UTTyler COLLEGE OF ENGINEERING

CENG 3306 – Mechanics of Materials

Dr. Minhyeok **Fall 2025**
Dept. of Civil and Construction Engineering and Management
RBS 1011, (903) 565-5711 mko@uttyler.edu

Course Description:
Mechanics of Materials is an introductory course to the field of structural engineering. In particular, the course develops the theory behind the fundamental topics of mechanics of materials and demonstrates how this theory is put into practice to analyze and design structural elements.

The topics covered include: (1) the principles of stress and strain, (2) axial forces, shear forces and bending moments in statically determinate beams, (3) normal and compound stresses in beams, (4) analysis of composite beams, (5) plastic bending, (6) deflections of statically determinate beams, (7) method of superposition, (8) deflections and internal stresses in statically indeterminate beams, (9) elastic column buckling and (10) shear stress, shear flow and shear center.

Learning Objective:
By the end of this course, students should successfully be able to:
(1) derive the fundamental equations that govern the behavior of beams and columns
(2) compute the internal axial forces, shear forces, bending moments and corresponding stresses acting in statically determinate beams
(3) compute the deflected shapes of statically determinate beams
(4) apply the principle of superposition to compute the deflected shape and internal stresses in simple statically indeterminate beams
(5) compute the buckling loads of columns with various end conditions
(6) determine the required sizes of beams and columns to support prescribed sets of loads
(7) apply the procedures developed in the course to the analysis and design of simple structures.

Course Time and Place:
Mo/We/Fr 9:05 AM – 10:00 AM in RBS 2019

Office Hours:
- Mo 1:15 PM – 2:15 PM
- Th 9:00 AM – 10:30 AM
- Or by appointment

Teaching Assistant:
TBA

Course Website:
Canvas will be used to manage the course material for the semester. There you will find homework assignments, HW solutions, handouts, and other material pertaining to the class. Collected homework will be graded either for points or completion only. Please check canvas regularly.

Prerequisites/Corequisite:
ENGR 2301: Engineering Statics

Main Textbook:
Mechanics of Materials, 10th Edition, R. C. Hibbeler, Pearson

Homework Policy:

- *Collaboration*: Students are encouraged to study in groups; however, all homework assignments must be completed and submitted individually.
- *Submission*: Homework will be assigned regularly and submitted as a single PDF file through Canvas by 11:59 pm on the due date. Solutions may be scanned or created using an iPad/Tablet PC.
- *Late Work*: Late submissions will incur a 20% deduction. Assignments will not be accepted more than 24 hours after the deadline.
- *Format*: Homework must follow the required format:
  - Submitted on engineering paper (or digital equivalent).
  - Problem statements included.
  - Numerical results must be accompanied by clear explanations and solution steps.
  - Work must be neat and legible; unclear or disorganized work may receive reduced or no credit.
- *Lowest Score*: Your lowest homework grade will be dropped.

Exams & Quizzes Policy:

- *Quizzes*: Several pop-up quizzes will be given throughout the semester. The quizzes are completed in groups of 3-4 students, with one solution submitted per group. The lowest quiz grade will be dropped.
- *Exams*: There will be two midterms and one comprehensive final examination. All exams are closed book/closed notes.
- *Make-up Exams*: Make-up exams are not normally offered. Exceptions will be made only for serious, documented circumstances (e.g., official UT Tyler travel, illness, accident, childbirth, passing of an immediate family member, jury duty, court appearance). Events that are pre-schedulable (e.g., traffic, weddings, car service, etc) are not considered valid reasons. Job interviews may be considered with proper documentation and early notice. In case of an emergency during exam day, please notify the instructor immediately (via email).
- *Grades*: Final grades are based on total points earned and are not subject to a curve. Your grade depends only on your performance, not on others.

Exams schedule:
There will be three midterm examinations (held during the scheduled class time) and one final examination. The exams are TENITATIVELY scheduled for:

- Midterm1: **9/29/2025**
- Midterm2: **10/27/2025**
- Midterm3: **11/21/2025**
- Final: **TBD**

Important Artificial Intelligence (AI) Information :
AI is not permitted in this course at all. I expect all the work students submit for this course to be their own. I have carefully designed all assignments and class activities to support your learning. Doing your own work, without artificial intelligence assistance, is best for your efforts in mastering course learning objectives. For this course, I expressly forbid using ChatGPT or any other artificial intelligence (AI) tools for any stages of the work process, including brainstorming. Deviations from these guidelines will be considered a violation of UT Tyler's Honor Code and academic honesty values.

Assessment Policy:

Students' performance will be assessed on their ability to explain the course concepts and use the presented techniques. The final grades will be computed based on the following weighting scheme

- Homework 15 %
- Quizzes 10 %
- Midterm1 15 %
- Midterm2 15 %
- Midterm3 15 %
- Final Exam 30 %

Note

In grading the homework, assignments, and exams, etc., **no credit will be given to methods not covered in this class**, although these methods, tables, formulae may appear in the textbook. Errors or outdated material in the textbook should not be the reason for claiming full credit on work done.

Course Grades:

A	$90 \leq G \leq 100$	B	$80 \leq G < 90$	C	$70 \leq G < 80$
D	$60 \leq G < 70$	F	$G < 60$		

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.

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.

