GAVILAN COLLEGE
5055 Santa Teresa Blvd
Gilroy, CA 95023

Course Outline

COURSE: AMT 120 DIVISION: 50 ALSO LISTED AS:

TERM EFFECTIVE: Spring 2021 CURRICULUM APPROVAL DATE: 10/13/2020

SHORT TITLE: POWERPLANT TECH

LONG TITLE: Aviation Powerplant Technology

Units	Number of Weeks	Type	Contact Hours/Week	Total Contact Hours/Units
13.5	18	Lecture:	9	162 / 9 Units of Lecture
		Lab:	13.5	243 / 4.5 Units of Lab
		Other:	0	0
		Total:	22.5	405

Out of Class Hrs:	324.00
Total Learning Hrs:	729.00

COURSE DESCRIPTION:

This course is part of the curriculum required by the Federal Aviation Administration to obtain certification as an aircraft powerplant maintenance technician. This certificate allows the rated technician to perform maintenance, preventive maintenance repairs and alterations to USA FAA certificated aircraft powerplants. This Section covers the theory and practical application of operation, overhaul practices, inspection, installation, testing and troubleshooting techniques covering the subject areas of reciprocating and turbine engines, ignition, induction, supercharging, cooling and exhaust systems. PREREQUISITE: Successful completion of AMT 100 and AMT 101. Basic hand tools required. Details at the first class meeting.

PREREQUISITES:

Successful completion of AMT 100 and AMT 101. Basic hand tools required.

CREDIT STATUS: D - Credit - Degree Applicable

GRADING MODES

L - Standard Letter Grade

REPEATABILITY: N - Course may not be repeated

SCHEDULE TYPES:

02 - Lecture and/or discussion

03 - Lecture/Laboratory

04 - Laboratory/Studio/Activity

04A - Laboratory - LEH 0.65

STUDENT LEARNING OUTCOMES:

By the end of this course, a student should:

1. Demonstrates the ability to meet the written test standards outlined in FAA AC 147-3 ? Certification and Operation of Aviation Maintenance Technician Schools.

2. Demonstrates the ability to meet the oral/practical test standards outlined in FAA AC 147-3 ? Certification and Operation of Aviation Maintenance Technician Schools.

3. Demonstrate the ability to inspect and determine if components and aircrafts meet airworthy standards outlined in FAA AC 43.13-1B ? Acceptable Methods, Techniques, and Practices ? Aircraft Inspection and Repair.

COURSE CONTENT:

Curriculum Approval Date: 10/13/2020

LECTURE CONTENT:

45 Hours

RECIPROCATING ENGINE THEORY FAMILIARIZATION AND OVEHAUL PRACTICES

CONTENT: Types of reciprocating engines and parts nomenclature; principles of the Otto cycle; use of manufacturer's overhaul and maintenance publications; valves, valve timing and firing order; physical factors affecting engine performance; standard engine overhaul practices; inspection of engine parts; parts replacement and machining operations; and engine reassembly.

STUDENT PERFORMANCE OBJECTIVE: Identify the various types of aircraft engines using the standard letter and numerical designations and, using correct nomenclature, name the parts of an engine; explain the principle of the Otto cycle; select the correct manufacturer's manual and, collect the necessary information and specification for the task being performed; explain the various valve operating mechanics interpret valve timing diagrams, compute firing order and time the valve opening on an engine; identify, disassemble, clean, inspect and replace parts in an engine using practices that are accepted standards of the aviation industry; use precision measuring equipment, magna flu and Zyglo equipment to assess the conformity of internal engine part to the manufacturer's specifications as set forth in the overhaul manuals; replace internal engine parts and assess and measure machine dimensions given in the overhaul manual; reassemble an aircraft engine following the procedure given in the overhaul manual.

27 Hours

INSPECTION, SERVICING, REMOVAL, INSTALLATION AND TESTING OF RECIPROCATING AIRCRAFT ENGINES

CONTENT: Engine removal and installation in aircraft; installation testing and troubleshooting; and service engine with correct fuel, lubrication and fluids.

STUDENT PERFORMANCE OBJECTIVE: Follow the manufacturer?s service instructions to remove; reinstall; test and service engine.

COURSE CONTENT(CONTINUED):

LECTURE CONTENT(CONTINUED):

36 Hours

TURBINE ENGINE OVERHAUL, INSPECTION, REMOVAL, INSTALLATION AND TESTING

CONTENT: Types of turbine engines and parts nomenclature; principles of the Brayton cycle; aerodynamic and thermodynamic laws and principles of compressors, diffusers, combustors, turbines and exhaust ducts; standard turbine engine overhaul practices; engine airworthiness conformity inspection and engine operation and troubleshooting.

