

MAE 2312-002: Solid Mechanics

Fall 2016

Instructor: Dr. Erian Armanios

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Office Hours: 11:00 am - 12:00 pm; TR

Section Information: MAE 2312-002

Time and Place of Class Meetings: Room 210, Woolf Hall (WH) TR 12:30 – 1:50 pm

Course Website: <https://elearn.uta.edu/> (blackboard)

Teaching Assistant: Mr. Bastiaan van der Vossen

Office Number: 323H Woolf Hall

Email Address: bastiaan@uta.edu

Office Hours: 9:30 am – 11:00 am MW;

Description of Course Content: This course covers the relationships between stresses and strains in elastic bodies and the tension, compression, shear, bending, torsion, and combined loadings which produce them. It also covers the deflections and elastic curves, shear and bending moment diagrams for beams, and column theory.

Student Learning Outcomes: The course is intended to provide students with a clear and thorough presentation of both the theory and application of the fundamental principles of mechanics of materials for mechanical design. Students will develop an understanding of the meaning of stress and strain, and the relation between them. They will learn how to analyze the distribution of internal loads, deformation, stresses and strains in structural elements (e.g. bars, beams) due to application of external loading. They will also learn the basic concepts and analysis techniques of structural stability emphasizing the buckling of columns.

Course Prerequisites: MAE 1312 Engineering Statics

Required Textbooks and Other Course Materials:

J.M. Gere and B.J. Goodno, Mechanics of Materials, 8th Edition, Cengage Learning, 2013.

The text book will be used as reference, and for some reading and homework assignments.

Course Content: The topics listed below will be covered during this course.

1. Stress and Strain
2. Mechanical Properties of Materials
3. Axial Load
4. Torsion
5. Bending
6. Transverse Shear
7. Combined Loading
8. Stress and Strain Transformation
9. Analysis of Beams and Shafts
10. Beam Deflection
11. Buckling of Columns

Descriptions of major assignments and examinations:

There will be 10-12 homework assignments, two midterm exams and one final exam.

1st Midterm: Tuesday, September 20, 2016, 12:30– 1:50 pm.

Syllabus: All class materials, solved problems, homework and reading assignments that are covered to date.

2nd Midterm: Tuesday, November 1st, 2016, 12:30– 1:50 pm.

Syllabus: All class materials, solved problems, homework and reading assignments that are covered between 1st midterm and to date.

Homework: Assigned weekly during class and due at the beginning of class one week later.

Final Exam: Thursday, December 15, 2016, 11 – 1:30 pm. On the date scheduled by the University during the Final Exam Period. Covers all class materials including homework, solved problems, reading assignments and midterm exams.

Labor Day Holiday: September 5, 2016.

Thanksgiving Holidays: November 24 – 25, 2016.

Last day to drop class: November 2, 2016.

Last day of class: December 7, 2016.

Note on Assignments and Exams:

Reading: You are expected to read the assigned sections in your textbook and encouraged to check other sections and references. Learning is the ultimate goal.

Homework: The work you turn in is a product, with your name on it. It must represent your very best effort. I expect you to complete it on time, because you will plan your effort accordingly.

Work as many problems as possible, especially those marked with an asterisk (*). Each problem is an application of the principles presented in class and provides training on how to apply them. As you work these problems you will also appreciate the underlying assumptions and applicability of these principles.

All work submitted must be done by you, and any help you get from your study group must be acknowledged. Refer to the University Academic Integrity conduct when in doubt.

Homework turned in late will receive a 5% penalty per day until solution for that Homework is posted.

No late home work will be accepted after the solution is made available to students.

Exams: Are one means to evaluate your understanding not to punish you for your mistakes. UTA regulations permitting, missed midterms and/or final exams can only be rescheduled when missed due to major health problems or circumstances beyond the student's control. With instructor's discretion, students will be required to reschedule the missed exams at the earliest time possible.

Attendance Policy: At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I strongly recommend to attend each class.

Course Grading Policy:

1 st Midterm	100
2 nd Midterm	100
Homework	40
Final Exam	160

Semester Total points	400
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Grading Scale	Letter Grade
340 or above	A
300 – 339	B
260 – 299	C
220 – 259	D
000 – 220	F

Students are expected to keep track of their performance throughout the semester and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels; see “Student Support Services,” below.

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. For more information, contact the Office of Financial Aid and Scholarships (<http://www.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). Only those students who have officially documented a need for an accommodation will have their request honored. 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. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability.

Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Non-Discrimination Policy: *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.*

Title IX Policy: The University of Texas at Arlington (“University”) is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit www.uta.edu/titleIX or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.*

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 in their courses by 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. Additional information is available at <https://www.uta.edu/conduct/>.

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>.

Campus Carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>

Student Feedback Survey: At the end of each term, students enrolled in face-to-face and online classes categorized as "lecture," "seminar," or "laboratory" are 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 via the SFS database is aggregated with that of other students enrolled in the course. Students' anonymity will be protected to the extent that the law allows. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit <http://www.uta.edu/sfs>.

Final Review Week: for semester-long courses, 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 are located at either end of the hallway. 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 individuals with disabilities.

Students should also be encouraged to subscribe to the MavAlert system that will send information in case of an emergency to their cell phones or email accounts. Anyone can subscribe at <https://mavalert.uta.edu/> or <https://mavalert.uta.edu/register.php>

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>.

The IDEAS Center (2nd Floor of Central Library) offers **free** tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. To schedule an appointment with a peer tutor or mentor email IDEAS@uta.edu or call (817) 272-6593.

Course Schedule

Week 1 Tuesday		Thursday Aug 25	Intro/Syllabus
Week 2 Tuesday Aug 30	Ch 1	Thursday Sept 1	Ch 1
Week 3 Tuesday Sept 6	Ch 2	Thursday Sept 8	Ch 2
Week 4 Tuesday Sept 12	Ch 2	Thursday Sept 15	Ch 3;MT Review
Week 5 Tuesday Sept 20	1 st Midterm	Thursday Sept 22	Ch 3
Week 6 Tuesday Sept 27	Ch 3	Thursday Sept 29	Ch 3
Week 7 Tuesday Oct 4	Ch 4	Thursday Oct 6	Ch 4
Week 8 Tuesday Oct 11	Ch 5	Thursday Oct 13	Ch 5

Week 9			
Tuesday Oct 18	Ch 5	Thursday Oct 20	Ch 5
Week 11			
Tuesday Oct 25	Ch 7	Thursday Oct 27	Ch 7; MT Review
Week 12			
Tuesday Nov 1	2 nd Midterm	Thursday Nov 3	Ch 7
Week 13			
Tuesday Nov 8	Ch 8	Thursday Nov 10	Ch 8
Week 14			
Tuesday Nov 15	Ch 9	Thursday Nov 17	Ch 9
Week 15			
Tuesday Nov 22	Ch 9	Thursday Nov 24	Thanksgiving
Week 16			
Tuesday Nov 29	Buffer	Thursday Dec 1	Ch 11
Week 17			
Tuesday Dec 6	Review	Thursday Dec 8	*No class*
Week 10			
Tuesday Dec 13	*No class*	Thursday Dec 15	Final Exam (11-1:30 pm)

As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. –Erian Armanios

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381

Special Note from your Instructor:

Learning is a two-way process. I expect you to put forth your best effort as I do. Be assured that I am your best fan. I applaud as you progress, and brag about your achievements at every opportunity.