INSTRUMENTS/COMMUNICATION/NAVIGATION
Course Syllabus

Course Number: TRAM-2102
OHLAP Credit: No
OCAS Code: None
Course Length: 56 Hours
Career Cluster: Transportation, Distribution & Logistics
Career Pathway: Aviation Maintenance Technology
Career Major(s): Airframe Mechanic

Pre-requisite(s):
Course Description:
Aircraft instruments, position and warning systems and communication/navigation systems will be discussed. Hands-on inspection and systems check will be accomplished in the course.

Textbooks:
Dale Crane, Dictionary of Aviation Terms, Aviation Supplies and Academics, 1997
DOT, Aircraft Inspection and Repair, Jeppesen, Sanders, Inc., 1998

Course Objectives:
A. Lesson: INSTRUMENTS, POSITION AND WARNING SYSTEMS
1. Define terms related to instrument systems.
2. List the A&P mechanic's limitations and FAR guidelines for instrument marking, repair, and maintenance. (Level 1) (App. C,II,D,36)
3. Describe instrument panel construction, layout, and mounting.
4. Discuss the operation and construction of the bourdon tube mechanisms. (Level 1) (App. D,II,D,36) (AF-N5,N6,N7)
5. Discuss the operation and construction of the bellows-type mechanisms. (Level 1) (App. C,II,D,36) (AF-N16,N17)
6. Explain the operation of temperature and thermal couple systems. (Level 1) (App. C,II,D,36) (AF-N22)
7. Explain the operation of a wheatstone bridge. (Level 1) (App. C,II,D,36)
8. Discuss the operation of ratiometer. (Level 1) (App. C,II,D,36)
9. Describe the operation of remote position indicating systems. (Level 1) (App. C,II,D,36) (AF-N13,R1,R2,R3,R4,R9,R10,R11,R12, R13)
10. Discuss the operation and maintenance of the pitot-static system. (Level 1) (App. C,II,D,36) (AF-N4,N15)
11. Describe the operation of air speed indicators. (Level 1) (App. C,II,D,36)
12. Explain the operation of altimeters. (Level 1) (App. C,II,D,36) (AF-N3, N12, N19)
13. Discuss the operation of vertical speed indicators. (Level 1) (App. C,II,D,36)
14. Install instruments and perform a leak check on the pitot-static system. (Level 2) (App. C,II,D,36,37) (AF-N1,N18,N20)
15. Discuss heading instruments. (Level 1) (App. C,II,D,36) (AF-N10,N11)
17. Inspect and check speed and configuration warning systems. (Level 2) (App. C,II,H,51) (AF- R7,R8)
B. **Lesson: AIRCRAFT ENGINE INSTRUMENTS AND WARNING SYSTEMS**
1. Identify and discuss engine pressure instruments.
2. Discuss temperature indicating systems.
3. Explain types and operation of tachometer systems.
4. Describe usage of fluid flow meters.
5. Discuss torque meter usage and operation.
6. Identify vibration monitoring systems.
7. Describe purpose and operation of fault indicating and isolating systems.
10. § Inspect, check, service, troubleshoot, and repair as necessary an engine pressure indicating system. (Level 3) (App. D,II,A,10) (PP- H9,H14,H15,N8)
11. § Inspect, check, service, troubleshoot, and repair as necessary an engine RPM indicating system. (Level 3) (App. D,II,A,10) (PP- H6,H10)

C. **Lesson: COMMUNICATION AND NAVIGATION SYSTEMS**
1. Define terms related to communication and navigation systems.
2. Identify aircraft communication and navigation system frequencies. (Level 1) (App. C,II,E,39)
3. Discuss the propagation of radio waves and how information is transmitted.
4. Identify antenna types and the principles of their operation.
5. Discuss aircraft internal and external communication systems. (Level 1) (App. C,II,E,39)
6. Discuss FCC regulations concerning the operation of a two-way radio. (Level 1) (App. C,II,E,39) (AF-O19,O20)
7. Describe the procedures for an operational check of communication equipment. (Level 1) (App. C,II,E,39) (AF-O1)
8. Explain the operating principles, inspection, servicing, and operational checks of navigational systems including: VHF, static discharge, VOR, ILS, Loran, transponders, flight computers, and GPWS. (Level 1) (App. C,II,E,39) (AF-O4,O5,O6,O17,N9,O16)
9. List navigation systems and equipment. (AF-N8)
10. Discuss removal, handling, installation, and approval for return to service of navigation and communication equipment.
11. Discuss inspecting, checking, and troubleshooting autopilot servos and approach coupling systems. (Level 1) (App. C,II,E,38) (AF-O2,O3)
12. § Inspect a radio installation and perform an operational check. (Level 2) (App. C,II,E,39,40)(AF-O10,O11,O12,O13,O14,O15)
14. § Determine proper antenna location on an aircraft. (Level 2) (App. C,II,E,40) (AF-O18)
15. § Inspect and repair antenna installations. (Level 2) (App. C,II,E,40) (AF-O7)

**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.