ENGR 8
Statics
Spring 2021
Section #55000

Class:
100% Online; All class materials are posted on Canvas

Instructor:
Dr. John Heathcote
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Virtual Office Hours:
M 11:00 am-12:50 pm
W 9:00-9:50 am
ThF 11:00-11:50 am
These are my official office hours, but you can find me at many other times!
Send me an email or a Canvas message to set up a Zoom meeting!

During virtual office hours, I will be monitoring my Canvas messages closely. Send me a message and I will quickly answer your question or we can set up an instant Zoom meeting.

Course Communication Policy:
My instructions to you each week will be posted in a weekly module. Be sure to read through all instructions posted in the module so that you fully understand what you need to complete each week. (Do not simply look at assignments posted in your course calendar. You will miss some important instructions if you do that.)

I will send Canvas messages regularly to keep you updated on the progression of the class and any important announcements. You will need to read these to stay informed about the class.
I will be available for virtual office hours as shown above. During these times, you can expect a quick response from a Canvas message or we can set up a Zoom meeting.

Another important method of communication will be the feedback that I provide when I grade your assignments. Whenever you have a new grade posted, read any comments that I have posted regarding your work. This feedback will be very important for you to know what you have done well and what needs improvement.

Please contact me with any questions or concerns you have about this class. Contact me through a Canvas message. I will reply within 24 hours on weekdays. I may be able to

respond on weekends as well, but it is not guaranteed. (If I do not respond within 24 hours, please resend your message.)

I also encourage you to communicate with your classmates. There is a student Question and Answer discussion board that is open for any questions you want to discuss with your classmates.

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:
Grading is based on the overall points that you earn from all of your activities. There will be approximately 700 total points by the end of the semester.

10 points each:	Learning Quizzes, Discussions and Individual and Group Assignments
50 points each:	Tests
50 points each:	Projects
100 points:	Final Exam

Learning Quizzes:
For many modules, there will be a learning quiz that will both test your understanding of the concepts from that chapter and help you learn them. These quizzes are formative in nature. So, you will have an unlimited number of attempts so that you can eventually master the material.

Discussions:
In order to learn from each other and to create a learning community, we will occasionally have class discussions. Your grade on these discussions will be based upon meeting the requirements for your posts as detailed in assignment description for each discussion.

Assignments:
Written assignments will include end-of-chapter problems from the textbook or other problems set up for you to practice the material. You will work these problems out by hand

and then scan and submit your work on Canvas. You need to show your work completely and include appropriate diagrams in your work. A good app to use to scan your work and create a pdf file is GeniusScan. This app will create very clear pictures of your work and will compile them together as one pdf file.

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 (the final exam) will cover the most recent unit, but will also include questions covering the cumulative content from the entire semester.

Tests will be taken as online Canvas quizzes. You will also be required to scan and submit your handwritten work for the test.

It is ethically imperative that you complete the tests **on your own**, without help from other people or from tutoring assistance websites (such as Chegg or CourseHero). You will be allowed to refer to your notes and textbook, but you need to show me what you are capable of doing on your own. Online courses require a level of ethics to complete in an honest manner. If you cheat on an online exam, you are starting your engineering career on the wrong foot!

Projects:
Another way for you to show me your understanding of the topics from this course is through completing the four projects for this course. These may involve more involved analysis using tools such as Excel or may involve engineering design.

Late Work Policy:
Please do your best to keep up with this course. You will not receive full credit for tasks completed after the due date. Assignments and projects will be accepted after the deadline. However, your grade will drop by 5% for each day that you are late. Due to the interactive nature of discussions, they must be completed by the deadline. Late discussion posts will not be accepted. Exams also have strict deadlines. There will be a window of time in which you may take your exam. After this window closes, the exam will not be available.

HOWEVER, I do understand that circumstances to come up. If you have a good reason to ask for an extension for a task, please communicate that to me as early as possible. Depending on the situation, I will consider an extension for you.

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 29	Last day to add a course
Drop Date:	Friday, March 12	Last day to drop this course
Holidays:	Monday, January 18	Martin Luther King Jr. Day
	Friday, February 12-Monday, February 15	Presidents' Day Holidays
	Monday-Friday, March 29 – April 2	Spring Break

Course Outline:

Unit	Chapters	Topics	Weeks
A	1-3	Introduction, Force Vectors, Equilibrium at a Point	1-5
B	4, 5	Force Systems, 2-D and 3-D Rigid Body Equilibrium	6-10
C	6, 8	Structures, Friction	11-14
D	7,9,10	Internal Forces, Shear and Moment Diagrams, Centroid, Moments of Inertia, + Semester Review	15-17
Final Exam	All		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