

Advanced Solid Mechanics (MEEN 4170/MEEN 5410)

Instructor Prof. Herman Shen. (Office: F101T.1)

IA: Harshavardan Reddy Miryala (Office: TBA)

Office Hours Dr. Shen: Wednesdays 2:00-4:00 PM

Fall 2024

Time: (MW) 4:00 PM-5:20 PM

Classroom: B192

Office Hours IA: Tu & Thurs 1-3PM

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Course Description

This course introduces the principles on advanced mechanics of solid materials. This course will enable graduate students and senior level undergraduate students to understand the fundamental solid mechanics and solve elastic problems of solids and structures.

Course prerequisite

Mechanics of Materials (ENGR 2332)

Course Objectives

Introduce advanced solid mechanics of materials. When completed, students would be able to understand and solve elastic mechanics problems in complex conditions, such as torsion, beam bending, column stability, and contact problems.

Course Requirements

Attendance – Attendance is mandatory. Lectures and class discussions will contain vital information needed to do well on the exams.

Textbooks

(1) Advanced Mechanics of Materials (6th Edition), by Arthur P. Boresi and Richard J. Schmidt, ISBN-10: 0471438812. (2) Dr. Shen's class/lecture notes.

Exams

There will be three exams, including two midterm exams and one final exam, and one course project. Exams will be based on text readings, handouts, class exercises, and class lectures and discussions. Students are responsible for all text materials, regardless of whether we review the text material in class or not.

Missed Exams

You will be allowed to make up a missed exam only if you have a documented university excused absence.

Assignments

In addition to the readings from the text, there will be homework assignments. No late assignments will be accepted.

Grade

Attendance	10%	Homework Assignments	30%
Two Exams	30%		
Final Exam	30%		

Distribution: 90 - 100 = A, 80 - 89 = B, 70 - 79 = C, 60 - 69 = D, Below 60 = F

Course Policies:

Attendance

Students are expected to attend class meetings regularly and to abide by the attendance policy established for the course. It is important that you communicate with the professor and the instructional team prior to being absent, so you, the professor, and the instructional team can discuss and mitigate the impact of the absence on your attainment of course learning goals. Please inform the professor and instructional team if you are unable to attend class meetings because you are ill, in mindfulness of the health and safety of everyone in our community.

If you are experiencing any symptoms of COVID-19 (<https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>) please seek medical attention from the Student Health and Wellness Center (940-565-2333 or askSHWC@unt.edu) or your health care provider PRIOR to coming to campus. UNT also requires you to contact the UNT COVID Team at COVID@unt.edu for guidance on actions to take due to symptoms, pending or positive test results, or potential exposure.

Academic Integrity Policy

Academic Integrity Standards and Consequences. According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

ADA Policy

UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one's specific course needs. Students may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website (<https://disability.unt.edu/>).

Emergency Notification & Procedures

UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.

Additional Policies and Procedures

The Student Evaluation of Teaching Effectiveness (SETE) is a requirement for all organized classes at UNT. Tardiness: If you arrive late, please enter quietly and sit down. Do not walk in front of speakers or disrupt the class in any other way. Cell Phones: Please remember to mute or turn off phones prior to class.

Extra Help: Please do not wait until the last minute. If you are having trouble with this class, please stop by my office during office hours or send me an email (Herman.Shen@unt.edu).

Course Outline

- 1. Introduction and overview**
- 2. Approaches of structural analysis**
- 3. Stress and strain relations**
- 4. Energy method - FEM**
- 5. Torsion**
- 6. Beam bending**
- 7. Stability of columns**
- 8. Stress concentration**
- 9. Fatigue and Fracture - Introduction**