

**AE/ME 5365: Introduction to Rotorcraft and Tiltrotor Modeling and Simulation**  
**Spring 2007**  
**Tuesday/Thursday 4:00pm – 5:20pm**  
**Woolf Hall 208**

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**Office Hours:** TBA

**Description of Course Content:**

This graduate level course introduces the engineer to helicopter and tiltrotor simulation, which is significantly different from airplane or spacecraft simulation because of the unique flying capabilities of rotorcraft. The course relies heavily on mathematical tools and first principles. A review of units, linear algebra, trigonometry, the calculus, vectors and integration techniques is presented in the first weeks. This is followed by study of kinematics and axis systems. Afterward, study focuses on aerodynamic fundamentals. The majority of the class is devoted to modeling subsystems of a rotorcraft, with emphasis on rotors, propellers, wings, and fuselages. Engines, drive systems, landing gear and simple control systems are also reviewed. Finally, problems in trimming and maneuvering are examined.

**Pre-requisites** for this ambitious course are a B.S. in aerospace, mechanical or other related engineering field, and familiarity with the calculus and numerical techniques.

**Course Topics:**

1. Review of Units
2. Structure of a Simulation
3. Review of Required Mathematics
4. Vectors and Vector Resolution
5. Open and Closed Integration Techniques
6. Axis Systems
7. Basic Kinematics and Flight Dynamics
8. Aerodynamic fundamentals
9. Wing Theory
10. Propellers Theory
11. Rotor Theory
12. Dealing with Arbitrary Shapes
13. Aerodynamic Interference and Wash Models
14. Engine Theory
15. Drive Systems
16. Landing Gear Models
17. Control Systems
18. Trimming Methods

**Drop Policy:** Per university drop policy.

**Americans With Disabilities Act:**

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 92-112 - The Rehabilitation Act of 1973 as amended. With the passage of federal legislation entitled *Americans with Disabilities Act (ADA)*, pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.

As a faculty member, I am required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty of their need for accommodation and in providing authorized documentation through designated administrative channels. Information regarding specific diagnostic criteria and policies for obtaining academic accommodations can be found at [www.uta.edu/disability](http://www.uta.edu/disability). Also, you may visit the Office for Students with Disabilities in room 102 of University Hall or call them 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.

"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." (Regents' Rules and Regulations, Series 50101, Section 2.2)

**Student Support Services Available:**

The University of Texas at Arlington supports a variety of student success programs to help you connect with the University and achieve academic success. These programs include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at 817-272-6107 for more information and appropriate referrals.

**Final Review Week:**

A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabi. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. Classes are held as scheduled during this week and lectures and presentations may be given.

**E-Culture Policy:**

The University of Texas at Arlington has adopted the University email address as an official means of communication with students. Through the use of email, UT-Arlington is able to provide students with relevant and timely information, designed to facilitate student success. In particular, important information concerning registration, financial aid, payment of bills, and graduation may be sent to students through email.

All students are assigned an email account and information about activating and using it is available at [www.uta.edu/email](http://www.uta.edu/email). New students (first semester at UTA) are able to activate their email account 24 hours after registering for courses. There is no additional charge to students for using this account, and it remains active as long as a student is enrolled at UT-Arlington. Students are responsible for checking their email regularly.

**Grade Grievance Policy:** Per university catalog.