

INSTRUCTOR: Dr. M. Sathyamoorthy, Office – Engineering RBS2007 – 903 565 5939 – msathy@uttyler.edu-- Office hours posted at the door and on Blackboard.

ABOUT THE COURSE
Mechanics of Materials is the third of the three-course sequence in Mechanics, (Statics and Dynamics being the other two), that is usually required of most engineering majors. Statics and Dynamics provide an early introduction to basic engineering principles and applications in traditional engineering curricula. Ordinarily, they are included at the beginning of engineering programs/curricula so as to provide an opportunity to find out if the student has the necessary aptitude to succeed in engineering. In-depth understanding of Statics and Dynamics is an absolute necessity for the study of other mechanics courses such as Strength of Materials, Thermodynamics, Fluid Mechanics etc. In order to meet these objectives, this course will be presented with a strong emphasis on understanding the fundamental theoretical concepts complemented by solutions to a number of example problems to reinforce the understanding of the theory discussed in class. Past experience indicates that one of the most effective ways of mastering the course material is to solve as many classroom, practice and homework problems as possible.

PRE-REQUISITES
ENGR2301 or CENG2301-Statics is a prerequisite for this course. If you took Statics at UT Tyler, your minimum course grade should be “D” for you to take this course.

COURSE SYLLABUS & TOPICS COVERED
The following syllabus describes the course contents in general terms. A flexible lecture schedule will be used to adjust the material covered to suit the background, interest and response of the students in order to maximize the overall benefits. All the sections shown below are from the textbook – 9th edition.

Chapter 1: Stress - Sections: 1.1 to 1.7
Chapter 2: Strain - Sections: 2.1 and 2.2
Chapter 3: Mechanical Properties of Materials - Sections: 3.1 to 3.7
Chapter 4: Axial Load - Sections: 4.1 to 4.7

Review Session I on September 16, WED-5 to 6:30pm, RBS2024
Exam 1 on September 17 in class

Chapter 5: Torsion - Sections: 5.1 to 5.8
Chapter 6: Bending - Sections: 6.1 to 6.5, 6.8, 6.9
Chapter 7: Transverse Shear - Sections: 7.1 to 7.5

Review Session II on October 14, WED-5 to 6:30pm, RBS2024
Exam 2 on October 15 in class

Chapter 8: Combined Loadings - Sections: 8.1 and 8.2
Chapter 9: Stress Transformation - Sections: 9.1 to 9.5
Chapter 10: Strain Transformation - Sections: 10.1 to 10.7

Review Session III on November 11, WED-5 to 6:30pm, RBS2024
Exam 3 on November 12 in class

Chapter 11: Design of Beams and Shafts - Sections: 11.1 to 11.4
Chapter 12: Deflection of Beams and Shafts - Sections: 12.1, 12.2, 12.4 to 12.7
Chapter 13: Buckling of Columns - Sections: 13.1 to 13.4

FINAL COMPREHENSIVE EXAMINATION: The date for the 2-hour comprehensive final exam will be announced later and will be during the final exam week.

ATTENDANCE:
Mechanics of Materials is one of the challenging courses in engineering. Regular attendance is imperative if you want to do well in this course. Therefore, regular attendance is highly recommended. In case you have to miss a class, it is your responsibility to keep up with the class work and be informed of all announcements made in the class on home works, tests etc.

HOMEWORK:
Doing homework is very important in understanding the course material. Completing your homework independently is an absolute necessity to do well in this course. Therefore I strongly urge each of you to complete the homework assignments independently. They will, in general, be assigned after lectures on sections that are completed. Homework assignments and solutions will be posted on blackboard. Homework will NOT be collected or graded.

EXAMS:
Closed-book, closed-notes exams will be given after completing a reasonable amount of material from the text as shown in the syllabus. A final 2-hour COMPREHENSIVE examination will be given during the final exam week. For each of the exams and the final exam, you are allowed to use only one page of self-written notes (cheat sheet with no problem solutions of any kind) which will be collected with the exam papers. A formula sheet will be posted on BB before each exam and it will also be included with the exam.
FINAL GRADES:
Final course grades will be based on:

- 3 Exams @ 25% each  75%
- Final Comprehensive Exam  25%
- Total  100%

NOTE:
Course syllabus, course material such as handouts and example problems with solutions, homework assignments, homework solutions, review material, exam solutions will all be posted on Blackboard. Please review all the material posted on blackboard on a regular basis. I will use Blackboard to post announcements and contacting students by e-mail.

