

AC Circuits (CETT 1405)



Credit: 4 semester credit hours (3 hours lecture, 4 hours lab)

Prerequisite: CETT 1403

Course Description

A study of the fundamentals of alternating current including series and parallel AC circuits, phasors, capacitive and inductive networks, transformers, and resonance.

Required Textbook and Materials

1. Electronics Fundamentals 8th edition by Thomas L. Floyd
ISBN-13: 9780135072950
2. Notebook
3. Calculator
4. Pencil

Course Objectives

Upon completion of this course, the student will be able to:

1. Demonstrate appropriate use of test equipment.
2. Identify various sources of electricity in AC circuits
3. Analyze AC circuits using appropriate mathematical formulas.
4. Troubleshoot various AC circuits using schematic diagrams

Course Outline

Chapter 8 Introduction to Alternating Current and Voltage	9-2 Types of Capacitors
8-1 The Sinusoidal Waveform	9-3 Series Capacitors
8-2 Sinusoidal Voltage Sources	9-4 Parallel Capacitors
8-3 Voltage and Current Values of Sine Waves	9-5 Capacitors in DC Circuits
8-4 Angular Measurement of a Sine Wave	9-6 Capacitors in AC Circuits
8-5 The Sine Wave Formula	9-7 Capacitor Applications
8-6 Analysis of AC Circuits	Chapter 10 RC Circuits
8-7 Superimposed DC and AC Voltages	10-1 Sinusoidal Response of RC Circuits
8-8 Nonsinusoidal Waveforms	10-2 Impedance and Phase Angle of Series RC Circuits
8-9 The Oscilloscope	10-3 Analysis of Series RC Circuits
Chapter 9 Capacitors	10-4 Impedance and Phase Angle of Parallel RC Circuits
9-1 The Basic Capacitor	10-5 Analysis of Parallel RC Circuits

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10-6 Analysis of Series-Parallel RC Circuits

10-7 Power in RC Circuits

10-8 Basic Applications

10-9 Troubleshooting

Chapter 11 Inductors

11-1 The Basic Inductor

11-2 Types of Inductors

11-3 Series and Parallel Inductors

11-4 Inductors in DC Circuits

11-5 Inductors in AC Circuits

11-6 Inductor Applications

Chapter 12 RL Circuits

12-1 Sinusoidal Response of RL Circuits

12-2 Impedance and Phase Angle of Series

RL Circuits

12-3 Analysis of Series RL Circuits

12-4 Impedance and Phase Angle of Parallel RL Circuits

12-5 Analysis of Parallel RL Circuits

12-6 Analysis of Series-Parallel RL Circuits

12-7 Power in RL Circuits

12-8 Basic Applications

12-9 Troubleshooting

Chapter 13 RLC Circuits and Resonance

13-1 Impedance and Phase Angle of Series RLC Circuits

13-2 Analysis of Series RLC Circuits

13-3 Series Resonance

13-4 Series Resonant Filters

13-5 Parallel RLC Circuits

13-6 Parallel Resonance

13-7 Parallel Resonant Filters

13-8 Applications

Grade Scale

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
0 – 59	F

Course Requirements

1. Describe the basic structure and characteristics of capacitors and inductors
2. Analyze series and parallel capacitor circuits
3. Describe how a capacitor operates in an AC circuit and in a DC circuit
4. Analyze series and parallel RC and RL circuits
5. Analyze series and parallel inductor circuits
6. Describe how an inductor operates in an AC circuit and in a DC circuit
7. Discuss basic capacitor, inductor, RL and RC applications
8. Analyze series and parallel RLC circuits
9. Analyze RLC circuits for resonance
10. Use a multimeter to measure voltage, current and resistance in a circuit
11. Use oscilloscope to measure voltage in a circuit

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12. Troubleshoot circuits using multimeters, oscilloscopes and appropriate mathematical formulas

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

Student Code of Conduct Statement

It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the LIT Catalog and Student Handbook. The LIT Catalog and Student Handbook may be accessed at www.lit.edu or obtained in print upon request at the Student Services Office.

Course Schedule

Week	Topic	Reference
1	Intro to AC Current and Voltage <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises	Chapter 8
2	AC Current and Voltage <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises	Chapter 8
3	AC Current and Voltage <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises• Exam One	Chapter 8
4	Capacitors <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises	Chapter 9
5	Capacitors <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises	Chapter 9
6	Capacitors <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises• Exam Two	Chapters 9
7	RC Circuits <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises	Chapters 10
8	RC Circuits	Chapter 10

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Week	Topic	Reference
	<ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises	
9	RC Circuits <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises• Exam Three	Chapter 10
10	Inductors <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises	Chapter 11
11	Inductors <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises	Chapter 11
12	RL Circuits <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises	Chapter 12
13	RL Circuits <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises• Exam Four	Chapter 12
14	RLC Circuits <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises	Chapter 13
15	RLC Circuits <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises	Chapters 13
16	RLC Circuits <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises• Exam Five	Chapters 13