

# Aircraft Engine Operation-23094

## CAV 2340 -010

### Course Description/Overview

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This course introduces the new aviation student to the basic understanding of the different types of aircraft engines. The study of aircraft engine operation will include gas-turbine engines and internal combustion engines. The course provides a basic understanding of how aircraft engines operate so that the aviation student will have practical knowledge regarding the information needed for safety.

#### **Prerequisite Knowledge**

Freshman standing

#### **Course Technology**

Students should be familiar with the use of Microsoft Office Word and PowerPoint (or other acceptable presentation) software and have access to Angelo State University Blackboard.

#### **Class Meeting Times**

CAV 2340 class meets in RAS 265 on Mon & Wed from 9:00 a.m. to 10:15 a.m.

#### **Technical Support**

The Technology Service Center (TSC) may be contacted by calling (325) 942-2911 or 1-866-942-2911 or by email at [helpdesk@angelo.edu](mailto:helpdesk@angelo.edu)

### Faculty/Instructor Information

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Name: Rebecca Shorey

*Adjunct Instructor*

Office: Rassman #202

Phone: 325-486-6299

E-Mail: [rebecca.shorey@angelo.edu](mailto:rebecca.shorey@angelo.edu)

Office Hours: M & W 11:00p – 12:00p and by appointment

### Course Objectives

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The objectives of this course are for you to develop basic applicable knowledge of aircraft engine operation regarding:

- Basic understanding of engine design and classification
- Key understanding of Reciprocating-Engine Construction
- Internal-Combustion Engine Theory
- Engine systems

Like other introductory courses, you will be exposed to and expected to learn the “language of aircraft engine operations” (that is, terms and concepts) utilized by professionals in the aviation industry including pilots and mechanics. Therefore, it is also expected that by the end of the course you will have a fundamental understanding of the basics of engine operations.

This course is designed to be interactive, experiential, and pragmatic while developing your conceptual and technical knowledge of aircraft engine operation. Case studies may be used to enhance learning.

Groups of students will present case studies in this course.

These objectives can only be achieved through a joint effort: I will work to stimulate your interest and learning in these areas, but you will be expected to display initiative and a program of self-study as well. In that sense, a complementary objective of the course is to provide you with an environment that will encourage and reward your own intellectual effort, while simultaneously maintaining rigorous standards that identify those who are motivated to pursue excellence in their own educational preparation for a future career in aviation.

### **Student Learning Outcomes**

After completing this course, you should be able to:

- Identify the parts of an internal-combustion engine
- Demonstrate knowledge of the nomenclature of aircraft engine construction
- Demonstrate knowledge of the specifics on the engine operation
- Express an understanding of current topics regarding alternative fuels and diesel engines

### **Methods of Assessing Learning Outcomes**

Student knowledge and proficiency will be assessed through the following methods:

- Three examinations will assess the ability to remember and understand the core proficiencies related to aircraft engine operation.
- 15-chapter review assignments will assess chapter knowledge.
- Final Presentations will assess the competencies in interpersonal oral communication, presentation proficiencies, and a demonstrable ability to express an understanding of aircraft engine failures.

## Course Textbook and Required Readings

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Wild, Thomas W., (2018). *Aircraft Powerplants, 9<sup>th</sup> ed.* New York, NY: McGraw Hill. ISBN:978-1-259-83570-4.

## Grading Policies

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This course employs the following to measure student learning:

Exam 1	100 points
Exam 2	100 points
Exam 3	100 points
Chapter Review Questions	50 points
<u>Final Presentation</u>	<u>50 points</u>
Total Points	400 points

Angelo State University employs a letter grade system. Grades in this course are determined on a percentage scale:

A = 90% - 100%	360-400 points
B = 80% - 89%	320-359 points
C = 70% - 79%	280-319 points
D = 60% - 69%	240-279 points
F = Below 60%	Below 240 points

### Tests and Final Exams

The tests during the term are objective-test format. The tests will consist of multiple-choice questions given in the traditional format (given in the classroom on the dates specified on the Class Schedule). SCANTRON answer forms will be provided at no cost to students during the term for the multiple-choice questions.

