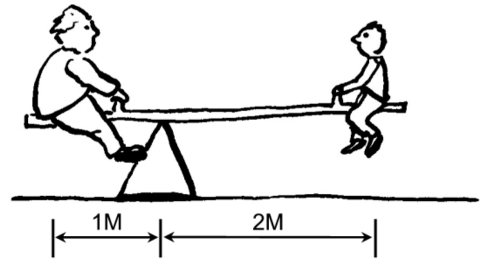
Statics
Spring 2018
Engineering 8
Section #52059



Instructor: Dr. John Heathcote
Class Times: TTh 8:00-9:15am, BUS-49
Office: FEM-1B (in the math study center)
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Office Hours:
TTh 1:00-1:50 pm
F 10:00-10:50 am
If you cannot make regular office hours, feel free to make an appointment.

Prerequisite: PHYS 4A
Corequisite: MATH 6

Welcome to Statics, your first course in Engineering Mechanics!

I would like to welcome you to ENGR 8! In this course, you will take the topic of static equilibrium which you started in your first semester of physics and develop that topic in an engineering mindset! You will gain skills in vector mathematics, balancing forces and moments (torques), analyzing structures, and building several skills that will be useful in future mechanics courses, such as dynamics and mechanics of materials!

I look forward to working with you in this class! This is a challenging topic, but we can work together so that you can be successful!

Catalog Description: The study of rigid bodies in static equilibrium when acted upon by forces and couples in two- and three-dimensional space. Includes equilibrium of rigid bodies, trusses, frames and machines, as well as the calculation of centers of mass, centroids, friction, moments of inertia, and shear and bending moment diagrams.

Required Textbook: Engineering Mechanics: Statics, R.C. Hibbeler, 14th Edition, Pearson

Grading:	70%	Tests and Final Exam
	20%	Homework and In-Class Problems
	10%	Design Project

Tests and Final Exam: There will be four tests during the term. The first three tests will cover the chapters from that unit. The fourth test will cover the most recent unit, but will also include questions covering the cumulative content from the entire semester. Rules for what is allowed for each test will be announced before each test.

Homework: Homework will be assigned in order to practice the problem-solving skills taught in class. These will be handwritten assignments. You are required to show complete diagrams and full working of your problem solving for each assignment. Grades will be based upon both completeness, accuracy, and neatness. The homework is very important. Not only does it count for 20% of the overall grade, it will also be very useful practice for the problem solving techniques taught in this class.

Design Projects: Students will complete design projects through the semester that will apply the topics from this course to “real-world” applications. These projects may involve computer calculations of problem solutions or the creative design of a structure. Grades will be based on the success of the design in meeting the goals, the accuracy of the calculations, and the neatness of the report.

Homework Grading Policies: Late homework will not receive full credit. It is important that you use the homework assignments to practice the problem-solving techniques and learn the material.

Grading Scale:	90-100%	A
	80-89.9%	B
	70-79.9%	C
	60-69.9%	D
	<60%	F

Accommodations for Students with Disabilities:
If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact me as soon as possible.

Add Date:	Friday, January 26	Last day to add a course
Drop Date:	Friday, March 9	Last day to drop this course
Holidays:	Monday, January 15	Martin Luther King Jr. Day
	Friday-Monday, Feb. 16-19	Presidents’ Day Holidays
	Monday-Friday, March 26-30	Spring Recess Holidays
Final:	Tuesday, May 15, 8:00-9:50 am	

Course Outline:

Unit	Chapters	Topics	Weeks
A	1-3	Introduction, Force Vectors, Equilibrium at a Point	1-6
B	4, 5	Force Systems, 2-D and 3-D Rigid Body Equilibrium	5-9
C	6, 8	Structures, Internal Forces, Friction	10-13
D	7,9,10	Shear and Moment Diagrams, Centroid, Moments of Inertia, + Semester Review	14-18

COURSE OUTCOMES:

Upon completion of this course, students will be able to:

A. Solve mechanical equilibrium problems involving the equilibrium of particles and rigid bodies using both graphical and vector calculus techniques.
B. Solve mechanical equilibrium application problems for trusses, frames, and machines.
C. Calculate shear, normal forces, and bending moment for loaded beam problems and produce shear and bending moment diagrams.
D. Solve friction application problems.
E. Determine centroid, center of mass, and center of gravity for various objects and geometric shapes.
F. Determine moment of inertia and mass moment of inertia for various objects and geometric shapes.

COURSE OBJECTIVES:

In the process of completing this course, students will:

A. Perform the vector operations of addition, subtraction, dot product, and cross product and use them in applications.
B. Draw the free body diagram of an object subjected to external forces and couples.
C. Apply the principles of mechanical equilibrium to solve problems involving a force system acting on a point mass.
D. Define and use the concepts of moment, couple, and resultant as they apply to static equilibrium problems.
E. Apply the principles of mechanical equilibrium to solve problems involving forces and couples acting on a theoretical rigid body.
F. Learn the analytical techniques appropriate for objects subjected to distributed forces.
G. Solve truss, frame, and machine application problems, using the principles of mechanical equilibrium.
H. Define and use the concepts of shear force, normal force, and bending moment in the solution of internal force problems.

I. Generate shear and bending moment equations and draw shear and bending moment diagrams for a loaded beam.
J. Solve different classes of dry friction problems.
K. Apply the theory of dry friction to application problems.
L. Define and calculate centroid, center of mass, and center of gravity for various 1-D, 2-D, 3-D, and composite bodies.
M. Define and calculate moment of inertia and mass moment of inertia for various 1-D, 2-D, 3-D, and composite bodies