

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 8th edition by Thomas L. Floyd
 - a. ISBN-10: 013507293X | ISBN-13: 9780135072936
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. (SCANS C5.5, C6.5, C7.5, C9.5, C10.2, C14.5, C19.4, C20.5, F1.4, F3.5, F4.5, F5.5, F6.3, F8.3, F9.5, F10.4, F11.4, F12.5, F15.5)
2. Interpret color codes and other descriptors used in electronics. (SCANS C5.5, C6.5, C7.5, F10.5)
3. Identify various sources of electricity in DC circuits. (SCANS C5.5, C6.5, C7.5, C14.5, F1.4, F3.5, F4.5, F5.5, F6.3, F8.3, F9.5, F10.4, F11.4, F12.5, F15.5)
4. Interpret characteristics of voltage, current, resistance and power in DC circuits. (SCANS C5.5, C6.5, C9.5, C10.2, C14.5, F1.4, F2.4, F3.5, F4.5, F5.5, F6.3, F8.3, F9.5, F10.4, F11.4, F12.5, F15.5)
5. Measure voltage, current and resistance in DC circuits using appropriate measuring devices. (SCANS C5.5, C6.5, C9.5, C14.5, F2.5, F6.3, F9.5, F10.4)
6. Analyze DC circuits using appropriate mathematical formulas such as Ohm's Law, Kirchhoff's Law, and the power formula. (SCANS C5.5, C6.5, C7.5, C9.5, C10.2, C14.5, C19.4, C20.5, F1.4, F3.5, F4.5, F5.5, F6.3, F8.3, F9.5, F10.4, F11.4, F12.5, F15.5)
7. Troubleshoot various DC circuits using schematic diagrams. (SCANS C5.5, C6.5, C7.5, C9.5, C10.2, C14.5, C19.4, C20.5, F1.4, F3.5, F4.5, F5.5, F6.3, F8.3, F9.5, F10.4, F11.4, F12.5, F15.5)

SCANS Skills and Competencies

Beginning in the late 1980's, the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) conducted extensive research and interviews with business owners, union leaders, supervisors, and laborers in a wide variety of work settings to determine what knowledge workers needed in order to perform well on a job. In 1991 the Commission announced its findings in *What Work Requires in Schools*. In its research, the Commission determined that "workplace know-how" consists of two elements: foundation skills and workplace competencies.

Course Outline

Chapter 1 Quantities and Units

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

Chapter 2 Voltage, Current, and Resistance

- 2-1 Atoms
- 2-2 Electrical Charge
- 2-3 Voltage
- 2-4 Current
- 2-5 Resistance
- 2-6 The Electric Circuit
- 2-7 Basic Circuit Measurements

Chapter 3 Ohm's Law, Energy, and Power

- 3-1 Ohm's Law
- 3-2 Application of Ohm's Law
- 3-3 Energy and Power
- 3-4 Power in an Electric Circuit
- 3-5 The Power Rating of Resistors
- 3-6 Energy Conversion and Voltage Drop in a Resistance
- 3-7 Power Supplies
- 3-8 Introduction to Troubleshooting

Chapter 4 Series Circuits

- 4-1 Resistors in Series
- 4-2 Total Series Resistance
- 4-3 Current in a Series Circuit
- 4-4 Application of Ohm's Law

4-5 Voltage Sources in Series

- 4-6 Kirchhoff's Voltage Law
- 4-7 Voltage Dividers
- 4-8 Power in Series Circuits
- 4-9 Voltage Measurements
- 4-10 Troubleshooting

Chapter 5 Parallel Circuits

- 5-1 Resistors in Parallel
- 5-2 Total Parallel Resistance
- 5-3 Voltage in a Parallel Circuit
- 5-4 Application of Ohm's Law
- 5-5 Kirchhoff's Current Law
- 5-6 Current Dividers
- 5-7 Power in Parallel Circuits
- 5-8 Troubleshooting

Chapter 6 Series-Parallel Circuits

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

Chapter 7 Magnetism and Electromagnetism

CETT 1403
Course Syllabi

7-1 The Magnetic Field
7-2 Electromagnetism
7-3 Electromagnetic Devices
7-4 Magnetic Hysteresis

7-5 Electromagnetic Induction
7-6 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:

Major Test/Final Exam	80%
Labs/Homework	20%

Course Requirements

1. Read Textbook
2. Write Notes
3. Take Tests
4. Perform Laboratory Exercises

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. No foul or harsh language will be tolerated
3. Headphones may be worn only upon Instructor approval
4. Do not bring children to class.
5. 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.
6. 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.

CETT 1403
Course Syllabi

7. 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.
8. You **MUST** use a pencil. No work will be accepted if written in pen.
9. No more than two people working together in lab without instructor approval.
10. No copies of work will be accepted. You may work on labs in pairs, but each person must turn in his/her own lab write-up.
11. Write legibly. If I cannot clearly read an answer, it will be counted wrong
12. 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.

Course Schedule

Week	Topic	Reference
1	Course introduction and policies <ul style="list-style-type: none">• Lecture• Lab: Multisim on computers	Handouts
2	Electronics Math <ul style="list-style-type: none">• Lecture• Lab: Safety Procedures• Exam One	Chapter 1
3	Voltage <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises	Chapter 2
4	Current, Resistance <ul style="list-style-type: none">• Lecture• Lab: Chapter Exercises	Chapter 2

CETT 1403
Course Syllabi

Week	Topic	Reference
5	Ohm's Law <ul style="list-style-type: none"> • Lecture • Lab: Chapter Exercises 	Chapter 3
6	Energy, Power <ul style="list-style-type: none"> • Lecture • Lab: Chapter Exercises • Exam Two 	Chapters 3
7	Series Circuits <ul style="list-style-type: none"> • Lecture • Lab: Chapter Exercises 	Chapters 4
8	Series Circuits <ul style="list-style-type: none"> • Lecture • Lab: Chapter Exercises 	Chapter 4
9	Series Circuits <ul style="list-style-type: none"> • Lecture • Lab: Chapter Exercises • Exam Three 	Chapter 4
10	Parallel Circuits <ul style="list-style-type: none"> • Lecture • Lab: Chapter Exercises 	Chapter 5
11	Parallel Circuits <ul style="list-style-type: none"> • Lecture • Lab: Chapter Exercises 	Chapter 5
12	Parallel Circuits <ul style="list-style-type: none"> • Lecture • Lab: Chapter Exercises • Exam Four 	Chapter 5
13	Series Parallel Circuits <ul style="list-style-type: none"> • Lecture • Lab: Chapter Exercises 	Chapter 6
14	Series Parallel Circuits <ul style="list-style-type: none"> • Lecture • Lab: Chapter Exercises 	Chapter 6
15	Series Parallel Circuits <ul style="list-style-type: none"> • Lecture • Lab: Chapter Exercises 	Chapters 6
16	Magnetism and Electromagnetism <ul style="list-style-type: none"> • Lecture • Lab: Chapter Exercises • Exam Five 	Chapters 7