RECIPROCATING ENGINE OVERHAUL
Course Syllabus

Course Number: TRPPM-3005  
OHLAP Credit: No
OCAS Code: None
Course Length: 154 Hours
Career Cluster: Transportation, Distribution & Logistics
Career Pathway: Aviation Maintenance Technology
Career Major(s): Powerplant Mechanic

Pre-requisite(s):
Course Description: Purpose, condition, and overhaul time will be discussed. Pre-overhaul procedures, cleaning, structural and dimensional inspection will be performed while overhauling a reciprocating engine. Students will perform hands-on repair and/or replacement of internal and external engine parts including cylinders.

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

Course Objectives:

A. Lesson: INTRODUCTION TO RECIPROCATING ENGINE OVERHAUL
1. Define terms related to reciprocating engine overhaul.
2. Discuss conditions that can necessitate an engine overhaul.
3. Explain how recommended overhaul time is determined.
4. Differentiate between a complete overhaul and a top overhaul.
5. State the difference between an overhauled engine and a rebuilt engine.
6. Discuss how major repairs differ from a major overhaul.

B. Lesson: OVERHAUL PRELIMINARIES
1. Arrange, in order, the basic steps of the engine overhaul process.
2. Discuss usage of engine overhaul tools and equipment.
3. Explain the importance of following procedures listed in manufacturer's overhaul manuals.
4. Discuss what is meant by a certificated repair station.
5. Discuss shop safety procedures utilized when preparing for an overhaul.
6. Discuss MSDS related to Powerplant 2.

C. Lesson: PRE-OVERHAUL PROCEDURES
1. Receive and inspect general condition of engine and accessories. (Level 2) (App. D,I,A,2)
2. Record status, make, model, and serial numbers of engine and components. (Level 2) (App. D,I,A,2)
3. Explain the importance of organizing engine records.
4. Use manufacturer's manuals, service instructions and bulletins to identify and mark aircraft engine parts. (Level 2) (App. D,I,A,2)
5. Perform a preliminary visual inspection and tag defective parts. (Level 2)
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(App. D,I,A,2)

D. Lesson: CLEANING PROCEDURES
1. List and describe cleaning procedures.
2. Discuss safe and proper use of parts washing machine.
3. Demonstrate safe and proper use of parts washing machine.
4. Discuss why dissimilar metals should not be placed in the solution tank at the same time.
5. Select proper types of blasting materials for various engine parts.
6. Discuss safe and proper use of grit blast machine.
7. Demonstrate safe and proper use of grit blast machine.
8. Disassemble and clean a reciprocating engine. (Level 2) (App. D,I,A,2)

E. Lesson: STRUCTURAL INSPECTION
1. Explain the need for a structural inspection and discuss safe use of NDT equipment.
2. Discuss basic nondestructive methods of structural inspections.
3. Perform nondestructive methods of structural inspection as required by instructor. (Level 2) (App. D,I,A,2)

F. Lesson: DIMENSIONAL INSPECTIONS
1. Discuss dimensional inspections and wear characteristics of engine components.
2. Use precision measuring instruments to check tolerances. (Level 2) (App. D,I,A,2) (PP-A3)
3. Perform dimensional inspection to check for wear. (Level 2) (App. D,I,A,2)

G. Lesson: REPAIR AND REPLACEMENT
1. Describe how to recondition cylinder assemblies.
2. Discuss reassembly of pistons and rings.
3. Discuss safe and proper use of valve spring compressor.
4. Demonstrate safe and proper use of valve spring compressor.
5. Explain safe and proper procedures for grinding valves and valve seats.
7. Discuss safe and proper usage of a cylinder heat stand.
8. Inspect, service, repair and reassemble a cylinder. (Level 3) (App. D,I,A,2) (PP-A1,A2)
9. Discuss reassembly of crankshaft and connecting rods.
10. Explain procedures to be used in reassembling a powercase.
12. Discuss final assembly and inspection of a complete engine.
15. Perform an exhaust systems leak test and repair as needed. (Level 3) (App. D,II,J,31,32a) (PP-Q2,Q3,Q4,Q5,Q15)

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.