# DC Electronics Course No. 40460 Credit: 1.0

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| --- | --- | --- | --- |
| **Student name:** |  | **Graduation Date:** |  |

Pathways and CIP Codes:Aviation Maintenance and Operations (47.0607)  - Maintenance and Avionics Strand

Course Description: An **application level** course that teaches the fundamental concepts of direct current. **Recommend students have a good grasp of Algebra 1**

Directions:The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

**RATING SCALE:**

4. Exemplary Achievement: Student possesses outstanding knowledge, skills or professional attitude.

3. Proficient Achievement:Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.

2. Limited Achievement:Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.

1. Inadequate Achievement:Student lacks knowledge, skills or professional attitude.

0. No Instruction/Training:Student has not received instruction or training in this area.

## Benchmark 1: Basic electronic Principles

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Identify metric prefixes used in electronics measurement. |  |
| 1.2 | Calculate powers of 10 represented by metric prefixes. |  |
| 1.3 | Solve problems using values expressed in metric prefixes and powers of 10. |  |
| 1.4 | Read and interpret color codes and symbols to identify resistive electrical components and values. |  |
| 1.5 | Define voltage, current, resistance, power, and energy. |  |
| 1.6 | Measure electrical properties of a circuit using a digital multimeter circuit. |  |
| 1.7 | Set up and utilize power supplies, oscilloscopes, and multimeters (e.g. ammeter, ohmmeter, and voltmeter). |  |

## Benchmark 2: Voltage, Current, and Resistance

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Describe the atomic model of matter. |  |
| 2.2 | Explain the concept of electric charge. |  |
| 2.3 | Explain the relationship between EMF, current, and resistance. |  |
| 2.4 | Understand the difference between electron flow and conventional current. |  |

## Benchmark 3: Ohm’s Law

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Apply and relate Ohm’s Law. |  |
| 3.2 | Explain the difference between a linear and nonlinear resistance. |  |
| 3.3 | Compute and measure conductance and resistance of conductors and insulators. |  |

## Benchmark 4: Power and Energy

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 4.1 | Compute power using Watt’s Law. |  |
| 4.2 | Determine the required resistance and appropriate wattage rating of a resistor. |  |
| 4.3 | Describe and apply maximum power transfer theory. |  |

## Benchmark 5: Series Resistive Circuits

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 5.1 | Construct and verify series circuits. |  |
| 5.2 | Construct and verify voltage divider circuits both loaded and unload. |  |
| 5.3 | Troubleshoot various circuit failures. |  |

## Benchmark 6: Parallel Resistive Circuits

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 6.1 | Construct and verify parallel circuits. |  |
| 6.2 | Troubleshoot various circuit failures. |  |

## Benchmark 7: Series-Parallel Circuits

### Competencies

| **#** | **Description** | **RATING** |
| --- | --- | --- |
| 7.1 | Construct and verify series-parallel circuits. |  |
| 7.2 | Troubleshoot various circuit failures. |  |

## Benchmark 8: DC Network Analysis

### Competencies

| **#** | **Description** | **RATING** |
| --- | --- | --- |
| 8.1 | Summarize the differences between an ideal and non-ideal (practical) voltage source. |  |
| 8.2 | Explain the meaning of an ideal and non-ideal (practical) current source. |  |
| 8.3 | Convert a non-ideal (practical) voltage source to a non-ideal (practical) current source. |  |
| 8.4 | Convert a non-ideal (practical) current source to a non-ideal (practical) voltage source. |  |
| 8.5 | Explain the application of the superposition theorem. |  |
| 8.6 | Solve electrical circuits using the superposition theorem. |  |
| 8.7 | Explain Thevenin’s theorem. |  |
| 8.8 | Solve for voltage and current in a branch of an electrical circuit by using Thevenin’s theorem. |  |
| 8.9 | Explain how a Wheatstone bridge can be used to determine the value of an unknown resistor. |  |
| 8.10 | List other applications of balanced bridge circuits. |  |

I certify that the student has received training in the areas indicated.

Instructor Signature:

For more information, contact:

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