United States Naval Academy
Mechanical Engineering Department
EM371 Introduction to Design

Catalog Description: EM211 Statics **Credit:** 3 (3-0-3)

An initial course in applied vector mechanics with emphasis on static equilibrium. Topics include forces, moments, couples, equivalent force-couple systems, centroids, distributed forces, and Coulomb friction. The application of the free body diagram in the analysis of static equilibrium of frames, machines and trusses is stressed.

Prerequisites: None
Corequisites: Calculus III and Physics I

Textbooks: R. C. Hibbeler
Engineering Mechanics, Statics, 14th Edition
Prentice Hall, Inc

Course Director: Associate Professor John Burkhardt

Course Content:

No.	Topic or Subtopic	hrs.
1	Introduction	1
3	Forces and Vectors	2
4	Particle Equilibrium	5
5	Force Resultants	5
6	Rigid Body Equilibrium	8
7	Structural Analysis	4
8	Internal Forces	5
9	Friction	5
10	Center of Gravity	2
11	Moments of Inertia	1

Assessment Methods:

		YES	NO
A	Quizzes	X	
B	Homework	X	
C	Exams	X	
D	Laboratory Reports		X
E	Oral Presentations		X
F	Design Reports/Notebooks		X
G	Prototypes/Demonstrations		X
H	Projects		X
I	Other		X

Course Outcomes[1]

Students will be able to:

1. construct free-body diagrams. (A,B,C)
2. solve particle equilibrium problems. (A,B,C)
3. solve rigid body equilibrium problems. (A,B,C)
4. solve for member forces in plane trusses. (A,B,C)
5. solve for member forces in frames and machines. (A,B,C)
6. calculate internal forces and moments in beams. (A,B,C)
7. construct shear and moment diagrams for beams. (A,B,C)
8. analyze the behavior of rigid bodies subjected to Coulomb dry friction. (A,B,C)
9. calculate the centroid and moment of inertia of simple and composite plane areas. (A,B,C)
10. communicate solutions to engineering problems clearly and effectively. (A,B,C)

[1] Letters in parenthesis refer to the assessment methods listed in the previous section.

Program Outcomes	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(a)	X	X	X	X	X	X	X	X	X	
(b)										
(c)										
(d)										
(e)	X	X	X	X	X	X	X	X	X	X
(f)										
(g)										X
(h)										
(i)										
(j)										
(k)										

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