Statics
Spring 2014
Engineering 8
Section #52838

Instructor: Dr. John Heathcote **Class Format:** ONLINE, with on-campus tests
Office: FEM-1B (in the math study center)
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Office Hours:
Monday 11:00 am -11:50 am
Wednesday 11:00 am -11:50 pm
Thursday 11:00 am -11:50 pm
Or, feel free to make an appointment.

Prerequisite: PHYS 4A
Corequisite: MATH 6

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.

Optional Textbook: Engineering Mechanics: Statics, R.C. Hibbeler, 13th Edition, Pearson
(You will be doing homework on the online website. However, a textbook will still be very useful for reading the material and seeing the examples. I would recommend finding an older edition of this textbook. It will be much cheaper but will still cover the same material.)

Required Online Site: MasteringEngineering site for Engineering Mechanics: Statics, 13th edition

Online cost is $110 (with etext) or $60.50 (without etext)

Register at: http://www.pearsonmylabandmastering.com/northamerica/masteringengineering/
Course ID: heathcote32373

Grading:
80% Tests and Final Exam
20% Homework

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. Students will take these exams on the Reedley College campus. The dates for these exams are **2/20, 3/27, 5/1, and 5/22 at 7 pm in FEM-4E**.

Alternate Test Arrangements: Students who are unable to take the tests at the times listed above will need to make special arrangements ahead of time with the instructor.

Homework: Homework will be assigned in order to practice the problem-solving skills taught in class. These will be accessed and submitted on the MasteringEngineering website. 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.

Homework Grading Policies: Late homework will be reduced in credit by 2% for each day that it is late (up to a maximum of 50% off). (This applies only to the problems that are submitted late, not to the entire assignment.) Students will have eight attempts to get each question correct. Credit will be reduced by 2% for each incorrect submission. (Credit will be reduced more for incorrect answers on multiple choice and True/False questions.)

How does this online course work? This course will be managed through Blackboard and the "MasteringEngineering" website. Each week, there will be two deadlines. For each deadline, I will post a folder on Blackboard which will include study materials such as notes, links to recorded lectures, and practice problems. For each deadline, there will also be an online homework assignment on MasteringEngineering.

Deadline Schedule: A schedule of deadlines is posted on Blackboard and at the end of this syllabus. On most weeks, the deadlines fall on Tuesday and Friday (at 11:59pm). On weeks when there is a test, the test will be given on a Thursday. On these weeks, there will be no other deadline on Tuesday of that week and the Friday deadline is shifted back to Sunday night.

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 31st	Last day to add a course
Drop Date:	Friday, March 14th	Last day to drop this course
Holidays:	Monday, January 20th	Martin Luther King Jr. Day
	Friday-Monday, Feb. 14-17th	Presidents' Day Holidays
	Monday-Friday, April 14th-18th	Spring Recess Holidays
Final:	Thursday, May 22nd 7:00 pm	

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	5-11
C	6, 7	Structures, Internal Forces, Shear and Moment Diagrams	10-15
D	8-10	Friction, 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

ENGR 8 Deadlines (Subject to Change) -- *All homework deadlines are 11:59pm*

1: Friday	1/17	Sign up for Mastering, Practice problems with MasteringEngineering, Chap. 1
2: Tuesday	1/21	2.1-2.3 Vector Addition of Forces, 2.4 Addition of a system of coplanar forces
3: Friday	1/24	2.5-2.6 Addition of Cartesian Vectors, 2.7-2.8 Position vectors; force along a line
4: Tuesday	1/28	2.9 Dot Product, plus Chap 2 review
5: Friday	1/31	3.1-3.3 2-D equilibrium at a point
6: Tuesday	2/4	3.4 3-D equilibrium at a point
7: Friday	2/7	More equilibrium at a point
8: Tuesday	2/11	4.1-4.4 2-D and 3-D Moments
No HW for Friday, 2/14 (Holiday)		
9: THURSDAY	2/20	Test #1 (Chaps. 1-3)
10: SUNDAY	2/23	4.1-4.4 2-D and 3-D Moments / 4.5 Moment about a specific axis
11: Tuesday	2/25	4.6 Moment of a couple, 4.7 Simplification of a force / couple system
12: Friday	2/28	4.8 Further simplification of a force/couple system, 4.9 Reduction of a simple distributed load
13: Tuesday	3/4	5.1-5.2 Rigid Body FBD's / 5.3 2-D Rigid Body equilibrium
14: Friday	3/7	5.3-5.4 2-D Rigid Body equilibrium, 2- and 3- force members
15: Tuesday	3/11	5.5-5.7 3-D Rigid Body equilibrium
16: Friday	3/14	5.5-5.7 3-D Rigid Body equilibrium
17: Tuesday	3/18	2-D and 3-D rigid body equilibrium
18: Friday	3/21	6.1-6.3 Method of Joints
19: THURSDAY	3/27	Test #2 (Chaps. 4 and 5)
20: SUNDAY	3/30	6.4 Method of Sections
21: Tuesday	4/1	6.6 Frames and Machines
22: Friday	4/4	Trusses, Frames and Machines
23: Tuesday	4/8	7.1 Internal Loadings
24: Friday	4/11	7.2 Shear and Moment equations and diagrams
Spring Break		
25: Tuesday	4/22	7.3 Relations between dist load, shear and moment
26: Friday	4/25	8.1-8.2 Dry Friction
27: THURSDAY	5/1	Test #3 (Chaps. 6-7)
28: SUNDAY	5/4	Extra day on friction – Tipping vs. Slipping
29: Tuesday	5/6	9.1 - 9.2 Centroids of Composite bodies
30: Friday	5/9	10.1-10.4 Moment of inertia for composite areas
31: Tuesday	5/13	10.8 Mass Moment of inertia
32: Friday	5/16	Review Assignment
33: THURSDAY	5/22	Final Exam (Chaps. 8-10, plus cumulative)