Mechanics of Elastic Bodies
MECH 3250 Fall 2025

Schedule and Location

Lecture: 4:30-5:45 p.m. MW PKI 256 August 25, 2025 – December 15, 2025
Final exam: 5:00 p.m. – 7:00 p.m. PKI 256 December 15, 2025
Office hour: MW 11:00 a.m. – 12:15 p.m. or by appointment

Instructor

Dr. Yumeng Zhao
School of Civil and Environmental Engineering, UNL
Email: yzhao52@unl.edu; Office: PKI 204D

Teaching Assistants

Yuhan Bao Email: ybao6@huskers.unl.edu Office: PKI 305

Prerequisite

MECH 2230 or EMEC 2230; and MATH 1970

Textbook

Mechanics of Materials, 9th Ed. By Barry J. Goodno, James M. Gere, Cengage Learning

Course Description and Objectives

This course introduces the mechanics of solid materials within the range of elastic deformation with applications to science and engineering. Topics covered include static equilibrium, free body diagrams, analysis of stresses, strains and deformation in structural elements (axial, torsional and bending), states of stress (shear, bending, torsion), shear and moment diagrams for beams, displacements and deformations, column buckling, Mohr's Circle, failure theories etc.

Grading

Homework 15%
Pop quizzes 5 quizzes in total = 15%
Exam I & II: 20% + 20%
Final exam: 30%

Grading scale:
100 >= A+ >97 > A >= 93 > A- > =90
90 > B+ > =87 > B = > 83 > B- => 80
80 > C+ > =77 > C > =73 > C- > =70
70 > D+ > =67 > D > =63 > D-> =60
60 > F >= 0

You may drop one lowest score of homework assignments.
You may drop one zero score or one lowest score of quizzes.

Homework

Students are encouraged to discuss course topics in groups; however, all assignments must be completed independently and submitted on time. The homework schedule is provided in the "Lecture Schedule" section. Unless otherwise noted, assignments are due the following Wednesday. Each assignment must be submitted as a PDF file on Canvas **and** as a printed hard copy, turned in at the beginning of class on the due date. Late submissions will receive **zero credit** unless a prior arrangement is made at least 24 hours before the deadline. Plagiarism will not be tolerated. Any suspected cases will be referred to the Dean of Students for disciplinary action.

Students should make their best efforts to solve all assigned problems. Grads will be given based on your efforts, procedures (see above listed items), and understanding of concepts. Sketches and diagrams should be included in homework if it helps answer the questions.

Quizzes

Will cover both theoretical aspects and problem-solving skills. No makeup quizzes.

Exams

All students must take all exams in person. If any arrangement is needed due to medical reasons, please contact the instructor in advance.

Two mid-term exams will be held during lecture time. See the lecture schedule below for details. The final exam will be held at the end of the semester.
All exams will be in closed book/notes format. Formulas and other necessary information will be provided on the question sheets.

Attendance

Required.

Honor code

Academic integrity is of the utmost importance at UNO/UNL. Be sure you understand expectations of you and your academic work. View the complete list of academic dishonesty violations in the Academic Honesty Policy (see Student Code of Conduct, Section B. Conduct - rules and Regulations, 1. Acts of Academic Dishonesty). For more information, please visit https://studentconduct.unl.edu/
and https://www.unomaha.edu/campus-policies/academic-integrity.php

Students are encouraged to discuss course topics in groups, but homework assignments must be carried out by each student independently. Copying homework (exams) from other students or old assignments (exams) or solution manuals or other online sources or allowing someone to copy your homework are academic dishonesty. Students may not post any part of the assignments, quizzes, or exams to internet.

