The University of Texas at TYLER
COLLEGE OF ENGINEERING

Department of Mechanical Engineering
Phone: +1.903.566.7003
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Uttyler.edu/engineering

MENG 3306 – Mechanics of Materials
Course Syllabus

Semester / Year	Spring 2020
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/EENG 2301
Section number	030
Instructor name	Aws Al-Shalash
Contact info	Email: aalshalash@uttyler.edu Voice: Office: HEC A211
Class Type / Location	Face-to-face / A216
Class Time	030 : M / W 09:30 AM – 10:50 AM ;
Office Hours	TBD Or by appointment
Credits	3 credits
Required Textbook	Mechanics of Materials 10th edition by R. C. HIBBELER with Modified Mastering Engineering – *Registration Code:* **al-shalash53524** *If student does not register by census day, the student will be dropped from this course!*
Optional References	
Additional requirements	N/A
Evaluation Method	Exam 1 25% Exam 2 25% Final Exam 25% Homework / Quizzes 20% Course Participation 5%
Grading Policy / Scale	Letter grades Scale: A 90 – 100 B 80 – 89 C 70 – 79 D 60 – 69 F < 60
Important events / dates	Census date: January 27th Last day to withdraw: March 30th Final date: Per published schedule by the registrar – TBD

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Attendance / Makeup policy	Regular attendance is imperative if you want to do well in this course. **Therefore, any student incurs four unexcused absents or more during the 15-week semester will result in an instant F grade for the course.** 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. No makeup
Course Learning Outcomes / ABET & PEOs relation	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.
Tentative Topics	
Other	N/A

Pre-requisite knowledge:

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- 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)

Homework Policy:

1. Homework will be assigned after each 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 the Mastering Engineering Website. The hard-copy of the homework assignment will be scanned and submitted to Canvas. **If the hard-copy is not submitted on the given due date, the assignment credit will be lost.** It will be graded on the basis of format, grammar and spelling, technical content, and overall quality. Messy will not be graded and you will receive a 0.
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). If you receive assistance from a fellow student on a particular problem, you must cite that assistance in your solution. ***Answer reflecting the solutions manual are not considered correct and will be turned in to the Dean of Students as copying.***

   - ✓ All homework should include a clear statement of the problem to be solved, indicating the known and unknown parameters. Engineering paper is preferred.
   - ✓ Work should be handwritten 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 (FBDs and KBDs), 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 *units*

Quizzes:

To ensure that students do their own work and prepare for each class, one of the problems, from each homework, or a reading question from the subject that will be discussed that day will be chosen for quiz that will be administered the day the homework is due. Absent students will not be allowed to take quizzes. ***Answer reflecting the solutions manual are not considered correct and will be turned in to the Dean of Students as copying.*** The student's performance on the quiz will be used in grading the homework assignment. 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.

Exams:

1. *Answer reflecting the solutions manual are not considered correct and will be turned in to the Dean of Students as copying.*
2. **Absolutely no** cell phones, graphing calculators, laptops, iPads, iPods, smart watches, or any other smart technology devices are allowed in exams.
3. Make-ups for in-class exams for **documented emergencies.**
4. *Exam grades will be returned, students will be allowed to view their exams, and the professor will keep original exams.*
5. Any grade changes must be resolved no later than 24 hours after exam has been handed out. If you are absent, then it is your responsibility to meet with me to see your exam grade.

Binder:

Keep an authentic well-organized and complete three ring binder with dividers for all class notes, home-works, quizzes, and exams. It will be due and graded during the final exam.

University Policies:

UT Tyler Honor Code

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

Students Rights and Responsibilities

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: http://www.uttyler.edu/wellness/rightsresponsibilities.php

Campus Carry

We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at http://www.uttyler.edu/about/campus-carry/index.php

UT Tyler a Tobacco-Free University

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors.
Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless
tobacco, snuff, chewing tobacco, and all other tobacco products.

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There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support.
For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

Grade Replacement/Forgiveness and Census Date Policies
Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at http://www.uttyler.edu/registrar. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.
Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.
The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

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 census date (See Academic Calendar for the specific date).
Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

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Disability/Accessibility Services
In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible
diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit https://hood.accessiblelearning.com/UTTyler and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at http://www.uttyler.edu/disabilityservices, the SAR office located in the University Center, # 3150 or call 903.566.7079.

Student Absence due to Religious Observance
Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

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.

Emergency Exits and Evacuation
Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

Student Standards of Academic Conduct
Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but 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.

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i. "Cheating" includes, but is not limited to:
   - copying from another student's test paper;
   - using, during a test, materials not authorized by the person giving the test;
   - failure to comply with instructions given by the person administering the test;
   - possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
   - using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
   - collaborating with or seeking aid from another student during a test or other assignment without authority;
   - discussing the contents of an examination with another student who will take the examination;
   - divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
   - substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
   - paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;
   - falsifying research data, laboratory reports, and/or other academic work offered for credit;
   - taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
   - misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.

ii. "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit.

iii. "Collusion" includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.

iv. All written work that is submitted will be subject to review by plagiarism software.

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UT Tyler Resources for Students

- UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu
- UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu
- UT Tyler Counseling Center (903.566.7254)

Tentative Course Topics

Internal Shear and Normal Stress
Analysis and Design of Axial Loaded Members
Axial Strain
Mechanical Properties, Stress vs. Strain Curve
Stress Transformations - Equations
Stress Transformations - Mohr Circle
Strain Transformation
Strain Transformation - Hooke's Law
Thin Walled Pressure Vessels
Fatigue and Stress Concentrations
Axial Deformations - Force Method
Axial Temperature Effects
Elastic Torque
Theory of Failures
In-Elastic Torque
Statically Indeterminate Torque
Combined Loading
Shear and Moment Diagrams
Centroids and Elastic Bending Stress
Elastic Bending Moment
In-Elastic Bending
Transverse Shear Stress
Transverse Shear Stress - 2
Design Prismatic Members
Beam Deflection
Beam Deflection - 2
Beam Deflection - Table Method
Buckling

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