The tests during the term will generally involve about 40-50 choice questions and they will sample about evenly from both the general concepts and the details presented in the text and in class.

Please keep in mind that being prepared and taking the tests during the allocated times is your responsibility. The tests are on the schedule and I urge you to mark them on your calendar now. Missing a scheduled test without approval will result in a zero for that test.

Feedback will be provided for each test, typically on the first class day following each exam. However, you are welcome to contact me at any point to review your test in more detail if you wish. I will be pleased to go over your test with you personally if you have questions or concerns that are not discussed in the review of the exam. **Each exam is worth 100 points.**

## Chapter Review Questions

The purpose of the chapter review questions is to offer an opportunity for you to demonstrate your understanding of each chapter and communicate that understanding to me. You will read the chapter and answer the review questions at the end of the chapter in Blackboard. **Each post is worth 4 points.**

## Final Presentation

The purpose of the presentations is to enhance interpersonal communication skills, which are essential in today's aviation environment. **The Final Presentation is worth 50 points.**

Present the following:

1. Overview of the presentation topic
2. Overview of the aviation issue involved
3. Discuss what can be learned from the case

You will find these guidelines helpful for your success in your group presentation:

- Analyze any graphs or charts in the case.
- Provide a copy of presentation before you present which may include PowerPoint slides to accompany your presentation.
- Present for at least 10 minutes in length.

## Response Time

I will respond to email questions within one business day (24 hours), and homework will be graded and posted within one week after the due date. Individual exams will be graded and returned to the students within one week of the exam date.

## Missed/Late Work

Generally speaking, any assignment or test that is not completed or turned in on time will be counted as a zero grade. Any exceptions made will be on a case-by-case basis. Students with approved absences will be allowed time to take make up exams and/or turn in assignments.

## Participation/Absenteeism

You are expected to participate in class discussions. You are also expected to stay off your phone or any other personal electronic device that interferes with class instruction or distracts your fellow students.

Attendance is not only strongly encouraged but expected. The model I will use in assigning attendance grades is as follows for unexcused absences:

0 to 2 absences	Qualifies you for any curve that may be given at the end of the term, final grade, or exams.
3 to 4 absences	You do not qualify for any curve that is given.
5 to 6 absences	Your final grade is dropped by a letter grade.
7+ absences.	You will receive an "F" for the term.

It is your responsibility to keep track of your attendance. If you leave before the class ends or arrive late, you will be marked absent. Your Final is a group project and presentation; therefore, your attendance is mandatory to receive full credit. No exceptions.

## **Final Exam**

Your final exam will be a group presentation of a current topic in aircraft engine operation with instructor scoring of the live presentation. Since it is a group presentation - attendance is mandatory for full credit. No exceptions.

## **Course Policies**

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### ***Course Syllabus Statement on Required Use of Masks/Facial Coverings by Students in Class At Angelo State University***

As a member of the Texas Tech University System, Angelo State University has adopted the mandatory Facial Covering Policy to ensure a safe and healthy classroom experience. Current research on the COVID-19 virus suggests there is a significant reduction in the potential for transmission of the virus from person to person by wearing a mask/facial covering that covers the nose and mouth areas. Therefore, in compliance with the university policy students in this class are required to wear a mask/facial covering before, during, and after class. Faculty members may also ask you to display your daily screening badge as a prerequisite to enter the classroom. You are also asked to maintain safe distancing practices to the best of your ability. For the safety of everyone, any student not appropriately wearing a mask/facial covering will be asked to leave the classroom immediately. The student will be responsible to make up any missed class content or work. Continued non-compliance with the Texas Tech University System Policy may result in disciplinary action through the Office of Student Conduct.

