

MECH2030: Solid Mechanics Course Syllabus Summer Semester 2026

Instructor Information:

Instructor: Prof. Hanxun Jin
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Teaching Assistant: Elif Dursun
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Contact Preferences: The best way to reach me is via email.

Note: For questions related to course materials/homework, please email both Prof. Jin and Elif. For logistical inquiries or feedback, please email Prof. Jin only. You can expect a response within one business day (9am-5pm).

General Course Information:

Course Number and Title: MECH2030: Solid Mechanics (Section 3)
Meeting Days/Times: M / W / F 10:30AM – 11:35AM
Course Location: Old Chem 560
Course Description: Introduction of the concepts of displacement, strain, stress and constitutive equations of elastic solids in one, two and three dimensions. Study of material properties and solutions of one-dimensional structure members in tension, bending and torsion. Introduction of analytical, computational and experimental methods for analyzing mechanics problems of elastic solids.
Course Delivery Mode: This course is an in-person course, conducted entirely via in-person class meetings.
Prerequisites: MECH2020: Statics and Particle Dynamics
Credit Hours: 3
Contact Hours: 3

Course Learning Outcomes:

Having successfully completed this course, students will be able to:

- Understand internal forces, stresses, strains, and elastic deformation of solids.
- Understand stress-strain relations and be able to identify Young's modulus, yield stress, ultimate stress, and failure stress from a stress-strain curve.

- Determine the stress state and deformation of:
 - a bar in tension.
 - a bar in torsion.
 - a beam in bending.
 - one-dimensional structures under combined loading.
- Determine stress and strain fields in different coordinate systems.

Course Resources:

Required Textbooks

Russell C. Hibbeler. *Mechanics of Materials*, 11th ed. Pearson, 2022.

Required Software or Hardware:

MATLAB. There will be light coding for some homework assignments.

ABAQUS. You can download free student version at <https://www.3ds.com/edu/> or using CEAS remote access at <https://ceas3.uc.edu/remotearchive>.

Note: For CEAS remote access, you need to first connect to UC's network through UC_Secure or VPN.

AI Policy

It is crucial for students to learn to use generative AI tools such as ChatGPT *effectively* in their work. While these tools are great time savers, *their effective use requires solid foundational understanding of a topic*, so that students can critically evaluate the output for errors and hallucinations. This idea motivates our course AI policy.

- Students may use generative AI tools to increase their understanding of a topic or provide guidance on how to approach solving a particular problem **only on homework or in-class activities**.
- Students may not submit the work of generative AI as their own work, and no generative AI tools are allowed during quizzes or exams.

These and any other uses which are not specifically allowed will be considered **academic misconduct**. Students are encouraged to ask the instructor if they have questions about whether a particular use case is permissible. Students are not formally required to document, cite, or report their generative AI use on submitted assignments.

Course Assignments:

Homework	• Homework is assigned and submitted via Canvas, with at least a week to complete it. • Typically, there will be one homework for each section of material. • Collaborative discussion with other students on homework is encouraged, but simply copying someone else's solution is not allowed. • Late work is not accepted without prior approval or a significant extenuating circumstance.
Content Quizzes	• Short quizzes based off the homework topic will be conducted every 1-2 weeks. • Quizzes are in-class and typically one week after the submission of the homework which they are based on. • These quizzes make up the majority of your grade for the course, and are intended to be a lower-stakes, high-frequency assessment method.
Participation Assignments	• This class utilizes active learning, so students will be given daily in-class work that they are expected to complete and submit at the end of class.

	Class will begin with a short presentation and/or a solved example problem and will be followed by group problem solving activities. As such, <u>students are expected to bring writing utensils, calculators and paper to class every day</u> (or digital alternatives).
Midterm Exam	A midterm exam will be used to assess students' overall learning.
Final Project	A group computational project (5 members) using Abaqus to analyze mechanics of a simple 2D engineering structure.

Grading:

Grades for assignments will be reported over Canvas. **Final numerical grades** for the course are determined based on the following weights for assignments.

Assignment:	Weighting:
Homework	10 %
Content Quizzes	50 %
Class Activities	10 %
Midterm Exam	15 %
Final Project	15 %
Total:	100%

Homework grading: 80% completeness, 20% correctness on one randomly chosen problem.

Final letter grades for the course will be determined using your final numerical grade and the following ranges. The instructor reserves the right to modify the range for each letter grade. However, the ranges posted here provide the minimum score you must achieve to guarantee the grade indicated.

Grade:	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
Range:	>90	86-89	82-85	79-81	76-80	72-75	69-71	66-68	62-65	59-61	56-58	<56

Tentative Course Schedule:

This schedule is likely to change based on the progress of the class.

