



COURSE OUTLINE

AVI 203 / 62674
Course Number/Section

AIRCRAFT AND ENGINE COMPONENTS
Course Title

3 Credits / 3 Lecture Hours / 0 Laboratory Hours

SPRING 2007

TEXT:

- 1. Aircraft Powerplants, Latest Edition; Glencoe/McGraw-Hill**
- 2. FAR'S: Parts 1,21,23,33,39,43,45,65, 91, 121, 135, 145, and other materials supplied by instructor.**

Length of Semester 15 weeks

CATALOGUE DESCRIPTION:

The basic maintenance procedures, personnel, & regulations will be studied in conjunction with the fundamental components and systems of aircraft. Topics included in this course will be FAR'S, personnel, inspections, data, aircraft engines, airframes, systems, operating procedures and limitations, instruments and aircraft structures.

Prerequisites: College level Math and English ability or instructor approval

Course Coordinator: J. Blasenstein

Instructor: Jerry Kuhl

Office Location: BS 131

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(Do not assume I have received your e mail unless I acknowledge it.)

Office Hours:

MONDAY & WEDNESDAY 12:30PM-1:30PM

MONDAY & WEDNESDAY 5:00PM-5:45PM

FRIDAY 3:00PM-4:30PM

And by appointment

GENERAL OBJECTIVES :

It is the purpose of this course to have the student gain the knowledge of the design, function and operation of aircraft engines, engine instruments, and maintenance operations and personnel used to repair modern aircraft. The student should be able to understand the inspections and personnel that are related to aircraft and be able to explain the operations of various aircraft engine components and instruments. This is in keeping with the specific goals of the program to provide an informed and educated pilot who is well equipped to enter the academic or practical area of aviation and one who is also able to continually enhance and broaden their knowledge base.

SPECIFIC OBJECTIVES:

Unit I (3 weeks) -- INSPECTIONS, MAINTENANCE PROCEDURES, AIRCRAFT MAINTENANCE, PERSONNEL AND FORCES ACTING ON AN AIRCRAFT

The student should be able to define:

- | | |
|---------------------------------------|----------------------------------|
| a. Annual Inspection | s. Inoperative Equipment |
| b. 100 HR. Inspection | t. Minimum Equipment List |
| c. Progressive Inspection | u. Yield Point |
| d. Continuous Inspection | v. Ultimate Strength |
| e. A&P | |
| f. Inspection Authorization | |
| g. Type Certificate Data Sheet | |
| h. Specifications | |
| i. Listings | |
| j. STC | |
| k. TSO | |
| l. Major Overhaul | |
| m. Top Overhaul | |
| n. Alteration | |
| o. Minor Repair | |
| p. Major Repair | |
| q. Repair Station | |
| r. Forces on an Aircraft | |

The student should be able to differentiate between the various types of inspections an aircraft can undergo; understand the various maintenance facilities where repairs are made; and explain the forces an aircraft is subjected to in flight.

Unit II (7 weeks) -- THE AIRCRAFT PISTON ENGINE AND SYSTEMS

The student should be able to define:

- a. Horsepower**
- b. Indicated horsepower**
- c. Brake or shaft horsepower**
- d. Compression ratio'-**
- e. BMEP**
- f. METO Power**

The student should be able to:

- a. Describe the fundamentals of how a piston engine produces power.**
- b. Describe the difference between liquid and air cooled engines.**
- c. Describe the general configuration of in-line, opposed and radial engines.**
- d. Describe the principal parts of a piston engine.**
- e. Define the types of bearings used in engines and the qualities that they possess.**
- f. Describe the difference in appearance between an intake valve and an exhaust valve.**
- g. Know and understand the internal components in the wet and dry lubrication systems .**
- h. Describe the principal features of an aircraft piston engine ignition system.**
- i. Describe and know the difference between a supercharger, turbocharger and a turbo-supercharger.**
- j. Understand the four stroke, five event Otto cycle.**
- k. Explain how a propeller converts engine power into thrust.**
- 1. Describe and understand the various types of aircraft propellers in use.**

The student should be able to describe the following accessories and systems used in aircraft.

- a. Starting systems,**
- b. Engine driven generators and alternators**
- c. Ignition systems**
- d. Lubricating systems**
- e. Fuel supply systems**
- f. Carburetion and fuel injection**
- g. Landing gear and brake systems**
- h. Electrical system distribution and devices**

Unit III (3 weeks) --AIRCRAFT JET ENGINES

The student should be able to:

- a. Describe the main components of a gas turbine engine.**
- b. Describe the construction of stator and rotor blades and their function in the engine.**
- c. Describe the instruments that measure thrust in a gas turbine engine.**
- d. Understand and explain how a jet engine operates.**
- e. Define the parameters of jet engine operations and monitoring.**
- f. Describe the differences between pure jet, pulse jet, ramjet, turboprop, bypass engines, turbofan engines.**
- g. Describe what a water injection system is and what it does.**
- h. Describe the centrifugal and axial flow engine.**
- i. Describe an afterburner and its operation.**

Unit IV (2 weeks) --AIRCRAFT AND FLIGHT INSTRUMENTS -

The student should be able to describe the construction, principle of operation, accuracy and reliability of the following engine instruments and systems:

(Referenced flight instruments may also be included)

- a. Pilot-static systems**
- b. Pressure altimeters**
- c. Vertical speed indicators**
- d. Airspeed indicators**
- e. Air temperature gauges**
- f. Angle of attack indicator**
- g. Magnetic compasses**
- h. Gyroscopes**
- i. Tachometers**
- j. Manifold pressure gauges**
- k. Engine temperature and pressure ratio gauges**
- l. Fuel management**

ATTENDANCE:

Attendance is a requirement for class. Mercer does not have a class cut policy. If you know you will be absent please call (609) 570-3487 or 570-3489. Three absences will result in lowering your grade one letter grade. Additional absences will result in additional penalties including withdrawal from the roster and failing the course. Lateness after five minutes are absences, please do not come into the class.

GRADING:

Three announced quizzes 25% each, Final Exam 25%, Classroom Participation and other assignments will be taken into account.

ACADEMIC INTEGRITY STATEMENT:

"A student who:

- a.) knowingly represents work as his/her own;**
 - b.) uses or obtains unauthorized assistance in the execution of any academic work; or**
 - c.) gives fraudulent assistance to another student "...is guilty of cheating. Violators will be penalized."**
- (Student Handbook)**

CLASSROOM CONDUCT STATEMENT:

It is the student's responsibility to attend all of their classes. If they miss a class meeting for any reason, students are responsible for all content that is covered, for announcements made in their absence, and for acquiring any materials that may have been distributed in class. It is expected that students be on time for all their classes. If students walk into a class after it has begun, it is expected that they choose a seat close to where they entered the room so that they do not disrupt the class meeting.

Students are expected to follow ordinary rules of courtesy during class sessions. Engaging in private, side conversations during class time is distracting to other students and to the instructor. Leaving class early without having informed the instructor prior to class is not appropriate. Unless there is an emergency, leaving class and returning while the class is in session is not acceptable behavior.

Disruptive behavior of any type, including cell phone usage, is not appropriate. Cell phone ringing or usage during a test will result in a grade of zero.