(i) "Cheating" includes, but is not limited to:

a. copying from another student's test paper;
b. using, during a test, materials not authorized by the person giving the test;
c. failure to comply with instructions given by the person administering the test;
d. 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;
e. using, buying, stealing, transporting, or soliciting in whole or part the contents of an un-administered test, test key, homework solution, or computer program;
f. collaborating with or seeking aid from another student during a test or other assignment without authority;
g. discussing the contents of an examination with another student who will take the examination;
h. 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;
i. substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
j. paying or offering money or other valuable thing to, or coercing another person to obtain an un-administered test, test key, homework solution, or computer program or information about an un-administered test, test key, home solution or computer program;

k. falsifying research data, laboratory reports, and/or other academic work offered for credit;
l. 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
m. 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.

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
- The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.
- UT Tyler Counseling Center (903.566.7254)
- **Campus Assessment, Response, and Education (CARE) Team**, The CARE Team engages in proactive and collaborative approaches to identify, assess, and mitigate risks associated with students exhibiting concerning behaviors, or facing hardships. By partnering with members of the campus community, the CARE Team strives to promote an individual student's wellbeing and success. https://www.uttyler.edu/offices/student-success/dean-of-students/care-team/

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/StudentRightsandResponsibilities.html

Grade Replacement / Forgiveness and Census Date Polices:

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 that students need to be aware of. 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.

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 Tyler at Texas offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including non-visible a 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 an Accessibility Case Manager. 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.

Required Format for Homeworks:

Page #__ of x pages total. (Place on all pages of the problem set)

Engineering Paper Required

	CMGT4313 Assignment # (on first page only)	Date Due: DD MMM YY (on first page only)	Name (on all pages)	1/x

○ **GIVEN:** Write a brief description of the information given in the problem statement.

FIND: Indicate the information you are to find for this problem. When you finish the problem, check this line to make sure you found all the things you were supposed to find.

○ **SOL'N:** Indicates where the solution starts. Good solutions are neat and clearly written, reference equation numbers where necessary, and include notes of explanation. Drawings are neat and contain clear labels and dimensions.

Put only one problem per page. Do not start a new problem in the middle of a page.

Sloppy work or work which does not follow this format may result in a point cut.

Use parenthetical documentation to indicate where you received assistance or information from others. For example:

(Helpful, I.M.,'20 instructed me to check the slab in shear, not just bending and where to find the shear equation in the ACI 318-19.)

○ "XXXXXXX ANS" indicates your answer and the end of the problem. This should match the FIND line from above.

Tentative Schedule (Subject to change):

Lesson No.	Date	Topic	Lesson Material (Hibbler 10th Ed)
		Week 1	
1	8/25	Overview of course; intro and internal forces	1.1-1.2
2	8/27	Internal Shear and Normal stress	1.3-1.5
3	8/29	Analysis vs. Design of Axially Loaded Members	1.6-1.7
		Week 2	
-	**9/1**	**Labor Day Holiday - No Class**	
4	9/3	Axial Strain; Mechanical Properties of Materials	2.1-2.2, 3.1-3.5
5	9/5	Shear Strain, Mechanical Properties of Materials	3.1-3.6
		Week 3	
6	**9/8**	(**Census Date**) Stress transformations - Equation	9.1-9.3
7	9/10	Stress transformations - Mohr Circle	9.1-9.3
8	9/12	Stress transformations - Mohr Circle (Cont'd)	9.4-9.5
		Week 4	
9	9/15	Strain Transformations	10.1-10.2, 10.5
10	9/17	Strain to Stress transformation - Hooke's Law	10.6
11	9/19	Thin Walled Pressure Vessels	8.1
		Week 5	
12	9/22	Fatigue and Stress Concentrations	3.7, 4.7
13	9/24	Axial Deformations - Force Method	4.1-4.5
14	9/26	Axial Temperature Effects	4.6
		Week 6	
-	**9/29**	**EXAM 1**	-
15	10/1	Elastic Torque	-
16	10/3	Elastic Torsion Examples	5.1-5.4
		Week 7	
17	10/6	Theory of Failures	10.7
18	10/8	In-Elastic Torque	5.9
19	10/10	Statically Indeterminate Torque	5.5
		Week 8	
20	10/13	Combined Loading 1	8.2
20 (cont'd)	10/15	Combined Loading 2	8.2
21	10/17	Shear and Moment Diagrams - 1 (Method of sections)	-
		Week 9	
22	10/20	Shear and Moment Diagrams - 2 (Integration method)	-
23	10/22	Shear and Moment Diagrams - 3 (Inspection, graphical)	6.1-6.2
24	10/24	Elastic Bending Stress - 1	6.4

		Week 10	
-	**10/27**	**EXAM 2**	**-**
25	10/29	Elastic Bending Stress - 2	6.4
26 27	10/31	In-Elastic Bending In-Elastic Bending - Examples	6.10
		Week 11	
28	**11/3**	**Last Day to Withdraw from one or more 15-week Courses** Transverse Shear Stress	7.1-7.2
29	11/5	Transverse Shear Stress - 2	7.1-7.2
-	11/7	CATCH UP DAY (If Needed)	-
		Week 12	
30	11/10	Design Prismatic Members	11.1-11.2
31	11/12	Design Prismatic Members (con't)	11.1-11.2
32	11/14	Beam Deflection - Elastic Curve_Moment-Curvature Relationship	12.1-12.2
		Week 13	
33	11/17	Beam Deflection - 2	12.2,12.5
34	11/19	Beam Deflection - Superposition Method	-
-	**11/21**	**EXAM 3**	**-**
		Week 14	
-	**11/24 to 11/28**	**THANKSGIVING BREAK**	**-**
		Week 15	
35	12/1	Buckling - 1 & 2	13.2-13.3
36	12/3	Buckling Column Design	13.2-13.3
-	12/5	**NO CLASS**	-
		Week 16	
Final Exam	**TBD**	**COMPREHENSIVE FINAL EXAM**	**-**