

Widener University
Civil Engineering Department
ENGR-213: Statics
2005 Fall Semester
Prof. Mesut Pervizpour

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Textbook: Vector mechanics for Engineers (Statics), 7th Edition, Beer, Johnston & Eisenberg, McGraw-Hill, 2003

Tentative Grading:	3 Mid-term tests	60%
(± will be used)	Homework	10%
	Final Examination	30%
	Total:	100%

Class Schedule: Lecture, M, W, F 11:00 - 11:50 am (KH 113)

COURSE DESCRIPTION

Vector algebra. Concurrent force systems and equilibrium of a particle. General force systems and equilibrium of a rigid body. Elements of structural analysis. Shear and bending moment diagrams. Centroids, hydrostatic forces, and moments of inertia. Friction.

GENERAL CONDUCT OF COURSE

1. **Course Objectives** (students will, at course completion, have the ability to):
Perform vector addition and multiplication
Determine moments about points and axes
Identify and calculate moments of couples
Solve equilibrium problems of particles and rigid bodies
Determine centroids
Analyze distributed loads
Analyze trusses, frames, and machines
Prepare shear and bending moment diagrams
Calculate moments of inertia
Calculate static and dynamic friction
2. During the semester, 3 one-hour midterm tests will be given. The student **MUST** take all three tests. Basically **NO** make-ups are granted unless absence from a test is justified with proper documentation. All tests will be based on the material covered up to the date of test. Unless otherwise instructed, closed-book tests should be expected. Any grade review you see justified should be brought to my attention within the first week of receiving the grade.
3. Homework will be assigned. There will be in class unannounced quizzes. No late homework will be accepted regardless of reason. However you will be allowed to drop your two lowest homework grades. Homework assignments will include hand solution and computer usage (in terms of matlab and excel) for this course.
4. It has been my experience in the past that when students study in groups, and communicate and share resources, they seem to perform better. Obviously, this is a generalization and I am sure there are

many exceptions. However, please keep this in mind and take advantage of study groups whenever you can. However, the submitted work (homework, quiz, examinations) should be the original work of the individual.

COURSE OUTLINE

- A. *Introduction and Particle Statics* (Chapters 1 and 2)
- 1.1 – 1.6 Introduction
 - 2.1 – 2.6 Vectors and Forces
 - 2.7 – 2.8 Rectangular Components
 - 2.9 – 2.11 Particle Equilibrium (2D)
 - 2.12 – 2.14 Forces (3D)
 - 2.15 Particle Equilibrium (3D)

FIRST EXAM

Monday, September 26, 2005

- B. *Rigid Bodies and Their Equilibrium* (Chapters 3 and 4)
- 3.1 – 3.8 Vector Product – Moment about a Point
 - 3.9 – 3.11 Scalar Product – Moment about an Axis
 - 3.12 – 3.16 Couples
 - 3.17 – 3.19 Equivalent Systems
 - 4.1 – 4.5 Rigid Body Equilibrium (2D)
 - 4.6 – 4.7 Two and Three Force Bodies
 - 4.8 – 4.9 Rigid Body Equilibrium (3D)

SECOND EXAM

Monday, October 27, 2005

- C. *Distributed Forces and Centroids* (Chapters 5)
- 5.1 – 5.5 Centroids (2D)
 - 5.6 Centroids (2D) by integration
 - 5.7 Theorems of Pappus-Guldinus
 - 5.8 – 5.9 Distributed Loads
- D. *Analysis of Structures* (Chapter 6)
- 6.1 – 6.5 Trusses – Method of Joints
 - 6.7 Trusses – Method of Sections
 - 6.9 – 6.12 Frames and Machines

THIRD EXAM

Wednesday, November 23, 2005

- E. *Forces in Beams, Moments of Inertia and Friction*
- 7.1 – 7.6 Shear and Bending Moment Diagrams (Chapters 7)
 - 9.1 – 9.7 Moment of Inertia (Chapters 9)
 - 8.1 – 8.4 Friction (Chapters 8)

FINAL EXAM (TBA)