AIRCRAFT GENERATORS AND MOTORS
Course Syllabus

Course Number: GAPE-1205  
OCAS Code: None  
OHLAP Credit: No  
Course Length: 77 Hours  
Career Cluster: Transportation, Distribution & Logistics  
Career Pathway: Aviation Maintenance Technology  
Career Major(s): General Aviation

Pre-requisite(s):

Course Description: The operating principles of aircraft generators and motors will be taught. Aircraft motor components and internal motor systems will be identified and discussed as students will remove, disassemble, inspect, test, and assemble motors. The operating principles of aircraft generators and alternators will also be discussed. The major types of aircraft electrical sources will be covered. Students will remove, disassemble, inspect, test, and assemble generators and alternators.

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

Course Objectives:

A. Lesson: GENERATOR SAFETY AND TERMS
1. List and practice safety precautions related to generators.
2. Define terms related to aircraft generators.

B. Lesson: GENERATOR THEORY
1. Discuss magnetism in relation to electromechanical generation.
2. Identify generator parts and their functions. (PP- J1,J2)
3. Discuss the three types of generators and methods of control.
4. Discuss methods of controlling armature reactance.

C. Lesson: BASIC GENERATOR INSPECTION AND TESTING
1. Discuss visual inspections of generator components.
2. Determine inspection procedures for armatures using a growler.
3. Explain inspection and testing procedures for field circuits.
4. Discuss procedures for correcting brush arcing.

D. Lesson: 12-VOLT SHUNT-WOUND GENERATOR SYSTEM
1. Discuss the operation of a three-unit control panel.
2. Explain the installation and removal of an aircraft generator.
3. Troubleshoot, disassemble, inspect, reassemble, and test a generator. (Level 3) (App. C,II,G,48,50a;App. D,II,C,12) (AF-Q9,Q10,Q14) (PP-J3, J4, J5, J6, J7, J8, J9,)
4. Discuss parallel DC charging systems.
E. **Lesson: 24-VOLT COMPOUND-WOUND GENERATOR SYSTEM**
   1. Discuss the operation of a carbon pile voltage regulator.
   2. Identify interpoles and series windings and discuss their usage.
   3. Troubleshoot, inspect, and adjust a carbon pile voltage regulator.
   4. Discuss the operation of differential reverse current relay. (DRCR)
   5. Discuss generator paralleling circuits.

F. **Lesson: 12/24 VOLT ALTERNATORS**
   1. Discuss alternator parts and their functions.
   2. Compare generators and alternators.
   3. Explain alternator controls.
   4. Discuss alternator service and maintenance.
   5. Troubleshoot, disassemble, inspect, repair, reassemble, and test an alternator.

G. **Lesson: 120/208 VAC GENERATORS**
   1. Discuss brush type AC generators and voltage regulation.
   2. Discuss brushless AC generators and voltage regulation.
   3. Describe the purpose and operation of constant and integrated speed drives. (Level 1)
      (App. C,II,G,50b)

H. **Lesson: INVERTERS AND RECTIFIERS**
   1. Explain rotary type inverters.
   2. Discuss solid-state inverters.
   3. Discuss methods of rectification.
   4. Discuss transformer / rectifier units

I. **Lesson: POWER DISTRIBUTION**
   1. Discuss simple power systems.
   2. Explain the difference between parallel and split bus systems.
   3. Discuss bus tie systems (split bus).

J. **Lesson: MOTOR SAFETY AND TERMS**
   1. List and practice safety precautions related to aircraft motors.
   2. Define terms related to aircraft motors.

K. **Lesson: AIRCRAFT MOTOR THEORY**
   1. Identify components of aircraft motors.
   2. Discuss magnetic reaction in an aircraft motor.
   3. Identify types of aircraft electric motors.
   4. Discuss methods of controlling aircraft motor speed and direction.

L. **Lesson: AIRCRAFT DC MOTORS**
   1. Discuss the construction and operation of aircraft DC motors.
   2. Describe methods of controlling aircraft DC motors.

M. **Lesson: AIRCRAFT STARTER MOTORS**
   1. List and discuss types of starter motors.
   2. Identify components of a starter motor.
   3. Describe methods of starter engagement.

N. **Lesson: AIRCRAFT AC MOTORS**
1. Describe the construction and operation of aircraft AC motors.
2. Discuss methods of controlling aircraft AC motors.

O. Lesson: MOTOR BRAKES AND CLUTCHES
1. Discuss types and the construction of motor brakes.
2. Discuss types and the construction of motor clutches.

P. Lesson: STARTER GENERATORS (PP-J18)
1. Discuss the construction and operation of starter generators.
2. Identify starter generator applications.

Q. Lesson: SYNCHRONOUS SERVOS
1. Discuss stepper motors.
2. Discuss autosyn systems.
3. Explain synchronous systems.

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.