Office of Disability Services

It is my goal that this class be an accessible and welcoming experience for all students. Reasonable accommodation is provided for students who are registered with the Accessibility Services Center and make their requests sufficiently in advance. Please note the accommodated exam should be arranged on the same day with the same time slot as the scheduled exam of the class. or more information, contact:

https://www.unomaha.edu/enrollment-management/testing-center/accommodated-student-guidelines.php

Resources for Students Seeking Mental Health Help

UNL offers a variety of options to students to aid them in dealing with stress and adversity. Counseling and Psychological Services (CAPS) is a multidisciplinary team of psychologists and counselors that works collaboratively with Nebraska students to help them explore their feelings and thoughts and learn helpful ways to improve their mental, psychological and emotional well-being when issues arise. UNL CAPS Counseling and Psychological & Services (CAPS) 402-472-7450 At UNL, Big Red Resilience & Well-Being (BRRWB) provides one-on-one well-being coaching to any student who wants to enhance their well-being. Trained well-being coaches help students create and be grateful for positive experiences, practice resilience and self-compassion, and find support as they need it. BRRWB can be reached by calling 402-472-8770.

Lecture Schedule

Week	Day	Date	Topic	Reading	HW
1	M	08/25	L0 Introduction, Static Review, Free Body Diagrams	Ch. 1.1-1.3	
1	W	08/27	L1 Axial Loaded Members: Normal Stress and Strain	Ch. 1.4, 2.10	#1
2	M	09/01	Labor Day, No Class		
2	W	09/03	L2 Mechanical Properties	Ch. 1.5-1.7, 1.9	#2
3	M	09/08	L3 Axial Loaded Members: Deformation #1	Ch. 2.1-2.3	
3	W	09/10	L3 Axial Loaded Members: Deformation #2	Ch. 2.1-2.3	#3
4	M	09/15	L4 Axial Loaded Members: Statically Indeterminate #1	Ch. 2.4	
4	W	09/17	L4 Axial Loaded Members: Statically Indeterminate #2	Ch. 2.4	#4
5	M	09/22	L5 Axial Loaded Members: Thermal Effects, Misfits	Ch. 2.6	
5	W	09/24	L6 Shear Stress and Strain	Ch. 1.8, 3.6	#5
6	M	09/29	Exam 1		
6	W	10/01	L7 Torsional Loaded Members #1	Ch. 3.1-3.4	
7	M	10/06	L7 Torsional Loaded Members #2	Ch 3.7-3.8	
7	W	10/08	L8 Shear Force and Bending Moment	Ch. 4.3	#6
8	M	10/13	L9 Relationship Among Loads, Shear and Moment	Ch. 4.4	
8	W	10/15	L10 Shear and Moment Diagrams	Ch. 4.5	#7
9	M	10/20	Fall Semester Break, No Class		
9	W	10/22	L11 Flexural Members: Normal Stress in Beam #1	Ch. 5.1-5.5	#8
10	M	10/27	L11 Flexural Members: Normal Stress in Beam #2	Ch. 5.1-5.5	
10	W	10/29	L12 Design Beam for Bending	Ch. 5.6	#9
11	M	11/03	L13 Flexural Members: Shear Stresses in Beam	Ch. 5.8-5.10	
11	W	11/05	L14 Flexural Members: Beam with Axial Load	Ch. 5.12	#10
12	M	11/10	Exam 2		
12	W	11/12	L14 Flexural Members: Statically Indeterminate Beam	Ch. 10.1-10.5	
13	M	11/17	L15 Flexural Members: Deflection of Beam	Ch. 9.1-9.5	
13	W	11/19	L16 Flexural Members: Beam Design Overview		#11
14	M	11/24	L17 Column Buckling	Ch. 11.1-11.4	
14	W	11/26	Thanksgiving Break, No Class		
15	M	12/01	L18 Mohr's Circle and Principal Stresses #1	Ch. 7.1-7.4	
15	W	12/03	L18 Mohr's Circle and Principal Stresses #2	Ch. 7.1-7.4	#12

16	M	12/08	L19 Failure Theory	Ch. 10.7 Mechanics of Materials. Hibbeler	
16	W	12/10	Review		
17	M	12/15	Final Exam		

(*The tentative syllabus is subject to change*)