



MENG 3306 – Mechanics of Materials

Course Syllabus

Semester / Year	Spring 2023
Catalog Description	A required course providing undergraduate mechanical engineering students with fundamentals of internal forces and deformation of solids, concepts of stress and strain, formulas for stress and deflection for elastic bars, shafts, and beams, stress and strain transformation, and theories of failure.
Prerequisites	Grade C or better in ENGR 2301 Mechanics - Statics
Section number	030
Instructor name	Ola Al-Shalash
Contact info	Office: Houston Engineering Center: HEC A212 E-mail: oaalshalash@uttyler.edu
Class Type / Location	Face-to-face Location: HEC A218
Class Time	Tuesday and Thursday 6:00 PM – 7:20 PM
Office Hours	Fridays: 3:00 PM – 6:00 PM Via Zoom or by appointment
No. of Credits	3 credits
Required Textbook	Mechanics of Materials, 10th edition , by R. C. Hibbeler
Optional References	N/A
Additional requirements	Handouts and manuals posted on Canvas
Evaluation Method	Grading: Midterm Exam 20 % Project 25 % Final Exam 25 % Homework 15 % Quizzes 10 % Course Participation & Attendance 5 %
Grading Policy / Scale	Letter grades, <i>scale</i> : A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: < 60 Grade appeal Grades can be appealed by sending an email then meeting the instructor during office hours, but no later than three days after the grade has been posted. Moreover, students may appeal any grade reduction to the instructor if valid excuse with documentation is provided.

<p>Important events / dates</p>	<p>Census date: January 23 Last day to withdraw: March 23 Midterm Exam: Week of February 27 Project due: Week of April 17 Final Exam: During finals week UT Tyler College of Engineering Career Fair: February 21 Houston Engineering Internship and Career Fair: March 2</p>
<p>Attendance / Makeup policy/ other rules</p>	<ul style="list-style-type: none"> • Attendance is expected per university policy. Regular attendance is highly recommended. It is imperative if you want to do well in this course. • Attendance will be taken and regularly checked using Canvas. Students who come to class after attendance is taken will be considered absent. • 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. • Students will not be permitted to leave the classroom during lectures except for extreme emergencies. • No email submission of assignments, HomeWorks, etc. All assignments MUST be submitted to Canvas for grading. • No makeups unless students provide a university accepted excused absence with proper documentation justifying the absence. • Student with SAR status should contact the UT Tyler Office of Student Accessibility and Resources for exam arrangements. • Any minor violation of the Student Behavior (see below) by a student as deemed by the instructor will result in a full letter grade reduction for each incident while any major violation(s), such as cheating and plagiarism, by a student as deemed by the instructor will result in automatic failing grade in the course. • The use of cellular phones during the class is prohibited. • No food is allowed in the classroom.
<p>Course Learning Outcomes / ABET & PEOs relation</p>	<p>Expected Learning Outcomes</p> <p>By the end of this course, students will be able to:</p> <ol style="list-style-type: none"> 1. Use external loads including axial force, moment, torque, shear force to determine internal forces and moments for a variety of structures and structural elements. 2. Determine the state of stress at a point different stress configurations and combined loading and find principal stresses

	<p>and directions both analytically and graphically using the Mohr's circle diagram.</p> <ol style="list-style-type: none"> 3. Relate stress to strain using material properties and analyze the state of strain at a point and use strains to calculate deformations. 4. Design shafts and beams and use load-deformation equations and other methods to calculate beam deflections.
Tentative Topics	<ul style="list-style-type: none"> • Normal and shear stress • Normal and shear strain • Mechanical properties of materials • Axial load • Torsion • Bending • Stress and strain transformation • Beam and shaft design • Deflections of beams and shafts
University Policies	https://www.uttyler.edu/academic-affairs/files/syllabus_information_2021.pdf

Pre-requisite knowledge:

- Calculus (integration and differentiation) and Linear Algebra (systems of equations)
- Vector Analysis (understanding of vector representations and operations)
- Statics (free body diagrams and equilibrium analysis)

Evaluation activities:

Exams:

- There will be two exams for this course, one midterm exam and the final exam. The final exam will be comprehensive.
- Absolutely no cell phones, graphing calculators, laptops, iPads, iPods, smart watches, or any other smart technology devices are allowed in exams and quizzes. In case of the Zoom class type, only the exam window is allowed on the laptop screen (more instructions will be provided before each exam if this is the case).
- Students are not allowed to leave the examination room unless they submit their exam paper; scan and submit to Canvas in case of Zoom class type.
- Makeup exams for documented emergencies only.
- Late or no submission for the exam results in automatic grade of zero.
- Solutions of tests (quizzes and exams) must be well organized and neatly presented.

