

MAE 130A / SE 101A (4 units)
Mechanics I: Statics

Class/Laboratory Schedule: four hours of lecture, eight hours outside preparation.
12 hours/week total

Course Coordinator(s): Vlado Lubarda

Textbooks/Materials:

1. Beer and Johnston, Vector Mechanics for Engineers - Statics, McGraw-Hill, 2012, 10th ed.
2. Hibbeler, R.C., "Engineering Mechanics: Statics", Pearson Prentice Hall, 2010, 12th ed.

Catalog Description: Statics of particles and rigid bodies in two and three dimensions; free body diagrams; internal forces; static analysis of trusses, frames, and machines; shear force and bending moment diagrams in beams; equilibrium problems with friction.

Prerequisites: Grades of C- or better in Math 20C and Phys 2A

- Required Course
- Technical Elective Course
- Other: _____

Performance Criteria:

Objective 1

1.1 Students will learn to formulate and solve equilibrium equations for particles and rigid bodies.

Objective 2

2.1 Students will learn to construct free-body diagrams, and to compute internal forces in statically determinate trusses, frames, and machines.

2.2 Students will learn to construct the moment-shear diagrams for beams, and to identify critical sections subjected to maximum internal forces.

Objective 3

3.1 Students will learn how to solve and analyze equilibrium problems with friction.

Course Objectives:

(Numbers in parenthesis refer to ME and AE Program Outcomes)

Objective 1: To teach students the formulation of equilibrium equations for planar and spatial rigid bodies (1a, 5e).

Objective 2: To teach students the process of modeling external forces, drawing free-body diagrams, and evaluating internal forces (1a, 5e).

Objective 3: To teach students how to solve equilibrium problems with friction (1a, 5e).

Course Topics:

- 1.) Statics of particles
- 2.) Moment of a force, couples, equivalent systems of forces
- 3.) Equilibrium of rigid bodies in 2D and 3D
- 4.) Distributed forces, centroids, and centers of gravity
- 5.) Static analysis of trusses, frames, and machines
- 6.) Internal forces in beams, shear force and bending moment diagrams
- 7.) Equilibrium problems with friction

Syllabus Prepared By: H. Murakami, March 2000

Revised: V. Lubarda, via Teaching Work Group, April 2008

Reviewed: TWG, June 2010

Revised: Lelli Van Den Einde, Anne Hoger, via TWG Meeting, June 2011

Reviewed: TWG, August 2012