ENGR/MEEN 2301, Mechanics I (Statics)

Instructor: Yijie Jiang, Ph.D.
Office: Discovery Park F101T
Email: yijie.jiang@unt.edu

Fall 2022
Time: 11:30-12:20 MWF
Office Hours: 8:30-11:30 AM Mondays

Catalog Course Description:

Introduction to the utilization of vector algebra and free-body diagrams to solve static mechanical problems. The course introduces basic theory of engineering mechanics, using linear algebra and calculus, involving the equilibrium of particles, rigid bodies, and structures.

The course covers six major areas of study: (1) vector algebra of forces and moments; (2) free-body diagrams and equilibrium of particles and rigid bodies, (3) structural analysis of internal and external forces of trusses, frames, and machines; (4) centroids and centers of gravity; (5) moments of inertia; and (6) principles and application of friction.

Prerequisites: MEEN 1000, PHYS 1710/1730

Credits: 3, **Required** course in the program

Program Outcomes:

MEEN 2301 Course Learning Outcomes	ABET EAC Student Outcomes
State the fundamental principles used in the study of mechanics	1
Define magnitude and directions of forces and moments and identify associated scalar and vector products	1
Draw free body diagrams for 2- and 3-dimensional force systems	1
Solve problems using the equations of static equilibrium	1
Compute the moment of force about a specified point or line	1
Replace a system of forces by an equivalent simplified system	1
Analyze the forces and couples acting on a variety of objects	1
Determine unknown forces and couples acting on objects in equilibrium	1
Analyze simple trusses using the method of joints or the method of sections	1
Determine the location of the centroid and the center of mass for a system of discrete particles and for objects of arbitrary shape	1
Analyze structures with a distributed load	1
Calculate moments of inertia for lines, area, and volumes	1
Apply the parallel axis theorem to compute moments of inertia for composite regions	1
Solve problems involving equilibrium of rigid bodies subjected to a system for forces and moments that include friction	1
Solve problems involving dry sliding friction, including problems with wedges and belts	1

* ABET EAC Student Outcomes 1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

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.

Course Materials for Remote Instruction

Remote instruction may be necessary if community health conditions change or you need to self-isolate or quarantine due to COVID-19. Students will need access to a webcam to participate in fully remote portions of the class. Information on how to be successful in a remote learning environment can be found at https://online.unt.edu/learn

Textbooks:

Engineering Mechanics: Statics, R.C. Hibbeler, Pearson, 14th edition, 2016 or newer
Engineering Mechanics: Statics, A. Bedford and W. Fowler, Prentice Hall, 5th edition, 2008 or newer

Exams: There will be four exams - 3 quizzes, 1 final. Exams will be based on text readings, handouts, class exercises, and class lectures and discussions. Students are responsible for all text material, 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. No emailed assignments will be accepted.

Grade:

Attendance	5%	Homework Assignments	15%
Three Quizzes	15% each	Final Exam	35%

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

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 (Yijie.Jiang@unt.edu).

Schedule

Date	Time	Topic
29-Aug		Introduction
31-Aug		Scalars and vectors
2-Sep		Components in 2D and 3D
5-Sep		Labor Day (no class)
7-Sep		Dot product
9-Sep		Cross product
12-Sep		Forces
14-Sep		2D force systems
16-Sep		3D force systems
19-Sep	In class	Quiz #1
21-Sep		2D moment
23-Sep		Moment vector
26-Sep		Moment about a line
28-Sep		Couples
30-Sep		Moment summary
3-Oct		Equivalent system
5-Oct		
7-Oct		Object in equilibrium

10-Oct		2D and 3D applications
12-Oct	In class	Quiz #2
14-Oct		Force members
17-Oct		Truss and method of joints
19-Oct		Method of sections
21-Oct		Space truss
24-Oct		Frames and machines
26-Oct		Centroids of areas
28-Oct		Composite area
31-Oct		Recitation class
2-Nov		Distributed load
4-Nov		Center of mass
7-Nov		Moment of inertia
9-Nov		
11-Nov		Friction
14-Nov	In class	Quiz #3
16-Nov		Wedges and threads
18-Nov		Belt friction
21-Nov		Internal forces and moments
23-Nov		Thanksgiving Break (no class)
25-Nov		Thanksgiving Break (no class)
28-Nov		Beam bending moment and shear
30-Nov		Recitation class
2-Dec		Review for the final exam
12/5-12/7		Final

Note: The course outline above is subjected to change depending on the overall course progress.