

MAE 4321
AEROSPACE PROPULSION
FALL SEMESTER, 2009
TTh 11:00 am – 12:20 pm, 208 WH

- Instructor: Dr. Donald R. Wilson
- Office: 206B, Woolf Hall
- Office Hours: MWF 9:00 a.m.–12 Noon, Afternoons by appointment.
- Telephone: (817) 272-2072
- Email: wilson@uta.edu
- Course Prerequisites: MAE 3303 or MAE 3311
- Required Textbook(s): *Elements of Propulsion - Gas Turbines and Rockets*, Jack D. Mattingly, AIAA Education Series, 2006

Course Description:

Design and performance analysis of aerospace propulsion systems. Development of thrust and efficiency relations; mission requirements; cycle analysis for rocket, ram/scramjet, turbojet, turbofan, detonation wave and combined cycle engines; component design and performance analysis; propulsion system design/off-design performance analysis.

Course Goals/ Objectives:

Introduce students to aerospace propulsion system design and performance analysis methods.

Specific Course Requirements/ Grade Determination

Quizes (2)	60%
Homework assignments	15%
Design Project	<u>25%</u>
	100%

There are **two key assignments** in this course for the purpose of our ABET Assessment Process. One is a paper on “**Contemporary Issues**” in the field of aerospace propulsion, and the other is the “**Final Design Project.**” ***In order to pass this class, students must submit and pass both key assignments.*** If either key assignment is not submitted and passed, the student will not pass the class even if he/she scores perfectly on all exams and other assignments.”

Policy on Late Homework: Late homework will not be accepted unless extenuating circumstances arise— all homework assignments must be turned in on the due date even if incomplete.

Course Web Site: Note, login and password are case sensitive!

<http://www-woolf.uta.edu>
Login – 4321wilson
Password – 12matspace06

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Topic Outline

Introduction

- Course outline
- Aerospace propulsion systems
- Review of fundamental aerothermodynamics

Thrust/Efficiency Relations

- Rocket engines
- Air-breathing engines

Mission Requirements

- Atmospheric cruise vehicles
- Transatmospheric vehicles

Thermodynamic Cycle Analysis

- Rockets
- Ram/scramjets
- Turbojets/turbofans
- Detonation wave engines
- Combined cycle engines

Quiz # 1

Component Design/Performance Analysis

- Combustors
- Nozzles
- Inlets
- Turbomachinery

Quiz # 2

Propulsion System Design/Off-Design Performance Analysis

- Rocket engines
- Air-breathing engines
- Combined cycle engines

Final Design Project

Drop Policy: [Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. Contact the Financial Aid Office for more information.

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Academic Integrity: It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University. According to the UT System Regents' Rule 50101, §2.2, "Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts."

Student Support Services Available: The University of Texas at Arlington has established a variety of programs to help students meet the challenges of college life. Support to students includes advising, counseling, mentoring, tutoring, supplemental instruction, and writing assistance. For a complete list of academic support services, visit the Academic Assistance resource page of the Office of Student Success Programs, www.uta.edu/uac/studentsuccess/academic-assistance. To help students address personal, academic and career concerns, individual counseling is also available. For more information, students are encouraged to contact Counseling Services www.counseling.uta.edu at (817) 272-3671 or visit a counselor in 216 Davis Hall.

Electronic Communication Policy: The University of Texas at Arlington has adopted the University "MavMail" address as the sole official means of communication with students. MavMail is used to remind students of important deadlines, advertise events and activities, and permit the University to conduct official transactions exclusively by electronic means. For example, important information concerning registration, financial

aid, payment of bills, and graduation are now sent to students through the MavMail system. All students are assigned a MavMail account. ***Students are responsible for checking their MavMail regularly.*** Information about activating and using MavMail is available at <http://www.uta.edu/oit/email/>. There is no additional charge to students for using this account, and it remains active even after they graduate from UT Arlington.