ME6201 CONTINUUM MECHANICS
Fall 2026
Mon & Wed 11:00-12:15

Prerequisites Introduction to partial differential equations and vector mathematics (MATH 4581 or equivalent); or with the consent of the instructor

Instructor: Prof. Min Zhou
Email: min.zhou@gatech.edu
Office Hours: Mon & Wed 3-4 pm

TA: TBD
Email:
Office Hours:

Text Book: Introduction to the Mechanics of a Continuous Medium
by Lawrence E. Malvern, Prentice-Hall
See Modules/files on Canvas

Reference: Fundamentals of Structural Mechanics by Keith D. Hjelmstad
Prentice-Hall

Exams:

Midterm:	Wed Oct. 21, 2026, in class, 75 min, in regular classroom
Final:	TBD, in regular classroom

Grade: Homework - 30% + Midterm - 30% + Final - 40%

A Excellent	90%
B Good	80%
C Satisfactory	70%
D Passing	60%
F Failure	<60%

Goal: Continuum mechanics is a branch of applied mechanics that describes the behavior of solids, fluids and gases by considering them as continuously distributed media. This consideration neglects the discrete nature of matter on the atomistic or molecular levels. This course will provide knowledge of the fundamental and unifying concepts of the mechanics of continua as a core course for graduate study in Mechanical Engineering.

Class format: In classroom in-person lecture. Attendance is required and will be taken during each class and used as a gauge of effort and commitment to learning.

Recording & Zoom: Recording of lectures is available on Canvas under the Media Gallery tab as a backup resource for learning. A live Zoom link is also available under the Zoom tab. These can be used in case of absences due to genuine health

reasons or official GT functions. These resources are not a substitute for in-person class attendance.

Topics	Contents
1. Linear Algebra:	Fundamentals of tensors, tensor derivatives, Green-Gauss Theorem Reading choices: (a) Handouts on index notation, tensors and tensor algebra (b) Chapter 2, Malvern (c) Chapter 1, Hjelmstad (d) Appendix I (only as optional advanced reading), Malvern
2. Kinematics:	Definition of deformation, deformation gradient, strain & strain rates**,** Eulerian and Lagrangian coordinate systems, stretch and rotation, rate of deformation, principal strain, compatibility. Reading choices: (a) Chapter 4, Malvern (b) Chapter 2, Hjelmstad
3. Kinetics:	Definition of traction, stresses, equations of motion & equilibrium, principal stresses, deviatoric and hydrostatic stress. Reading choices: (a) Chapters 3 & 5, Malvern (b) Chapter 3, Hjelmstad
4. Constitutive Laws:	General requirements, fundamentals of hyperelastic behavior of solids, material symmetries, variational principles. Linear and nonlinear elasticity. Fundamentals of fluids, Newtonian fluids and Navier-Stokes equations, ideal and rotational flows, laminar and turbulent flow. Aspects of inelastic behavior of solids and Non-Newtonian fluids. First and second laws of thermodynamics for a continuum, coupled thermomechanics, boundary conditions. Reading choices: (a) Handouts on field equations (b) Chapters 6-8, Malvern (c) Chapters 4-7, Hjelmstad