GEORGIA INSTITUTE OF TECHNOLOGY

COE 3001-M - MECHANICS OF DEFORMABLE BODIES

Spring 2026

Instructor:	Yazhuo Liu	**Time:**	MW 8:00 – 9:15 am
Email:	yliu3500@gatech.edu	**Place:**	Mason 1133

Course Pages

https://gatech.instructure.com/courses/521096

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

Office Hours

- In-person: MW 12:30 – 1:30 pm (TBD) at MRDC 4114 A

- 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, etc. 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. However, for the 5 assignments that count, any extra points you earn beyond the 6-point maximum (e.g., from bonus points) can only be applied to at most 4 of those 5 assignments.

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. Unless approval is granted, late assignments will receive a 30% penalty. Assignments submitted after the solutions have been posted will not 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 by yourself.

✓ 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

(may be adjusted dynamically based on the course progress)

Week	Date	Tentative Topics	Comments
1	Jan. 12	Introduction	
	Jan. 14	Review of statics	
2	*Jan. 19*	*Martin Luther King, Jr. Day*	
	Jan. 21	Mechanical Properties of Materials	HW1 release

3	Jan. 26	Tension, Compression and Shear	
	Jan. 28	Axial loads and deformation	
4	Feb. 2	Thermal Strains and Statically Indeterminate Problems	
	Feb. 4	Review and problem solving section	HW1 due
5	Feb. 9	Torsion: Torsion formula	HW2 release
	Feb. 11	Torsion: Torsion formula cont.	
6	Feb. 16	Torsion: Statically indeterminate problems	
	Feb. 18	Bending: Shear force and moment diagrams	HW2 due, HW3 release
7	Feb. 23	Centroid and Moment of Inertia	
	Feb. 25	Bending: Stress in beams (1)	
8	Mar. 2	Bending: Stress in beams (2)	HW3 due
	Mar. 4	**Midterm Exam: cover materials in first 7 weeks**	
9	Mar. 9	Bending: review	HW4 release
	Mar. 11	Bending: deflections	
10	Mar. 16	Bending: Statically indeterminate beams	
	Mar. 18	Bending: Problem solving tutorial	
11	*Mar. 23*	*Spring Break*	HW4 due
	Mar. 25	*Spring Break*	HW5 release
12	Mar. 30	Analysis of stress (I) – stress transformation	
	Apr. 1	Analysis of stress (II) – strain transformation	
13	Apr. 6	Generalized Hooke's law	
	Apr. 8	Pressure Vessels and Combined loads	HW5 due
14	Apr. 13	Columns 1	HW6 release
	Apr. 15	Columns 2	
15	Apr. 20	Energy Method	
	Apr. 22	Introduction to COMSOL Structure Mechanics Module	HW6 due
16	Apr. 27	Final review	Last day of class
Final	**May. 1**	**8:00 AM - 10:50 AM**	