### ***Academic Honesty and Integrity***

Angelo State University expects its students to maintain complete honesty and integrity in their academic pursuits. Students are responsible for understanding and complying with the university Academic Honor Code, which is in both print and web versions of the ASU Student Handbook.

Academic integrity is expected. This includes, but is not limited to, any form of cheating, plagiarism, unauthorized sharing of work, or unauthorized possession of course materials. The professor assumes that all students can be trusted. Please do not violate this trust. Violation of academic integrity will result in a failing grade for the course.

It is the professor's intention to be as fair and impartial as is humanly possible. Therefore, all students will be asked to adhere to the same set of guidelines and rules UNLESS there are disabilities or documented extenuating circumstances that have been discussed with the professor and the Student Life Office. Please make sure you inform the professor as soon as any situation arises. Do NOT wait until the problem is compounded by poor class performance, poor attendance, etc.

### ***Code of Ethics***

Students, faculty, administrators and professional staff of the College of Business should always:

- Be forthright and truthful in dealings with all stakeholders
- Take responsibility for one's actions and decisions
- Serve as an example of ethical decision-making and behavior to others
- Admit errors when they occur, without trying to conceal them
- Respect the basic dignity of others by treating them as one would wish to be treated

### ***Courtesy and Respect***

Courtesy and respect are essential ingredients to this course. We respect each other's opinions and respect others points of view at all times while in our class sessions. The use of profanity and harassment of any form is strictly prohibited (Zero Tolerance), as are those remarks concerning one's ethnicity, life style, religion, etc., violations of these rules will result in appropriate disciplinary actions.

## ***Accommodations for Disability***

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA), and subsequent legislation.

Student Affairs is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability, and it is the student's responsibility to initiate such a request by emailing [studentservices@angelo.edu](mailto:studentservices@angelo.edu), or by contacting:

Mrs. Dallas Swafford  
Director of Student Development  
Office of Student Affairs University  
Center, Suite 112  
325-942-2047 Office  
325-942-2211 FAX  
[Dallas.Swafford@angelo.edu](mailto:Dallas.Swafford@angelo.edu)

## ***Student absence for religious holidays***

As stated in the Angelo State University Operating Policy and Procedures (OP 10.19 Student Absence for Observance of Religious Holy Day), a student who intends to miss class to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence.

## ***Course Drop***

To view information about how to drop this course or to calculate important dates relevant to dropping this course, you can visit [http://www.angelo.edu/services/registrar/office/course\\_drop\\_provisions.php](http://www.angelo.edu/services/registrar/office/course_drop_provisions.php).

## ***Incomplete as a Course grade***

As stated in the Angelo State University Operating Policy and Procedure (OP 10.11 Grading Procedures), the grade "I" is given when the student is unable to complete the course because of illness or personal misfortune. For undergraduates, an "I" that is not removed before the end of the next long semester automatically becomes an "F". A graduate student will be allowed one year to remove a grade of "I" before it automatically becomes an "F". To graduate from ASU, a student must complete all "I's".

## ***Title IX at Angelo State University***

Angelo State University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from sex discrimination of any kind. The University prohibits discrimination based on sex, which includes pregnancy, sexual orientation, gender identity, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination including: sexual assault, sex-based discrimination, sexual exploitation, sexual harassment, public indecency, interpersonal violence (domestic violence and/or dating violence), and stalking. As a faculty member, I am a Responsible Employee meaning that I am obligated by law and ASU policy to report any allegations I am notified of to the Office of Title IX Compliance. This is done in order to connect students with resources and options in addressing the allegations reported. As a student, are encouraged to report any incidents of sexual misconduct directly to ASU's Office of Title IX Compliance and the Title IX Coordinator. You may do so by contacting:

**Michelle Miller, J.D.**

Title IX Coordinator

Mayer Administration Building, Room 210

325-942-2022

[michelle.miller@angelo.edu](mailto:michelle.miller@angelo.edu)

You may also file a report online 24/7 at [www.angelo.edu/incident-form](http://www.angelo.edu/incident-form).

