Other Useful References:

1. Textbooks
    a. Oates, Aerothermodynamics of Gas Turbine and Rocket Propulsion, AIAA (A somewhat dated book on propulsion)
    b. Hill P., and C. Peterson (1992). Mechanics and Thermodynamics of Propulsion, 2nd Ed., Addison---Wesley (an excellent, albeit dated, reference on the subject)
    c. Sutton, G. P. and O. Biblarz (2001). Rocket Propulsion Elements, 8th Ed., Wiley (Classic text on rocket propulsion, extensively updated --- an excellent reference on the subject)
2. Journal articles, Conference papers and Technical reports
3. Personal notes

PREREQUISITES: ASEN 3113 & APPM 2360

REQUIRED EQUIPMENT: As needed for access to Canvas, lecture attendance and completion of assignments

COURSE OBJECTIVES: The goal of this course is to build an understanding of the different types of propulsion systems (both airbreathing and rocket), their relative performance trade-offs, and how they fit within the context of a vehicle "system". Specific emphasis will be placed on fundamental cycle analyses, component and propulsion system level understanding, and challenges with propulsion integration. Students will apply aerodynamics, fluid mechanics, thermodynamics, structural/thermal systems, and chemistry.

TOPICAL OUTLINE:

1. Introduction & Overview (Chapter 1)
2. Fundamentals (Chapters 2 & 3)
    a. Engineering solution method
    b. Thermodynamics
    c. Control volume analysis
    d. Perfect gas
    e. Chemical reactions
    f. Inviscid & compressible flows
    g. Normal shock
3. Compressible flows (Chapters 3)
4. Analysis and performance of airbreathing propulsion systems (Chapters 4-8, 11)
    a. Aircraft gas turbine engine
    b. Parametric cycle analysis of idealized engines
    c. Component performance - inlets, nozzles and combustors
    d. Parametric cycle analysis of real engines
    e. Engine performance analysis
5. Rocket Propulsion (Chapter 10, instructor provided material)
6. Rocket Project w/ solid rocket motor modeling & simulation with validation using experimental data

COURSE ASSIGNMENTS:

- x Readings
- x Lectures
- x Homework
- x Quizzes
- x Term Exams
- x Rocket Project Final Report

ACADEMIC INTEGRITY AND GRADE SCHEDULE:

Evaluated Outcomes: The Department of Aerospace Engineering Sciences has adopted a policy of assigning grades according to “evaluated outcomes” in

Table 2. Letter Grade Assignment for Final Student Grading

Letter Grade	Percent Grade	4.0 Scale
A	93-100	4.0
A-	90-92	3.7
B+	87-89	3.3
B	83-86	3.0
B-	80-82	2.7
C+	77-79	2.3
C	73-76	2.0
C-	70-72	1.7
D	60-69	1.0
F	Below 60	0.0

IMPORTANT NOTES AND CLASS POLICIES:

1. Homework assignments are due at the start of class on the due date and quizzes may be given at any point during a class, so be sure to attend regularly and arrive on time! If you must miss class for an excused absence, you may submit your homework early. Late assignment

ASEN

Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition, see Temporary Medical Conditions on the Disability Services website.