STUDENT PERFORMANCE OBJECTIVE: Identify the types of turbine engines and name the parts using correct nomenclature; explain the operating principles of the Brayton cycle; define the physical laws that apply to the development of thrust from a turbine engine; calculate thrust, thrust horsepower, and equivalent shaft horsepower; diagram velocity, temperature and pressure of airflow through the components of the turbine engine; compute a vector analysis of flow across a compressor and a turbine blade; disassemble, clean and analyze component parts of a turbine engine using the manufacturer's manual and practices that are accepted standard of the industry; through computer data mining the information necessary to apply an airworthiness conformity inspection on an engine and its installation; and start and operate the engine at various power settings and apply troubleshooting procedures.

27 Hours

IGNITION SYSTEMS THEORY AND MAINTENANCE

CONTENT: Electrical principles of operation of magneto and capacitor discharge ignition systems; magneto overhaul and testing; magneto-to-engine timing; spark plug servicing; and ignition systems.

STUDENT PERFORMANCE OBJECTIVE: Explain the theory of operation of magneto and capacitor discharge ignition systems; disassemble, examine (inspect), test, repair and reassemble a magneto; demonstrate correctly timing a magneto to an engine; correctly matching magneto firing order to engine firing order; perform a conformity (examination) inspection of an ignition system; and perform a service and test spark and igniter plugs.

25 Hours

INDUCTION, SUPERCHARGING, COOLING AND EXHAUST SYSTEMS

CONTENT: Reciprocating and turbine engine induction system design and components; operational theory of superchargers, internal and external and their controllers; supercharger component overhaul and adjustment; engine cooling systems design, component and fluid temperatures; turbine and reciprocating engine exhaust system design and functions; and inspection and maintenance of systems.

STUDENT PERFORMANCE OBJECTIVE: Identify the component parts of an induction system; illustrate fluid flows through the induction systems; compare design features of different induction system types; explain the operational theory of external and internal superchargers and their control systems; perform an overhaul of a turbocharger and its controllers; explain the design features of an engine cooling system; operation of subsonic and supersonic exhaust ducts; and perform an airworthiness conformity inspection on induction and exhaust systems.

2 Hours

Final

COURSE CONTENT(CONTINUED):

LAB CONTENT:

67.5 Hours

RECIPROCATING ENGINE THEORY FAMILIARIZATION AND OVEHAUL PRACTICES

LAB PROJECTS: Disassemble reciprocating engine and completely clean all individual components; measure/inspect all components to determine which components must be replaced; reassemble engine; and test run engine. Follow procedures outlined in the manufacturer?s overhaul manual.

40.5 Hours

INSPECTION, SERVICING, REMOVAL, INSTALLATION AND TESTING OF RECIPROCATING AIRCRAFT ENGINES

LAB PROJECTS: Using the manufacturer?s service instructions, remove; reinstall; test and service engine.

54 Hours

TURBINE ENGINE OVERHAUL, INSPECTION, REMOVAL, INSTALLATION AND TESTING

LAB PROJECTS: Disassemble, clean and analyze component parts of a turbine engine using the manufacturer's manual and practices that are accepted standard of the industry; collect through computer data mining the information necessary to apply an airworthiness conformity inspection on an engine and its installation; and start and operate the engine at various power settings and apply troubleshooting procedures.

40.5 Hours

IGNITION SYSTEMS THEORY AND MAINTENANCE

LAB PROJECTS: Disassemble, examine (inspect), test, repair and reassemble a magneto; time a magneto to an engine; correctly matching magneto firing order to engine firing order; perform a conformity inspection of an ignition system; and perform a service and test spark and igniter plugs.

40.5 Hours

INDUCTION, SUPERCHARGING, COOLING AND EXHAUST SYSTEMS

LAB PROJECTS: Using the appropriate manual; disassemble, examine (inspect) and reassemble a turbocharger and its controllers; change (adjust) the controllers to the correct pressures as prescribed in the service manual; following the manufacturer's checklist, inspect each component part of an induction and exhaust system and determine its conformity as to airworthiness standards.

METHODS OF INSTRUCTION:

Instruction will be done by: Classroom lecture with the use of visual aids and laboratory demonstration. Evaluation will be done by written oral and practical examination, lab project sheets and by satisfactory completion of lab projects.

