

## DC Circuits (CETT 1403)



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

**Co-requisite:** MATH 1332

### Course Description

A study of the fundamentals of direct current including Ohm's law, Kirchhoff's laws and circuit analysis techniques.

### Required Textbook and Materials

1. Electronics Fundamentals 8<sup>th</sup> edition by Thomas L. Floyd
  - a. ISBN-10: 0135072956 | ISBN-13: 9780135072950
2. Notebook
3. Calculator
4. Pencil

### Course Objectives

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

1. Apply safety techniques while working on and troubleshooting various circuits and components.
2. Interpret color codes and other descriptors used in electronics.
3. Identify various sources of electricity in DC circuits.
4. Interpret characteristics of voltage, current, resistance and power in DC circuits.
5. Measure voltage, current and resistance in DC circuits using appropriate measuring devices.
6. Analyze DC circuits using appropriate mathematical formulas such as Ohm's Law, Kirchhoff's Law, and the power formula.
7. Troubleshoot various DC circuits using schematic diagrams.

### Course Outline

#### Chapter 1 Quantities and Units

1. Scientific and Engineering Notation
2. Units and Metric Prefixes
3. Metric Unit Conversions
4. Measured Numbers
5. Electrical Safety

#### Chapter 2 Voltage, Current, and Resistance

1. Atoms

#### 2. Electrical Charge

3. Voltage
4. Current
5. Resistance
6. The Electric Circuit
7. Basic Circuit Measurements

#### Chapter 3 Ohm's Law, Energy, and Power

1. Ohm's Law
2. Application of Ohm's Law

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3. Energy and Power
4. Power in an Electric Circuit
5. The Power Rating of Resistors
6. Energy Conversion and Voltage Drop in a Resistance
7. Power Supplies
8. Introduction to Troubleshooting

Chapter 4 Series Circuits

1. Resistors in Series
2. Total Series Resistance
3. Current in a Series Circuit
4. Application of Ohm's Law
5. Voltage Sources in Series
6. Kirchhoff's Voltage Law
7. Voltage Dividers
8. Power in Series Circuits
9. Voltage Measurements
10. Troubleshooting

Chapter 5 Parallel Circuits

1. Resistors in Parallel
2. Total Parallel Resistance
3. Voltage in a Parallel Circuit
4. Application of Ohm's Law
5. Kirchhoff's Current Law
6. Current Dividers

7. Power in Parallel Circuits
8. Troubleshooting

Chapter 6 Series-Parallel Circuits

1. Identifying Series-Parallel Relationships
2. Analysis of Series-Parallel Resistive Circuits
3. Voltage Dividers with Resistive Loads
4. Loading Effect of a Voltmeter
5. The Wheatstone Bridge
6. Thevenin's Theorem
7. The Maximum Power Transfer Theorem
8. The Superposition Theorem
9. Troubleshooting

Chapter 7 Magnetism and

Electromagnetism

1. The Magnetic Field
2. Electromagnetism
3. Electromagnetic Devices
4. Magnetic Hysteresis
5. Electromagnetic Induction
6. Applications of Electromagnetic Induction

**Grade Scale**

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

**Course Evaluation**

Final grades will be calculated according to the following criteria:

<i><b>Activity</b></i>	<i><b>Percentage</b></i>
Major Test/Final Exam	80%
Labs/Homework	20%

**Course Requirements**

1. Work in lab to complete projects assigned.
2. Listen to lectures and take notes.
3. Take quizzes and tests

### **Attendance Policy:**

1. Missing more than 20% of classes will result in an automatic “F” for the course.
2. Absences are counted for unexcused, excused and coming to class late.
3. Missing more than 20% of a class period will count as an absence.
4. Being tardy 3 times equals 1 absence.

### **Course Policies**

1. No food, drinks, or use of tobacco products in class.
2. Do not bring children to class.
3. No Cheating of any kind will be tolerated. Students caught cheating or helping someone to cheat can and will be removed from the class for the semester. Cheating can result in expulsion from LIT.
4. If you wish to drop a course, the student is responsible for initiating and completing the drop process. If you stop coming to class and fail to drop the course, you will earn an ‘F’ in the course.
5. All pagers and cell phones must be turned off or on vibrate. **NO PHONES ARE ALLOWED DURING EXAMS!!!** If you are caught using your phone for texting or talking during an exam, the exam will be taken up and you will receive a grade of zero for that exam.
6. You **MUST** use a pencil. No work will be accepted if written in pen.
7. No more than two people working together in lab without instructor approval.
8. p.
9. Write legibly. If I cannot clearly read an answer, it will be counted wrong
10. Internet Usage
  - a. Classroom computers have access to the internet.
  - b. Student usage of the internet will be monitored.
  - c. Proper usage of the internet will be allowed. Used for classroom research or as directed.
  - d. Any unauthorized use of the internet will not be tolerated.
  - e. Improper usage of the internet, such as profanity, pornography, gambling, etc... will result in disciplinary action not limited to expulsion from LIT.

### **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](http://www.lit.edu) or obtained in print upon request at the Student Services Office.

### Course Schedule

Week	Topic	Reference
1	Course introduction and policies <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Multisim on computers</li></ul>	Handouts
2	Electronics Math <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Safety Procedures</li><li>• Exam One</li></ul>	Chapter 1
3	Voltage <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li></ul>	Chapter 2
4	Current, Resistance <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li></ul>	Chapter 2
5	Ohm's Law <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li></ul>	Chapter 3
6	Energy, Power <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li><li>• Exam Two</li></ul>	Chapters 3
7	Series Circuits <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li></ul>	Chapters 4
8	Series Circuits <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li></ul>	Chapter 4
9	Series Circuits <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li><li>• Exam Three</li></ul>	Chapter 4
10	Parallel Circuits <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li></ul>	Chapter 5
11	Parallel Circuits <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li></ul>	Chapter 5

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Week	Topic	Reference
12	Parallel Circuits <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li><li>• Exam Four</li></ul>	Chapter 5
13	Series Parallel Circuits <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li></ul>	Chapter 6
14	Series Parallel Circuits <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li></ul>	Chapter 6
15	Series Parallel Circuits <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li></ul>	Chapters 6
16	Magnetism and Electromagnetism <ul style="list-style-type: none"><li>• Lecture</li><li>• Lab: Chapter Exercises</li><li>• Exam Five</li></ul>	Chapters 7