
Course AE/ME 6310

Spring 2016

TTh 12:30-1:50

Nedderman Hall Room 203

Instructor: Kent L. Lawrence **Office:** 300D Woolf Hall

Office Hours: 2:00-3:00 TTh or by appointment or any other times I'm in the office & free. **Phone:** 817.272.2019

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Teaching Assistant: Artik Patel **Office:** WH-323C **TA Office Hours:** MW 1:00 - 2:30

Web site: <http://mae.uta.edu/~lawrence>

Course Prerequisites: ME 5310 or MAE 4344 or permission of instructor.

Course Description: Modeling of large systems, composite and incompressible materials, substructuring, mesh generation, solids applications, nonlinear problems. Computational aspects of these problems are discussed.

Course Learning Goals/Objectives: Course goals include development of an understanding of advanced finite element methods and its application to engineering systems.

References Materials:

<http://mae.uta.edu/~lawrence/> > MAVSPACE

<http://www.colorado.edu/engineering/CAS/courses.d/IFEM.d/Home.html>

Concepts and Applications of Finite Element Analysis, 4th Edition Oct 17, Robert D. Cook, et al, Wiley, 2001

TENTATIVE SCHEDULE

Week - Topic

- 1 - Introduction, Fundamentals
- 2 - 2D Line, Triangular & Quadrilateral Elements
- 3 - Solids of Revolution, Isoparametric Formulations, Tetrahedra & Bricks
- 4 - Plate Bending (Shells)
- 5 - Computational Aspects
- 6 - Orthotropic Materials, Composites
- 7 - Error Estimation & Modeling **EXAM 1 March 4.**
- 8 - Stress Stiffness & Buckling
- 9 - Nonlinear Problems
- 10 - Nonlinear Problems
- 11 - Formulation Techniques, Heat Transfer, Field Problems
- 12 - Structural Dynamics
- 13 - Special topics, **EXAM 2 April 21**
- 14 - Special topics
- 15 - Special topics

Final Exam

Specific Course Requirements

Quizzes: None

Examinations: Exam 1, Exam 2, Final

Major Assignments

Homework: Assigned and due weekly

Labs: None

Research Papers: None

Excused Missed Exams: Scheduled during last week of classes.

Makeup Work: At least half credit will be deducted for unexcused late (one class meeting) homework.

Makeup Work: No credit will be given for HW problems not properly documented.

Course Evaluation & Final Grade:

Homework - 25%, Exam 1 - 25%, Exam 2 - 25%, Final Exam- 25%

Student Evaluation of Teaching: Conducted near end of semester. Your lowest HW grade will be dropped if your submit proof of completing the course evaluation.

Home Work and Exam Procedures

1. Homework submissions

Submit your homework unfolded, stapled in the upper left corner, with a cover sheet that contains the following in the upper 1/4 of the page:

Your Name - Last, First

AE/ME6310

Date

Course Assignment Number and, if applicable, text problem number(s).

Each assignment should be considered an engineering task and documented accordingly. Work neatly, using one side of the paper only. Number, date, and put your initials in the upper right hand corner of each page. When the assignment calls for computer solution of problems, be sure to use the

computer generated output to support your results not as a substitute for a report of your effort.

Provide a **problem statement** indicating what is known and what is to be found. Include a **good sketch** that shows dimensions, units, materials and their properties, loadings, supports, axis systems used, and when appropriate, member cross section shapes and dimensions.

FEM models should show loadings, boundary conditions, the type of element(s) used, the FEM program used, important node and element numbers.

The **results should be summarized separately** from the supporting calculations and any relevant conclusions drawn. **Mark your results by underlining or drawing a box around the important final results.** If you are comparing an FEM solution to another known solution, make a clear statement of how the results compare using per cent error or per cent difference calculations. Be sure to include the input data you used. If you are solving a series of problems, one set of input data is probably sufficient.

Remember, **your work should stand alone**; that is, another engineer should be able to reproduce your results using only the write-up you prepare.

See ANSYS > 1.A Solutions Format and Samples.

2. Schedules

Unless otherwise noted, homework is due at the beginning of the class period on the published due date.

3. Exams

Exam 1 & Exam 2 will be an in-class exams, and the final exam will be a take-home exam.

If you wish to receive email at an email address in addition to your UTA email address, join the me6310 **LISTSERVE**. See menu item 'Join Mail List'.

Attendance and Drop Policy: Students are expected to arrive on time and to attend all classes and exams. Please advise the instructor by email if you must miss a class and provide the reason. The Drop Policy is consistent with

the University drop schedule; the student must be passing to receive a W/P. 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. For more information, contact the Office of Financial Aid and Scholarships (<http://wweb.uta.edu/aao/fao/>).

Disability Accommodations: UT 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), The Americans with Disabilities Amendments Act (ADAAA), and Section 504 of the Rehabilitation Act. 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 disability. Students are responsible for providing the instructor with official notification in the form of a letter certified by the Office for Students with Disabilities (OSD). Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364. Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671. 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.

Title IX: The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos. For information regarding Title IX, visit www.uta.edu/titleIX.

Academic Integrity: Students enrolled all UT Arlington courses 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.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents' Rule 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

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 <http://www.uta.edu/universitycollege/resources/index.php>

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>. If you also wish to receive mail at another email address, join the ae/me 63110 LISTSERVE. See menu item 'Join Mail List'. (<http://mae.uta.edu/~lawrence/me6310/me6310.htm>)

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. 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.

Upated 1-5-16