2,3). Learning resource for inductors: coursera.DC (Week 5, Lesson 4, 5, 6)	Chapter 3 Section 3.1	CL1: Module 5

Week 9 and 10, 11/4 to 11/14	Time dependent sources, Sinusoidal Steady-State Analysis: Passive elements in the Frequency Domain, The Phasor & Transformers.	Chapter 3 Section 3.2-3.5	Module 1 of CL2, and CL1: 4.2 (for RMS)
Monday 11/18	Test II		
R 11/21	Three-Phase generation and distribution	6.5, 6.6, and 6.7	
Week 13 11/25, 11/26	Rectifiers Circuits, the transistor as a switch, gates, digital logic design	8.5, 9.5	
Week 13 and 14: 12/2, 12/5 and 12/9.	Digital Logic MSI Circuits	Chapter 11	

Chapters of Textbook for Reference:

Chapter 1 Fundamentals of Electric Circuits
 Chapter 2 Resistive Network Analysis
 Chapter 3 AC Network Analysis
 Chapter 4 Transient Analysis
 Chapter 5 Frequency Response and System Concepts
 Chapter 6 AC Power
 Chapter 7 Operational Amplifiers
 Chapter 8 Semiconductors and Diodes
 Chapter 9 Bipolar Junction Transistors: Operation, Circuit Models, and Applications
 Chapter 10 Field-Effect Transistors: Operation, Circuit Models, and Applications
 Chapter 11 Digital Logic Circuits
 Chapter 12 Principles of Electromechanics
 Chapter 13 Introduction to Electric Machines

Please use the following on a cover sheet and attach it to the front of your homework.

ECE 405 HW#

Name: _____
Roster# _____

Date Submitted: _____
Problem Solved: _____