# BASIC ELECTRICITY/BATTERY SERVICE
## Course Syllabus

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>TRGA-1202</th>
<th>OH LAP Credit:</th>
<th>No</th>
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<tbody>
<tr>
<td>OCAS Code:</td>
<td>None</td>
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<tr>
<td>Course Length:</td>
<td>70 Hours</td>
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<tr>
<td>Career Cluster:</td>
<td>Transportation, Distribution &amp; Logistics</td>
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<td>Career Pathway:</td>
<td>Aviation Maintenance Technology</td>
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<tr>
<td>Career Major(s):</td>
<td>General Aviation</td>
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### Pre-requisite(s):

This course covers the fundamentals of aircraft electricity, batteries and charging systems. The student will read and interpret electrical circuit diagrams. The characteristics of magnets and magnetic lines of force will be studied. Ohm’s law will be discussed and used in the calculation of volts, amps, and resistance within an electrical circuit. Students will remove, inspect, service, and install aircraft batteries and operate Lead Acid and Nickel-Cadmium aircraft battery charging systems.

### Textbooks:
- Dale Crane, Dictionary of Aviation Terms, Aviation Supplies and Academics, 1997

### Course Objectives:

#### A. Lesson: ELECTRICITY SAFETY AND TERMS
1. List and practice safety precautions related to electrical circuits.
2. Define terms related to basic DC electricity.
3. Identify basic DC electrical symbols. (Level 3) (App. B,A,5) (Gen.A13)

#### B. Lesson: ELECTRON THEORY
1. Identify and label parts of an atom.
2. Describe electron flow.
3. Identify hazards and methods used to compensate for static electricity.
4. List the five basic units of electrical measurement. (Gen.A5)

#### C. Lesson: ELECTRICAL LAWS AND ANALYSIS
1. § Use Ohm's Law to determine the relationship between voltage, current, and resistance. (Level 3) (App. B,A,4)
2. Discuss the principle of Kirchhoff's voltage law.
3. Discuss the principle of Kirchhoff's current law.
4. List and describe the six sources of electrical energy.
5. Discuss the four physical characteristics that affect conductor resistance.
6. Identify types of resistors.
7. Determine resistor values using color codes.

#### D. Lesson: BASIC ELECTRICAL CIRCUITS
1. List the three basic elements of a simple circuit. (Level 3) (App. B,A,5)
2. Identify basic switches.
3. Compare the three types of circuits. (Level 3) (App. B,A,5)
4. Discuss the characteristics of series circuits.
5. Analyze a series circuit diagram using Ohm’s and Kirchhoff’s laws. (Level 3) (App. B,A,3,4)
6. Discuss the characteristics of parallel circuits.
10. Discuss characteristics of bridge circuits. Identify and discuss latching relays.

E. Lesson: MAGNETISM
1. Define magnetism and describe lines of force.
2. Identify types of magnets.
3. Discuss properties of electromagnets.

F. Lesson: ELECTRICAL METERS
1. Discuss magnetism as it relates to meter movements.
2. Identify types of meter movements.
3. Describe the construction and operation of a multimeter.
4. Interpret multimeter scales. (Level 3) (App. B,A,3)
5. § Construct circuits from schematic diagrams. (Level 3) (App. B,A,5)
7. Discuss troubleshooting of basic circuits
8. Use a multimeter to troubleshoot a circuit. (Level 3) (App. B,A,3) (AFQ11,Q12,Q13,Q19

G. Lesson: BATTERY SERVICE SAFETY AND TERMS
1. List and follow safety precautions for working with aircraft batteries.
2. Define terms related to aircraft batteries.

H. Lesson: BATTERY CLASSIFICATIONS
1. Discuss battery types and classifications.
2. Explain the construction and electrical characteristics of a primary cell.

I. Lesson: LEAD ACID BATTERIES
1. Explain the construction and electrical characteristics of a lead acid battery.
2. Discuss methods used to determine state of charge and cell condition
3. Describe battery compartment maintenance.
4. § Remove and install a battery. (Level 3) (App. B,A,6) (Gen.A18)
5. Compare charging methods.
6. Discuss the relationship between battery state of charge and freezing temperature of electrolyte.

J. Lesson: INSPECT AND SERVICE A LEAD ACID BATTERY
1. Review shop safety practices.
2. Discuss types of chargers.

K. Lesson: NICKEL-CADMIUM BATTERIES
1. Explain the construction and electrical characteristics of a nickel-cadmium battery.
2. Discuss methods used to determine state of charge and cell condition.
3. Describe battery compartment maintenance. (Gen.A19)
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4. Discuss proper battery installation.
5. Compare charging methods.
6. List advantages and disadvantages of ni-cad versus lead-acid batteries.

L. Lesson: INSPECT AND SERVICE A NICKEL-CADMIUM BATTERY
1. Review shop safety practices.
2. Discuss types of chargers.
3. Discuss service cycle and deep cycle requirements.
4. § Perform inspection and service. (Level 3) (App. B,A,6)

Teaching Methods: The class will primarily be taught by the lecture and demonstration method and supported by various media materials to address various learning styles. There will be question and answer sessions over material covered in lecture and media presentations. Supervised lab time is provided for students to complete required projects.

Grading Procedures:
1. Students are graded on theory and shop practice and performance.
2. Each course must be passed with seventy (70%) percent or better.
3. Grading scale: A=90-100%, B=80-89%, C=70-79%, F=0-69%.

Description of Classroom, Laboratories, and Equipment: Tulsa Technology Center campuses are owned and operated by Tulsa Technology Center School District No. 18. All programs provide students the opportunity to work with professionally certified instructors in modern, well-equipped facilities.

Available Certifications/College Credit

The student may be eligible to take state, national or industry exam after completion of the program. College credit may be issued from Oklahoma State University-Okmulgee or Tulsa Community College. See program counselor for additional information.

College Credit Eligibility:
The student must maintain a grade point average of 2.0 or better.