If you are wishing to speak to someone about an incident in confidence you may contact the University Health Clinic at 325-942-2171, Counseling Services at 325-942-2371 or the ASU Crisis Helpline at 325-486-6345.

The Office of Title IX Compliance also provides accommodations related to pregnancy (such as communicating with your professors regarding medically necessary absences, modifications required because of pregnancy, etc.). If you are pregnant and need assistance or accommodations, please contact the Office of Title IX Compliance utilizing the information above.

For more information about Title IX in general you may visit [www.angelo.edu/title-ix](http://www.angelo.edu/title-ix).

### ***Grade Appeal Process***

As stated in the Angelo State University Operating Policy and Procedures (OP 10.03 Student Grade Grievances), a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, has experienced inequitable evaluation procedures, or inappropriate grading practices, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the grade appeal process and the number of days allowed for completing the steps in the process, see Operating Procedure 10.03 at: <http://www.angelo.edu/content/files/14196-op-1003-grade-grievance>.

## Course Outline

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### CAV 2340 Airplane Engine Operations Class Schedule - Spring, 2022

<b>Week</b>	<b>Class Activity</b>
wk1 – 01/19	Chapter 1: Aircraft Powerplant Classification-End of Chapter Review Questions 3-8, due by 1/24.
wk2 – 01/24	Chapter 2: Reciprocating-Engine Construction and Nomenclature – End of Chapter Review Questions 8, 13, 15, 18, 21, 29, due 1/31
wk3 – 01/31	Chapter 3: Internal-Combustion Theory and Performance-End of Chapter Review Questions 1, 4, 6, 19, 20, 24, due 2/7.
wk4 – 02/07	Chapter 4: Lubricants and Lubricating Systems-End of Chapter Review Questions 4, 6, 8, 9, 11, 13, due 2/14.
wk5 – 02/14	Chapter 5: Induction, Supercharger, Turbocharger, Cooling, and Exhaust Systems-End of Chapter Review Questions 2, 6, 8, 18, 20, 24, due 2/21.
wk6 – 02/21	Chapter 6: Basic Fuel Systems and Carburetors-End of Chapter Review Questions 1, 5, 8, 10, 23, 26, due 2/28.
<b>wk7 – 02/28</b>	<b>Exam 1 (Chapters 1, 2, 3, 4, 5, 6)</b> Chapter 7: Fuel Injection Systems-End of Chapter Review Questions 1, 2, 8, 15, 20, 21, due 3/7.
wk8 – 03/07	Chapter 8: Reciprocating Engine Ignition and Starting Systems-End of Chapter Review Questions 1, 12, 15, 16, 17, 21, due 3/21.
<b>wk9 - 03/14</b>	<b>Spring Break</b>
wk10 – 03/21	Chapter 9: Operation, Inspection, Maintenance, and Troubleshooting of Reciprocating Engines-End of Chapter Review Questions 1, 5, 8, 10, 12, 20, due 3/28.
<b>wk11 – 03/28</b>	<b>Exam 2 (Chapters 7, 8, 9)</b> Chapter 11: Principal Parts, Construction, Types, and Nomenclature of Gas-Turbine Engines-End of Chapter Review Questions 1, 7, 12, 14, 15, 21, due 4/4.

wk12 – 04/04 Chapter 16: Turbofan Engines-End of Chapter Review Questions 1, 2, 3, 6, 7, 18, due 4/11.

wk13 – 04/11 Chapter 17: Turboprop Engines- End of Chapter Review Questions 1, 3, 12, 18, 19, 27, due 4/18.

wk14 – 04/18 Chapter 20: Propeller Theory, Nomenclature, and Operation-End of Chapter Review Questions 8, 11, 12, 18, 19, 23, due 4/25.

**wk15 – 04/25 Exam 3 (11, 16, 17, 20) and Final Presentation Prep**

**wk16 – 05/02 Group Final Presentations**

***\*\*\*schedule and assignments subject to change\*\*\****