Week	Day	Date	Topic
1	M	11-May	Introduction
	W	13-May	Centroids and Distributed Loads (Elif Dursun)
	F	15-May	Centroids and Distributed Loads
2	M	18-May	Internal forces
	W	20-May	Internal forces
	F	22-May	Stress
3	M	25-May	Memorial Day Holiday, No Class
	W	27-May	Strain
	F	29-May	Mechanical properties
4	M	1-Jun	Mechanical properties (Elif Dursun)
	W	3-Jun	Axial Load (Elif Dursun)
	F	5-Jun	Axial Load
5	M	8-Jun	Torsion
	W	10-Jun	Torsion
	F	12-Jun	Torsion

6	M	15-Jun	Shear and Moment Diagrams
	W	17-Jun	Shear and Moment Diagrams
	F	19-Jun	Juneteenth Holiday, No Class
7	M	22-Jun	Midterm Review (Elif Dursun)
	W	24-Jun	Midterm Exam
	F	26-Jun	Flexure Formula
8	M	29-Jun	Beam deflection
	W	1-Jul	Beam deflection
	F	3-Jul	Independence Day, No Class
9	M	6-Jul	Combined loading
	W	8-Jul	Combined loading
	F	10-Jul	Stress concentrations
10	M	13-Jul	Stress transformation equations
	W	15-Jul	Stress transformations using Mohr's circle
	F	17-Jul	Stress transformations using Mohr's circle
11	M	20-Jul	Strain transformation equations
	W	22-Jul	3D mechanical property relationships
	F	24-Jul	Introduction to FEA
12	M	27-Jul	Introduction to FEA, Truss and Beam
	W	29-Jul	Introduction to FEA, simple 2D case
	F	31-Jul	Introduction to FEA, complex 2D case
13	M	3-Aug	Work on Final Project
	W	5-Aug	Work on Final Project
	F	7-Aug	Work on Final Project (Final report due)

Course Policies:

Attendance and Participation

- Students are expected to attend the synchronous sessions, participate in guided problems and daily activities, and ask clarifying questions.
- Attendance is not formally required, but completion of daily activities is graded.
- Quizzes cannot be taken outside of class time without appropriate prior approval of the instructor or a significant extenuating circumstance, in the judgment of the instructor.
- The instructor will accommodate excused absences but will not accommodate unexcused absences for quizzes and assignments. If the excused absence is known about before the missed class, the student must notify the instructor as soon as they know about it (i.e. email the professor your sport team schedule at the beginning of the semester, or reach out to the professor as soon as you've fixed your flat tire and are in a safe place to contact the professor).
 - Excused absences: University sponsored/related events, documented health issues (mental and physical), unforeseen travel issues, major life events, etc. If you want to know if something qualifies, please reach out to the professor and provide any documentation requested.
 - Unexcused absences: Family vacation, oversleeping, poor planning.

Grade Challenges and Inquiries

For grade challenges and inquiries, an email is required within a week of receiving the graded assignment.

Classroom Management Policies

Students are expected to show up on time and prepared for class, which means having necessary writing and study tools. If a student is deemed to be disruptive of another student's ability to learn, they will be asked to leave and receive a grade of zero for any missed work.

Cheating

Quizzes and exams are to be taken without any help from your fellow students or internet tools. Specific guidelines for allowable materials will be shared at the time of the quiz or exam. If you are unsure if something is cheating, ask the professor. If a student is caught cheating, they will receive negative points for the assignment worth half the value of the assignment. For instance, if an assignment is worth 100 points, a plagiarized solution will give a student a score of -50/100. No submission is 0/100. As a result, it is better to submit nothing than to be caught cheating.

Class Cancellation

If the University closes due to inclement weather or other emergency situations, there will be university-wide announcements via email and to your cell phone number on record through the automatic University emergency text messaging system. Students should notify the University if they change their cell phone number to ensure they will receive these important emergency communications. As soon as possible following a university closure or any other event requiring class cancellation, the instructor will post an announcement on Canvas with instructions for how the material for the day will be covered.

Religious accommodations

Ohio law and the University's Student Religious Accommodations for Courses Policy 1.3.7 permits a student, upon request, to be absent for reasons of faith or religious or spiritual belief system or participate in organized activities conducted under the auspices of a religious denomination, church, or other religious or spiritual organization and/or to receive alternative accommodations with regard to examinations and other course requirements due to an absence permitted for the above-described reasons. Not later than fourteen days after the first day of instruction in the course, a student should provide the instructor with written notice of the specific dates for which the student requests alternative accommodations. Additional information about or questions related to the policy can be directed to the Office of Equal Opportunity (OEO).

University Policies & Services:

University statements on the following topics can be found at <http://ceas.uc.edu/syllabus-statements>:

- Academic Integrity
- Accessibility
- Title IX
- Counseling Services
- Inclusivity