ENME110: Statics

Instructor: Mark Edelen
Office location: Classroom (PAH108) or ME group study room
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COURSE DESCRIPTION

Students will study the equilibrium of stationary bodies under the influence of various kinds of forces. Topics studied include: forces, moments, couples, equilibrium, trusses, frames and machines, centroids, moment of inertia, friction, and hydrostatics. Vector and scalar methods are used to solve problems. Prerequisite: PHYS121, MATH151 with C or better (3 credits)

COURSE OBJECTIVES

1. Use engineering data in the FPS and SI unit systems.
2. Express position vectors and forces in Cartesian vector form.
3. Calculate and use unit vectors in equilibrium problems.
4. Compute the resultant of forces in up to three dimensions.
5. Use the dot product to compute force components and directions.
6. Sketch the free-body diagram of a particle in equilibrium.
7. Solve for unknown forces acting on a particle in equilibrium.
8. Determine the moment of a force, using scalar and vector approaches.
9. Calculate the magnitude and direction of a couple moment.
10. Replace a system of forces and couples with one force and one couple moment.
11. Compute the magnitude and location of the resultant of a distributed loading.
12. Sketch the free-body diagram of a rigid body in equilibrium.
13. Solve for unknown forces acting on a rigid body.
14. Determine the forces in members of trusses, frames, and machines.
15. Determine internal forces (normal, shear, and moment) in structural members.
16. Solve problems involving dry friction, including screws.
17. Compute centroid, center of mass, and center of gravity.
18. Compute the 2nd area moment of inertia.

COURSE FORMAT AND GRADING

The course consists of two meetings per week, for eight weeks. Each meeting will be a combination of lecture, homework review, discussion, and solving problems in class. Do not expect that every detail will be presented in lectures; students are expected to use the textbook to supplement concepts discussed in lecture. Midterm and Final Exams will be administered during normal class time as indicated in the course calendar below.

The overall course grade consists of the following components and weights:

Homework*	30%	*Note: lowest grade dropped
Midterm Exam	30%	
Final Exam	40%	

Final grades will be calculated numerically, rounded to the nearest tenth of a percent, and assigned a letter grade according to the following:

90.0-100%	A
80.0-89.9%	B
70.0-79.9%	C
60.0-69.9%	D
<= 59.9%	F

COURSE POLICIES

ATTENDANCE AND COURTESY

Attendance is expected and required to succeed in this course. Missed homework submittal and exams cannot be made up, unless your absence is excused. In order for an absence to be considered excused, you must notify the instructor prior to class with a valid excuse or have a verifiable documented emergency.

ASSIGNMENT FORMAT AND DOCUMENTATION REQUIREMENTS

Homework must be completed on engineering paper and submitted at the beginning of class on the due date. We will often discuss homework during class on the day it is due, so **late homework will not be accepted**. Additional details will be provided regarding homework format.

STUDENT EXPECTATIONS

Students are expected to prepare for each lecture by reading the relevant material from the textbook, according to the course calendar below. This is a key to understanding and benefitting from the lectures. **The best way to learn statics is to do <u>many</u> problems**; as a result, completing the homework is extremely important. **Using a solutions manual to complete your homework is considered plagiarism and will not be tolerated.**

TEXTBOOK

Hibbeler, <u>Engineering Mechanics: Statics & Mastering Engineering Package</u>, 13th Edition, Prentice Hall.

EXTRA HELP

I am eager to help any student requiring additional help with assignments or difficult concepts. Helping you succeed is my top priority. You are welcome to email me with questions or concerns, or make an appointment to meet with me before or after class.

MECHANICAL ENGINEERING REPEAT POLICY
At UMBC, students may not register for a course more than two times. They are considered registered for a course if they are enrolled after the end of the schedule adjustment period. Students may petition the Office of Undergraduate Education for a third and final attempt of a course taken at UMBC or another institution, however, the Department of Mechanical Engineering will not support petitions to repeat required lower-level courses for the purpose of continuing in the major.

GATEWAY CRITERIA - EFFECTIVE FALL 2009
Applicants admitted fall 2009 and later may designate mechanical engineering as their intended major. However, students are admitted to the mechanical engineering program only when they pass all four of the following Gateway courses: MATH152, ENES101 and ENME110 with a grade of "B" or better and CHEM101, with a grade of "C" or better. Students are permitted to retake two of the gateway courses one time to earn the required grade. Enrolling in a gateway course at UMBC or another institution is considered an attempt. Students are not allowed to take any 300-level or 400-level mechanical engineering courses until the gateway requirements are fulfilled.

For more information, refer to http://me.umbc.edu/academic-policies/

Course Calendar

Week	Tuesday	Thursday
1	Intro, Units (1) Position Vectors, Force Vectors (2)	Dot Product (2) Free Body Diagrams (3)
2	HW 1 DUE Particle Equilibrium (3)	Particle Equilibrium (3) Moments (4)
3	HW 2 DUE Couple Moments (4) Force Systems (4)	Distributed Loads (4) Rigid Body Equilibrium (5)
4	HW 3 DUE Rigid Body Equilibrium (5) Review	MIDTERM EXAM
5	HW 4 DUE Trusses (6)	Frames, Machines (6)
6	HW 5 DUE Frames, Machines (6)	Internal Forces (7)
7	HW 6 DUE Friction (8)	CG, CM, Centroid, Fluid Pressure (9)
8	HW 7 DUE Moment of Inertia (10) Review	FINAL EXAM

Note: Schedule subject to change. Check the course website for the latest information.