# MAE 2312-001: Solid Mechanics Fall 2014

Instructor: Dr. Erian Armanios Office Number: 211B Woolf Hall Office Telephone Number: (817) 272-2603 (voice), 817-272-5010 (fax) Email Address: armanios@uta.edu Faculty Profile: https://www.uta.edu/mentis/public/#profile/profile/view/id/3457 Section Information: MAE 2312-001 Office Hours: 1:30 pm - 2:30 pm; M W Time and Place of Class Meetings: Room 130, Engineering Research Building (ERB) MWF 11:00 - 11:50 am

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**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.

Course Prerequisites: MAE 1312 Engineering Statics

Textbooks: J.M. Gere and B.J. Goodno, <u>Mechanics of Materials</u>, 8th Edition, Cengage Learning, 2013. The text book will be used as reference, and for some reading and homework assignments.

**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 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.

**1<sup>st</sup> Midterm:** Monday, September 29, 2014, 11:00 am – 11:50 am.

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

2<sup>nd</sup> Midterm: Monday, November 3, 2014, 11:00 am – 11:50 am.
 <u>Syllabus:</u> All class materials, solved problems, homework and reading assignments that are covered between 1<sup>st</sup> midterm and to date.

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

**Final Exam:** 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.

<u>Thanksgiving Holidays</u>: November 27 – 28, 2014. <u>Last day to drop class</u>: October 29, 2014. <u>Last day of class</u>: December 3, 2014.

### 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: Students are strongly recommended to attend each class.

### Course Grading Policy:

1 <sup>st</sup> Midterm 2 <sup>nd</sup> Midterm Homework Final Exam	100 100 40 160	
Semester Total points	400	
Grading Scale		Letter Grade
340 or above		А
300 – 339		В
260 – 299		С
220 – 259		D
000 – 220		F

**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://wweb.uta.edu/aao/fao/).

**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 <u>www.uta.edu/disability</u> 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 University of Texas at 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.

According to the 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**: The University of Texas at 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.

**Electronic Communication:** The University of Texas at 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 <a href="http://www.uta.edu/oit/cs/email/mavmail.php">http://www.uta.edu/oit/cs/email/mavmail.php</a>.

**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 <a href="http://www.uta.edu/sfs">http://www.uta.edu/sfs</a>

**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 evenly split between the west staircase (exit room to the left, follow hall to fire door, one flight of stairs, exit the building on the west side) and the central staircase. (exit room to the right, turn right in the central corridor, exit is at the south end of the hall next to the glass wall. Down one flight, exit atrium -4 exits). 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.

## 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.