NEW JERSEY INSTITUTE OF TECHNOLOGY

ME 620-101 MECHANICS OF MATERIALS

Fall 2025

Instructor: Dr. Xing Liu (xing.liu@njit.edu)

Lectures: Monday 6:00–8:50 pm at CKB 219

Office hours: Monday 3:00–5:00 pm at 263 Fenster Hall

Prerequisites: Undergraduate differential equations, mechanics of materials or linear elasticity. Students who wish to strengthen their mathematical background in preparation for this course are encouraged to take ME 616 beforehand or concurrently.

Textbook: There is no required textbook for this course. Recommended reference:

- *Applied Mechanics of Solids*, by Allan F. Bower. solidmechanics.org

Course Description: This course covers the fundamentals of solid mechanics and their application to the mechanical behavior of engineering materials.

Course Learning Outcomes

1. Understand the mathematical descriptions of deformation and forces in solids.
2. Understand linear elasticity theory and solve boundary value problems for isotropic, linear elastic solids.
3. Describe fracture of isotropic, linear elastic solids.
4. Describe the stress–strain response and deformation behavior of linear viscoelastic solids.
5. Describe the stress–strain response and deformation behavior of elastoplastic solids.

Tentative Schedule and Topics

Sep. 8	Displacement and Strain
Sep. 15	Force, Traction, and Stress
Sep. 22	Equilibrium Equations, Principle of Virtual Work
Sep. 29	Linear Elasticity: Strain Energy and Constitutive Equations
Oct. 6	Linear Elasticity: Boundary Value Problems I
Oct. 13	Linear Elasticity: Boundary Value Problems II
Oct. 20	Linear Elasticity: Energy Methods

Oct. 27	**Midterm Exam**
Nov. 3	Introduction to Linear Elastic Fracture Mechanics I
Nov. 10	Introduction to Linear Elastic Fracture Mechanics II
Nov. 17	Introduction to Viscoelasticity I
Nov. 24	Introduction to Viscoelasticity II
Dec. 1	Introduction to Plasticity I
Dec. 8	Introduction to Plasticity II
TBD	**Final Exam**

Grading Policy

- **Homework Sets (50%)**

  Homework will be assigned regularly. Students must upload a PDF copy of their solutions to Canvas by the due date. Submission by other means will not be accepted. In rare cases of illness or other justified reasons, homework should be uploaded before the solutions are posted.

- **Midterm Exam (20%), Final Exam (30%)**

  There will be no make-up exams. Students are advised to contact the Office of the Dean of Students if they have any questions or need additional guidance.

- **Grading Scale**

  The final grade will not be curved.

A	B	C	F
90–100	75–89	60–74	< 60

Academic Integrity

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: NJIT Academic Integrity Code (https://www.njit.edu/sites/njit.edu.policies/files/NJIT-University-Policy-on-Academic-Integrity.pdf).

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary

action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Office of the Dean of Students at dos@njit.edu.

Generative AI

This course expects students to work without generative artificial intelligence (AI) assistance in order to better develop their skills in this content area. As such, student use of generative AI (*e.g.*, ChatGPT) is not permitted throughout this course under any circumstance.

Student Absences for Religious Observance

NJIT is committed to supporting students observing religious holidays. Students must notify the instructor in writing of any conflicts between course requirements and religious observances. Students expecting to miss classes or exams due to religious observances must submit a written list of dates to their instructors, ideally by the end of the second week of class, but no later than two weeks before the anticipated absence. Academically reasonable accommodation will be provided, allowing students to complete missed assignments, exams, quizzes, or other coursework within the academic term.

This policy applies only to absences for religious observances. For other excused absences, students should refer to the policies from the Dean of Students. For any questions or additional guidance, please review the policy (https://www.njit.edu/registrar/njit-policy-student-absences-religious-observances) or contact the Office of Inclusive Excellence at inclussiveexcellence@njit.edu.