

AE 6345
Turbulence
Fall 2015
Tuesday, Thursday
12:30 p.m. - 1:50 p.m.
WH 308

- 1. Instructor:** Frank K. Lu
2. Office Location: 249A NH
3. Office Hours: Open door policy or by appointment (via email)
4. Phone: 2-2083
5. Fax: 2-5010
6. Mailbox: 19018
7. Email: franklu@uta.edu
8. Instructor WWW Site: [All information will be posted on BLACKBOARD](#)

9. Link to Additional Course Info:

10. Course Prerequisites: A graduate course in fluid mechanics and mathematics. Otherwise, with instructor's approval.

11. Required Readings/Materials:

Pope, S.B., *Turbulent Flows*, 2nd ed., Cambridge, New York, 2000

- Davidson, P.A., *Turbulence*, Oxford, New York, 2004
- Durbin, P.A. and Pettersson Reif, B.A., *Statistical Theory and Modeling for Turbulent Flows*, Wiley, New York, 2001
- Supplemental material as necessary

12. Course Description:

This is an advanced course for engineering students with an interest in the physical, numerical and theoretical aspects of turbulence. The course begins with a review of the conservation equations for incompressible flow. It then develops statistical descriptions pertaining to fluid mechanics. A classical description of turbulence via Reynolds averaging is developed and applied to a number of different free shear flows, followed by wall-bounded flows. The second part of the course is devoted to modeling and simulation, including direct numerical simulation, classical turbulence modeling, PDF methods and large eddy simulation

13. Course Learning Goals/Objectives:

- To develop an understanding of turbulence and turbulent flows
- To be familiar with the applicability and limitations of turbulence modeling, including state-of-the-art challenges
- To be equipped for research into turbulent flows

14. Attendance and Drop Policy:

No attendance policy

Drop policy per university policy

STANDARD UNIVERSITY POLICIES

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: Students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Lab Safety Training: Students registered for this course must complete all required lab safety training prior to entering the lab and undertaking any activities. Once completed, Lab Safety Training is valid for the remainder of the same academic year (i.e., through the following August) and must be completed anew in subsequent years. There are no exceptions to this University policy. Failure to complete the required training will preclude participation in any lab activities, including those for which a grade is assigned.

For MAE 2381, the lab safety training is conducted during the first lab meeting. If you are absent from the meeting, you must make up the training or you will be dropped from the course.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as "lecture," "seminar," or "laboratory" shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters

the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

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 syllabus*. 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. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, [which is located \[insert a description of the nearest exit/emergency exit\]](#). When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.