GAVILAN COLLEGE

5055 Santa Teresa Blvd
Gilroy, CA 95023

Course Outline

COURSE: AMT 120 DIVISION: 50 ALSO LISTED AS:

TERM EFFECTIVE: Spring 2018 CURRICULUM APPROVAL DATE: 03/27/2017

SHORT TITLE: POWERPLANT TECH

LONG TITLE: Aviation Powerplant Technology

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

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:

Completion of AMT 100, as UG, with a grade of C or better.

AND Completion of AMT 101, as UG, with a grade of C or better.

COREQUISITES:

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

STUDENT LEARNING OUTCOMES:

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

Measure of assessment: Homework assignments, quizzes and written tests.

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

Measure of assessment: Shop/lab projects and oral/practical demonstrations

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.

Measure of assessment: Shop/lab projects and oral/practical demonstrations

CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS

Curriculum Approval Date: 03/27/2017

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: The student will be able to 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: The student shall follow the manufacturer’s service instructions to remove; reinstall; test and service engine.

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 & engine operation and troubleshooting

STUDENT PERFORMANCE OBJECTIVE: The student will be able to 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: The student will be able to 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.

27 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: The student will be able to 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

LAB CONTENT:

67.5 Hours

RECIPROCATING ENGINE THEORY FAMILIARIZATION AND OVEHAUL PRACTICES

LAB PROJECTS: The student will 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. The student must follow procedures outline 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: The student 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: The student will be 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, the student will 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, the student will be able to 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: 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 %

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours: 16

Assignment Description:

RECIPROCATING ENGINE THEORY FAMILIARIZATION AND OVEHAUL PRACTICES

Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 10

Assignment Description:

RECIPROCATING AIRCRAFT ENGINES

Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 10

Assignment Description:

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

Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 13

Assignment Description:

TURBINE ENGINE OVERHAUL, INSPECTION, REMOVAL, INSTALLATION AND TESTING

Homework: Complete reading assignments and answer question sheets.

Required Outside Hours: 10

Assignment Description:

IGNITION SYSTEMS THEORY AND MAINTENANCE

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

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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 %

REPRESENTATIVE TEXTBOOKS:

Dale Crane. Aviation Maintenance Technician Series"Powerplant", ASA-AMT-P Third edition. ASA,2011.

Reading Level of Text, Grade: Reading level of text: 8 grade. Verified by: Microsoft word grammar check and the Gavilan College librarian

FAA Department of Transportation. Airframe and Powerplant Mechanics General Handbook FAA-H-8083-30. 2008.

Reading Level of Text, Grade: Reading level of text: 8 grade. Verified by: Microsoft word grammar check and the Gavilan College librarian.

FAA Department of Transportation. Airframe and Powerplant Mechanics Powerplant Handbook FAA-H-8083-32 Vol I&Vol II. 2012.

Reading Level of Text, Grade: Reading level of text: 8 grade. Verified by: Microsoft word grammar check and the Gavilan College librarian

Otis&Vosbury. AC43.13-1B 09/98, Aircraft Gas Turbine Jeppesen JS312648. FAA,2010.

Reading Level of Text, Grade: Reading level of text: 8 grade. Verified by: Microsoft word grammar check and the Gavilan College librarian.

Recommended Other Texts and Materials

FAA AC443-13 & 8083-30 & 32 Vol I & II are available from the FAA website free as a PDF download!

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:

CSU GE:

IGETC:

CSU TRANSFER:

Transferable CSU, effective 200730

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
CAN:
CAN Sequence:
CSU Crosswalk Course Department: AMT
CSU Crosswalk Course Number: 120
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: B
Maximum Hours:
Minimum Hours:
Course Control Number: CCC000573691
Sports/Physical Education Course: N
Taxonomy of Program: 095020