

COE 2001 Statics (Required)

Catalog Description: COE 2001 Statics (2-0-2)
Prerequisites: MATH 1552 Integral Calculus (Minimum grade C) and Physics 2211 Introduction to Physics I (Minimum grade C)
Elements of statics in two and three dimensions, free-body diagrams, distributed loads, centroids, and friction.

Textbook: James L. Meriam, L.G. Kraige, and J.N. Bolton, *Engineering Mechanics: Statics*, 8th Edition, Wiley, 2014.

Topics Covered:

1. Introduction
2. Force and particle equilibrium
3. Moments and resultants
 - a) Moments and couples
 - b) Moments about a line
4. Equilibrium of rigid bodies
 - a) Free-body diagrams
 - b) Equilibrium in 2D and 3D
5. Centroids and distributed forces
 - a) Centroids of composite parts
 - b) Distributed loads
6. 2D structural applications
 - a) Plane trusses
 - b) Frames
7. Internal forces in beams
8. Friction

Course Outcomes:

Outcome 1: Students will understand the basic principles underlying the equilibrium of rigid bodies in planar and 3D spaces.

- 1.1 Students will demonstrate an ability to apply fundamental rigid-body mechanics concepts to set up and solve engineering mechanics problems such as equilibrium and force-balance problems for single and assemblies of rigid bodies.

Outcome 2: Students will learn to identify, formulate, and solve engineering problems in rigid-body statics.

- 2.1 Students will demonstrate the ability to isolate rigid bodies and to draw clear and appropriate free body diagrams.
- 2.2 Students will demonstrate an ability to apply skills in mathematics and physics to solve engineering mechanics problems.
- 2.3 Students will demonstrate an ability to identify appropriate supports and static knowns and unknowns, in both 2D and 3D structures.
- 2.4 Students will demonstrate that they can apply the appropriate principles referred to in Objective 1 to the solution of problems.

Correlation between Course Outcomes and Student Outcomes:

COE 2001											
	Mechanical Engineering Student Outcomes										
Course Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Outcome 1.1	X				X						X
Course Outcome 2.1	X				X						X
Course Outcome 2.2	X				X						X
Course Outcome 2.3	X				X						X
Course Outcome 2.4	X				X						X

GWV School of Mechanical Engineering Student Outcomes:

- (a) an ability to apply knowledge of mathematics, science and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (d) an ability to function on multidisciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

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