CALCULATOR POLICY:
You can only use one of the calculators allowed for the FE Exam (see the list below). No other calculator will be allowed for the exam. You are not allowed to store any class material in the calculator during the exams.

**Casio:** All fx-115 models. Any Casio calculator must contain fx-115 in its model name. Examples of acceptable Casio fx-115 models include (but are not limited to):

- fx-115 MS
- fx-115 MS Plus
- fx-115 MS SR
- fx-115 ES
- fx-115 ES Plus

**Hewlett Packard:** The HP 33s and HP 35s models, but no others.

**Texas Instruments:** All TI-30X and TI-36X models. Any Texas Instruments calculator must contain either TI-30X or TI-36X in its model name. Examples of acceptable TI-30X and TI-36X models include (but are not limited to):

- TI-30Xa
- TI-30Xa SOLAR
- TI-30Xa SE
- TI-30XS Multiview
- TI-30X IIB
- TI-30X IIS
- TI-36X II
- TI-36X SOLAR
- TI-36X Pro
**THERE WILL BE NO MAKE-UP EXAMS.** The percentage of any exam missed by a student will be added to his/her final comprehensive exam only if prior approval is granted. If you have to miss an exam due to emergencies (such as medical and other emergencies) please inform me as soon as possible before or immediately after the exam. Class average for each exam will be announced in class and posted on BB after each exam. Final grades will be determined on the basis of the class average. If your grade is consistently at the class average you will get a “C” grade. If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify me at least two weeks prior to the date of the planned absence.

**MANDATORY TUTORIAL SESSIONS**
Regardless of your exam average, you are required to attend at least 5 tutorial sessions offered by the PASS Tutoring Center. You are also required to get me a note stating that you have attended the required tutorial sessions. Days and times for tutorial sessions are posted on BB.

Academic policies regarding withdrawal from the course, state-mandated course drop rule, grade forgiveness, student rights, absence for religious observance, grade replacement, social security and privacy, learning disability, academic dishonesty and others can be found at [http://www.uttylet.edu/wellness/rightsresponsibilities.php](http://www.uttylet.edu/wellness/rightsresponsibilities.php). Some of the policies are reproduced below for your information.

**Grade Replacement/Forgiveness**
If you are repeating this course for a grade replacement, you must file an intent to receive grade forgiveness with the registrar by the 12th day of class. Failure to do so will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates will receive grade forgiveness (grade replacement) for only three course repeats; graduates, for two course repeats during his/her career at UT Tyler.

**State-Mandated Course Drop Policy**
Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the 12th day of class (See Schedule of Classes for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Registrar’s Office and must be accompanied by documentation of the extenuating circumstance. Please contact the Registrar’s Office if you have any questions.

**Disability Services**
If you have a disability, including a learning disability, for which you request disability support services/accommodation(s), please contact Ida MacDonald in the Disability Services office so that the appropriate arrangements may be made. In accordance with federal law, a student requesting disability services/accommodation(s) must provide appropriate documentation of his/her disability to the Disability Services counselor. In order to assure approved services the first week of class, diagnostic, prognostic, and prescriptive information should be received 30 days prior to the beginning of the semester services are requested. For more information, call or visit Disability Services located in the University Center, Room 3150. The telephone number is (903) 566-7079. Additional information may also be obtained at the following UT Tyler Web address: [http://www.uttylet.edu/disabilityservices](http://www.uttylet.edu/disabilityservices).
Student Absence for University-Sponsored Events and Activities
If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

Social Security and FERPA Statement:
It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

COURSE OBJECTIVES: By the end of this course students will be able to:
1. Use external loads including axial force, moment, torque, shear force, forces caused by temperature variation, and constraints to determine internal forces for a variety of structures and structural elements. Relate the internal forces to specific stress components, calculate those stresses and deformations.

2. Determine the state of stress at a point for uni-axial, bi-axial and tri-axial stress configurations and use them to find principal stresses and directions. Also, use the Mohr’s circle diagram to analyze biaxial state of stress, and determine the maximum and minimum stresses and directions.

3. Relate stress to strain using material properties, and analyze the state of strain at a point and use strains to calculate deformations. For a variety of external loads, analyze statically determinate structures, and indeterminate structures using compatibility of deformations.

4. Use load-deformation equations and other methods to calculate beam deflections. Analyze and design beams, circular and non-circular shafts and sections as well as other structural members based on strength and deformation requirements. Take into account maximum stresses due to geometric anomalies such as holes and fillets.

5. Use appropriate Theories of Failure to predict ductile or brittle material failure. Use elastic instability and column buckling analysis to design columns.