

# MAE 2312-001: Solid Mechanics

Spring 2011

**Instructor(s):** Erian Armanios

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**Office Hours:** 11:00 am - 12:00 pm; T TH

**Time and Place of Class Meetings:** Room 221, Woolf Hall

**T-TH 9:30 am - 10:50 am**

**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:** R.C. Hibbeler, Mechanics of Materials, 8th Edition, Prentice Hall, 2008.

*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

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

**Course Grading Policy:**

1 <sup>st</sup> Midterm	100
2 <sup>nd</sup> Midterm	100
Homework	40
Final Exam	160
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Semester Total points	400

<b>Tentative Grading Scale</b>	<b>Letter Grade</b>
340 or above	A
300 – 339	B
260 – 299	C
220 – 259	D
000 – 220	F

**Important Dates:**

**1<sup>st</sup> Midterm:** Thursday, February 24, 2011, 9:30 am – 10:15 am.

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

**2<sup>nd</sup> Midterm:** Thursday, March 24, 2011, 9:30 am – 10:15 am.

Syllabus: 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 the Tuesday class and due before the next Tuesday class.

**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.

Spring Breaks: March 14 – 18, 2011.

Last day to drop class: April 1, 2011.

Last day of class: May 6, 2011.

**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.

**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. Contact the Financial Aid Office for more information.

**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](http://www.uta.edu/disability) or by calling the Office for Students with Disabilities 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. According to the UT System Regents' Rule 50101, §2.2, "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."

**Student Support Services Available:** 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. These resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals to resources for any reason, students may contact the Maverick Resource Hotline at 817-272-6107 or visit [www.uta.edu/resources](http://www.uta.edu/resources) for more information.

**Electronic Communication Policy:** The University of Texas at Arlington has adopted the University "MavMail" address as the sole official means of communication with students. MavMail is used to remind students of important deadlines, advertise events and activities, and permit the University to conduct official transactions exclusively by electronic means. For example, important information concerning registration, financial aid, payment of bills, and graduation are now sent to students through the MavMail system. All students are assigned a MavMail account. ***Students are responsible for checking their MavMail regularly.*** Information about activating and using MavMail is available at <http://www.uta.edu/oit/email/>. There is no additional charge to students for using this account, and it remains active even after they graduate from UT Arlington.

**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.***