

MAE 130A Mechanics I: Statics

(Formerly AMES 121A. Cross-listed with SE 101A.)

Instructor:

Prof. M. A. Meyers

Tu-Th: CSB 001 8-9:20AM

W: CSB001 8-8:50AM

Readers:

Francisco Garcia fmgarcia@ucsd.edu

Nader Ali(?)

Angela Juran ajuran17@netzero.net (Tau Beta Pi tutor): Wednesday(?)2:30-4:00PM

EBU 2-Room 105

Principles of statics using vectors; Two- and three-dimensional equilibrium of statically determinate structures under discrete and distributed loading including hydrostatics; Internal forces and concept of stress; Free body diagrams; Moment, product of inertia; Analysis of trusses and beams.

Prerequisites: grades of C- or better in Math. 21C or 20D and Phys. 2A.

Priority enrollment given to pre-engineering and engineering majors. MAE students can receive credit for the SE courses and vice-versa, but they may not receive credit for both.

Textbook: F. P. Beer and E. R. Johnston Jr. Vector Mechanics for Engineers, Sixth edition, McGraw-Hill, 1996

Prerequisites: Algebra and geometry of Vectors, dot and cross products, and Newton's laws.

Course Topics:

1. Plane and Spatial Equilibrium of Particles under Point Forces (B&J, Ch.2)
2. Plane and Spatial Equilibrium of Rigid Bodies(B&J, Ch.3)
3. Distributed Forces: Centroids and Centers of Gravity(B&J, Ch.5)
4. Static Analyses of Trusses(B&J, Ch.6)
5. Internal Forces in Beams and Cables(B&J, Ch.7)
6. Moment and Shear Diagrams of Beams(B&J, Ch.7)
7. Distributed Forces: Moments of Inertia(B&J, Ch.9)
8. Friction(B&J, Ch.8)

Course Objectives:

Objective 1: To teach students the formulation of vector equilibrium equations for planar and spatial rigid bodies (2).

Objective 2: To teach students the first design process of modeling external forces, drawing free-body diagrams, and evaluating internal forces (4).

Methods of Evaluation:

1. Homework will be weekly assigned, collected on Thursdays, and graded.
2. Two Midterms(February 1 and 22) and one Final Examination(March 22, 8:00-1:00 AM)

First and second exam:	25% each
Final Exam	25%
Homework	25%

Homework will be assigned on Thursdays and will be due on the next Thursday. **NO LATE HOMEWORK WILL BE ACCEPTED.** Homework should be neat and written in engineering paper.

Grading for course will be done on statistical basis bas4s on class performance.

Performance Criteria:**Objective 1**

1.1 Students will develop vector equilibrium equations for planar and spatial rigid bodies in homeworks and i.

Objective 2

2.1 Homework problems are presented to students to follow step-by-step the first design process. The grading of problems emphasizes step-by-step formulation. In the end, students will demonstrate in the final examination to master the drawing free-body diagrams and computing internal forces.

2.2 By performing statically determinate truss analyses, students will identify critical members.

2.3 By drawing the moment-shear diagram for beams, students will learn how to identify critical points subjected to the maximum internal force.