GEORGIA INSTITUTE OF TECHNOLOGY

COE 3001-H - MECHANICS OF DEFORMABLE BODIES

Fall 2025

Instructor:	Yazhuo Liu	**Time:**	TR 9:30 – 10:45 am
Email:	yliu3500@gatech.edu	**Place:**	Skiles 270

Course Pages

https://gatech.instructure.com/courses/457662

All lecture notes, assignments, and solutions will be available at Canvas.

Office Hours

- In-person: TBD
- Online schedule by email (Subject includes "COE3001 Office Hour Appointment")

Tutoring Services

In addition to our office hours, peer tutors are available for this course for free in-person and virtual tutoring appointments. For more details, visit https://tutoring.gatech.edu/

Prerequisite

MATH 2403 or MATH 2552 or MATH 2413 (Differential equations)

COE 2001 or CEE 2020 or ME 2211 or AE 2120 (Statics)

Textbook

✓ Mechanics of Materials, by James M. Gere & Barry J. Goodno

  Note:

   ✧ Homework may be taken from the textbook but will provide full context.

   ✧ Reading recommendations are based on the textbook.

Course Description

COE 3001 is an undergraduate course on the mechanics of deformable solids. The course develops students' ability to analyze stress, strain, stress-strain relationships, deflections, and failure in materials under various loading conditions. Topics include axial deformation, torsion, bending, stress transformation, buckling, and energy methods. Both analytical and numerical approaches are emphasized, preparing students for advanced engineering courses. The course will also spend one lecture to introduce COMSOL Multiphysics structure mechanics module to cultivate students' ability to solve more advanced engineering applications.

Objectives

- Develop an ability to visualize and understand the fundamental behavior of deformable bodies

- Understand the assumptions and idealizations commonly used for analysis of deformable solids

- Learn methods of computing stresses in various types of structural components

- Learn the fundamental approach for determining internal forces and stresses in indeterminate structures

Grading

- Assignments: 30 pts

- Midterm Exam: 30 pts

- Final Exam: 40 pts

- Bonus: 10 pts

Points	Letter grade
>= 90	A
80 ~ 89	B
70 ~ 79	C
60 ~ 69	D
< 60	F

Attendance

There will be 3 random attendance checks throughout the semester. If you are present once, you will receive 1 bonus pt; if you are present twice, you will receive 3 bonus pts; and if you are present for all three, you will receive the full 6 bonus pts.

Assignments

There will be 6 assignments this semester, each worth 6 pts (one assignment with lowest grades will be dropped). Typed assignments will receive an additional 1 bonus pt each time (maximum 4 times).

Discussions on homework and class notes are encouraged. However, the exchange of written information in completing assignments is not permitted. To receive credit, you must submit your homework solutions through Canvas (under the Assignments section) by 11:59 pm of the due date. NO late homework will be accepted, except for delays due to serious illness or other documented difficulties. Whenever possible, advance request for extension is expected. You can email the request to the instructor when handing in late HW.

Exams

Both the midterm and final exams are closed book. Students are permitted to bring 1 sheet of letter sized self-prepared equation sheet (both sides) and calculator without programming function. It is NOT allowed to reproduce any homework solutions on equation sheet. No make-up exams will be given, unless allowed as defined by institutional policy (https://catalog.gatech.edu/rules/4/). Detailed exam instructions will be provided separately.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit https://catalog.gatech.edu/policies/honor-code/. Any student suspected of cheating or

plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodation for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office Disability Services (https://disabilityservices.gatech.edu/), as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also email me about your learning needs.

Generative Artificial Intelligence (GenAI) Statements

Students may, at their discretion, employ GenAI tools to support their learning process, including clarifying course concepts, reviewing material, or exploring alternative explanations of topics covered in class. However, any information obtained through AI must be critically evaluated and independently verified against authoritative sources, including course lectures, readings, and approved materials. Using GenAI to complete assignments, homework, projects, or any graded assessments is STRICTLY PROHIBITED. Submitting work generated by AI as your own constitutes academic misconduct and violates Tech's policy on academic integrity. Over-reliance without comprehension may violate academic expectations and result in penalties. More information about AI Standards and Guidance are available at https://oit.gatech.edu/ai/guidance.

How to do well on this course

✓ Attend classes and take notes.

✓ Complete all homework assignments.

✓ Read reading assignments.

✓ Make sure you understand. If not, **ask questions**.

✓ Take advantage of office hours or separate appointments.

✓ If there is a problem or any concerns, talk to your instructor.

Outline

Week	Date	Tentative Topics
1	Aug. 19	Introduction;
	Aug. 21	Review of statics
2	Aug. 26	Mechanical Properties of Materials
	Aug. 28	Tension, Compression and Shear
3	Sep. 2	Axial loads
	Sep. 4	Axial Deformation
4	Sep. 9	Thermal Strains and Statically Indeterminate Problems
	Sep. 11	Torsion: Torsion formula
5	Sep. 16	Torsion: Torsion formula cont.
	Sep. 18	Torsion: Statically indeterminate problems
6	Sep. 23	Bending: Shear force and moment diagrams
	Sep. 25	Centroid and Moment of Inertia
7	Sep. 30	Bending: Stress in beams
	Oct. 2	Midterm Exam
8	Oct. 9	Bending: Stress in beams cont.
9	Oct. 14	Bending: deflection of beams
	Oct. 16	Bending: Method of Superposition
10	Oct. 21	Bending: Statically indeterminate beams
	Oct. 23	Analysis of stress (I) – stress transformation
11	Oct. 28	Analysis of stress (II) – strain transformation
	Oct. 30	Analysis of stress (III) – strength theory
12	Nov. 4	Pressure Vessels and Combined loads
	Nov. 6	Combined loads + Columns
13	Nov. 11	Columns – Cont.
	Nov. 13	Energy Method (TBD)
14	Nov. 18	Energy Method – Cont. (TBD)
	Nov. 20	Introduction to COMSOL Structure Mechanics Module
15	Nov. 25	Final review: knowledge
16	Dec. 2	Final review: example problems