

AE 167 –Aerospace Propulsion**Instructor Info**

Professor Alex Carlozzi
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Credit

3 units

Class Days / Time

TR, 16:30 – 17:45

Final Exam

Friday, 20 May 2016, 14:45 – 17:00

Classroom

Engr. 164

Prerequisites

“C-” or better in AE 160 and AE 164

Textbook

J.D., Mattingly, Elements of Propulsion: Gas Turbines and
Rockets, AIAA Education Series, 2006

Description

Overall performance characteristics of ramjets, turbojets, turbofans, rockets.
Performance analysis of inlets, exhaust nozzles, compressors, burners, and turbines.
Rocket flight performance, single-/multi-stage chemical rockets, liquid/solid propellants
and design problems.

Goals

Introduce students to the basic principles and design of:
a) Air breathing propulsion systems.
b) Space propulsion systems.

AE 167 –Aerospace Propulsion**Learning Objectives**

Students completing AE167 should be able to:

1. Perform a thermodynamic analysis of, turbojet, and turbofan engines.
2. Analyze the performance of subsonic and supersonic inlets.
3. Analyze the performance of combustors, afterburners, and exhaust nozzles.
4. Analyze the performance of axial flow compressors and turbines.
5. Carry out flight performance calculations for rockets.
6. Analyze the performance of solid and liquid rockets.

Approximate Weekly Schedule

<u>Week</u>	<u>Topic(s)</u>
01	Introduction; review of aerothermodynamics required in engine analysis
02	Aircraft gas turbine engine
03	Parametric cycle analysis of ideal engines
04	Turbojets
05	Turbofans
06	Subsonic inlets
07	Supersonic inlets
08	Compressors
09	Turbines
10	Combustors
11	Nozzles (Jet and Rocket)
12	Liquid rocket engines
13	Thrust chambers
14	Solid rocket engines
15	Rocket vehicle performance, ascent trajectory analysis, attitude maneuvers, examples from the Apollo Program.

Grading			
	Biweekly quizzes	600	Points
	Project	200	Points
	Homework Problems (NO LATE HOMEWORK!!!)	200	Points
	950	Points	< A+
	900	Points	< A
	850	Points	< A-
	800	Points	< B+
	750	Points	< B
	700	Points	< B-
	670	Points	< C+
	650	Points	< C
	600	Points	< D
	Below 600 Points = F		

Project

Work in assigned teams to define an aerospace propulsion project of your choice. A proposal is due no later than the 3rd week of the semester following the posted guidelines. Progress reports are due every 2 weeks throughout the semester. A final report and an oral presentation are due at the end of the semester.