- Tests must be answered with pencil or black ink pen. Unclear handwriting may result in a lower grade.
- Answers reflecting the solutions manual are not considered correct and will be turned in to the Dean of Students as copying.
- In a Face-to-face lecture, exam grades will be returned, students will be allowed to view their exams, and the professor will keep original exams.

Quizzes:

- To ensure that students do their work and prepare for each class, one of the problems, from the homework, or a reading question from the subject that is already discussed will be chosen for a quiz.
- Quizzes will be **pop quizzes** that are assigned/ applied according to the topics covered in lectures.
- There will not be makeup quizzes. Absent students will not be allowed to retake quizzes and will result in a zero grade for the corresponding quiz.
- Answers reflecting the solutions manual are not considered correct and will be turned in to the Dean of Students as copying.
- Any discrepancy between the student's performance on the quiz and the homework assignment may result in loss of credit in the total homework grade.

Homework Policy:

1. Homework will be assigned after lecture and is due at the beginning of the class period after it is assigned unless other instructions are given. The homework problems will be posted on canvas. The hard-copy of the homework assignment has to be scanned and submitted to Canvas before class starts. It will be graded on the basis of format, grammar and spelling, technical content, and overall quality. Messy work will not be graded.
2. Students may discuss their homework solutions with one another, but each student must submit their own, **independent** solution (i.e., you may not just copy someone else's homework).
 - All homework should include a clear statement of the problem to be solved, indicating the known and unknown parameters.
 - Work should be handwritten or typed using a software on only one side of a standard letter size paper and stapled in the upper, left-hand corner.
 - Draw neat and organized free-body diagrams, use a straight edge if necessary.
 - Number all equations, indicate and describe variable substitutions and mathematical procedure, and highlight (enclose, or box) your answers.
 - Always indicate appropriate units in answer and study them to determine if it is reasonable.
 - Each problem needs to have the following: Given, Assumptions, Solutions, and a Box around your final answer with the appropriate unit.

- Number all your solution pages and write your name on each page at the upper, left-hand corner.
- These instructions apply to the exams and quizzes solutions as well.

Class Participation and Attendance:

Attendance is expected to lecture; taking notes and participating in discussions and class activities are required while in class.

Note:

Late submissions of assignments/ Homework (e.g. if due at 11:59:00 pm, then any time after such as 11:59:30 pm is late) will result in **20 % deduction per day** from the graded score.

Student attitude:

- Given this is a professional, educational setting you are expected to dress and behave appropriately. A positive, mature attitude/behavior is expected from the students in all classes. Students disturbing directly or indirectly the class or other students will be asked to leave the classroom with the consequences associated to an absence.
- Students are encouraged to utilize any tutoring services available if needed and come prepared to each week's class. Each student is expected to work with the group in a professional manner in case of any group activities. It is important to communicate clearly and professionally of any concerns or issues to the instructor.
- Canvas should be the primary mode of contacting the instructor so check the Canvas announcements and discussion board to check for information about the course. In addition, university provided patriots email should be the official communication method and you should check your email regularly. Use the above email address or Canvas messaging if you want to email the instructor. Please use **MENG 3306- your section, your question or concern title** in the email subject line. Please allow the instructor at least one to two business days to respond to your email. Emails with improper language will not be answered. Emails with same concerns or questions from multiple students will be answered/covered during class time.

Note:

The syllabus is subject to change during the semester as deemed necessary. Students will be notified for any major changes.

Tentative Course Schedule

#	Week of	Lecture Activity
1	Jan. 9	Syllabus + Static Review Chapter 1: Stress
2	Jan. 16	Chapter 1: Stress Chapter 2: Strain
3	Jan. 23	Chapter 3: Mechanical Properties of Materials
4	Jan. 30	Chapter 4: Axial Load (Project introduction)
5	Feb. 6	Chapter 5: Torsion
6	Feb. 13	Chapter 6: Bending (Project Proposal due)
7	Feb. 20	Chapter 7: Transverse Shear
8	Feb. 27	Midterm Exam
9	Mar. 6	Chapter 8: Combined Loadings
10	Mar. 13	Spring break – No Classes
11	Mar. 20	Chapter 9: Stress Transformation
12	Mar. 27	Chapter 10: Strain Transformation
13	Apr. 3	Chapter 11: Design of Beams and Shafts
14	Apr. 10	Chapter 12: Deflection of Beams and Shafts
15	Apr. 17	Project due
16	Apr. 24	Final Exam Week