MEEN 2301.001, Mechanics I (Statics)

Instructor: Yijie Jiang, Ph.D. Fall 2019

Office: Discovery Park F102K Time: 11:30-12:20 MWF

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Catalog (2019-2020) 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 Requirements:

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

Textbooks:

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

Exams: There will be four exams - 3 quizzes (50 min in class), 1 final (2 hours). 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. Final exam: 10:30 am - 12:30 pm, 12/09/2019.

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
26-Aug		Introduction
28-Aug		Scalar and vectors
30-Aug		Components in 2D and 3D
2-Sep		Labor Day (no class)
4-Sep		Dot product
6-Sep		Cross product
9-Sep		Forces
11-Sep		2D force systems
13-Sep		3D force systems
16-Sep	In class	Quiz #1
18-Sep		2D moment
20-Sep		Moment vector
23-Sep		
25-Sep		Moment about a line
27-Sep		
30-Sep		Couples
2-Oct		Equivalent system
4-Oct		
7-Oct		
9-Oct		Object in equilibrium
11-Oct		2D and 3D applications
14-Oct	In class	Quiz #2
16-Oct		Force members
18-Oct		Truss and method of joints
21-Oct		Method of sections
23-Oct		Space truss
25-Oct		Frames and machines
28-Oct		Centroids of areas
30-Oct		Composite area
1-Nov		Distributed load
4-Nov		Center of mass
6-Nov		Moment of inertia
8-Nov		
11-Nov		Parallel-axis theorems
13-Nov		
15-Nov	In class	Quiz #3
18-Nov		Friction
20-Nov		Wedges and threads
22-Nov		Belt friction
25-Nov		Internal forces and moments
27-Nov		
29-Nov		Thanksgiving Break (no class)
2-Dec		Beam bending moment and shear
4-Dec		Review for the final exam
9-Dec	10:30-12:30	Final exam
Note: The course outline above is subjected to change depending on the overall course progress.		