METHODS OF EVALUATION:

Writing assignments

Percent of total grade: 10.00 %

Percent range of total grade: 5% to 15% Written Homework, Lab Reports, Essay Exams, Term or Other Papers. If this is a degree applicable course, but substantial writing assignments are not appropriate, indicate reason: Course primarily involves skill demonstration or problem solving

Problem-solving assignments

Percent of total grade: 10.00 %

Percent range of total grade: 10% to 20% Homework Problems, Field Work, Lab Reports, Quizzes, Exams

Skill demonstrations

Percent of total grade: 20.00 %

Percent range of total grade: 10% to 20% Class Performance/s, Field Work, Performance Exams

Objective examinations

Percent of total grade: 50.00 %

Percent range of total grade: 30% to 50% Multiple Choice, True/False, Matching Items, Completion, Other: write in

Other methods of evaluation

Percent of total grade: 10.00 %

Percent range of total grade: 5% to 15%

OUT OF CLASS ASSIGNMENTS:

Out of Class Assignments
Required Outside Hours: 36
Assignment Description:
RECIPROCATING ENGINE THEORY FAMILIARIZATION AND OVEHAUL PRACTICES
Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 36
Assignment Description:
RECIPROCATING AIRCRAFT ENGINES
Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 72
Assignment Description:
INSPECTION, SERVICING, REMOVAL, INSTALLATION AND TESTING OF RECIPROCATING AIRCRAFT ENGINES
Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 72
Assignment Description:
TURBINE ENGINE OVERHAUL, INSPECTION, REMOVAL, INSTALLATION AND TESTING
Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 54
Assignment Description:
IGNITION SYSTEMS THEORY AND MAINTENANCE
Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 54
Assignment Description:
INDUCTION, SUPERCHARGING, COOLING AND EXHAUST SYSTEMS
Homework: Complete reading assignments and answer question sheets.
Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 10
Assignment Description:
INDUCTION, SUPERCHARGING, COOLING AND EXHAUST SYSTEMS
Homework: Complete reading assignments and answer question sheets.

METHODS OF EVALUATION:

Writing assignments

Percent of total grade: 5.00 %

Percent range of total grade: 5 % to 15 % Written Homework Lab Reports Essay Exams Term or Other Papers If this is a degree applicable course, but substantial writing assignments are not appropriate, indicate reason: Course primarily involves skill demonstration or problem solving

Problem-solving assignments

Percent of total grade: 10.00 %

Percent range of total grade: 10 % to 20 % Homework Problems Field Work Lab Reports Quizzes Exams

Skill demonstrations

Percent of total grade: 10.00 %

Percent range of total grade: 10 % to 20 % Class Performance/s Field Work Performance Exams

Objective examinations

Percent of total grade: 30.00 %

Percent range of total grade: 30 % to 50 % Multiple Choice True/False Matching Items Completion Other: write in

Other methods of evaluation

Percent of total grade: 5.00 %

Percent range of total grade: 5 % to 15 %

REPRESENTATIVE TEXTBOOKS:

Dale Crane. Aviation Maintenance Technician: Powerplant (Aviation Maintenance Technician series) Fourth Edition. ASA,2018.

Update to the latest version. This is the most current industry standards book.

ISBN: 978-1619546455

Reading Level of Text, Grade: 12th Grade Verified by: MS Word

FAA. Aircraft Inspection, Repair & Alterations: Acceptable Methods, Techniques & Practices (FAA AC 43.13-1B and 43.13-2B). ASA,2008.

FAA Standards Book. This is the most current industry standards book.

ISBN: 978-1619540217

Reading Level of Text, Grade: 12th Verified by: Microsoft Word

FAA. Aviation Maintenance Technician Handbook: Powerplant: FAA-H-8083-32A Volumes 1 & 2. ASA,2018.

Update to the latest version. This is the most current industry standards book.

ISBN: 978-1619548367

Reading Level of Text, Grade: 12th Verified by: MS Word

Recommended Representative Textbooks:

FAA AC43-13 & 8083-32A Vol I & II are available from the FAA website free as a PDF download

ARTICULATION and CERTIFICATE INFORMATION

CSU TRANSFER:

Transferable CSU

UC TRANSFER:

Not Transferable

SUPPLEMENTAL DATA:

Basic Skills: N
Classification: Y
Noncredit Category: Y
Cooperative Education:
Program Status: 1 Program Applicable
Special Class Status: N
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: B
Course Control Number: CCC000573691
Sports/Physical Education Course: N
Taxonomy of Program: 095020
CIP: