



Course Outline

2026-2027 Catalog

ENGR 8 - Statics

Catalog Description

Transfer Status: CSU/UC

Prerequisite: MATH C2220, PHYS 41

Unit(s): 3.00

Lecture: 34.00 Contact hours/68.00 Out of class hours/102.00 Total hours/2.00 Unit(s)

Lab: 51.00 Contact hours/0.00 Out of class hours/51.00 Total hours/1.00 Unit(s)

Total: 85.00 Contact hours/68.00 Out of class hours/153.00 Total hours/3.00 Unit(s)

Course Description: A first course in engineering mechanics: properties of forces, moments, couples and resultants; two- and three-dimensional force systems acting on engineering structures in equilibrium; analysis of trusses, and beams; distributed forces, shear and bending moment diagrams, center of gravity, centroids, friction, and area and mass moments of inertia. Optional additional topics include fluid statics, cables, Mohr's circle and virtual work. (C-ID ENGR 130).

Objectives

Upon successful completion of this course, the student should be able to:

1. Formulate and communicate legible problem solutions to be understood by engineers in and out of their specific discipline.
2. Determine the forces that act on rigid bodies including external forces, weight, normal, distributed loads, friction and reactions at supports.
3. Calculate internal forces in members and create shear and bending moment diagrams for beams.
4. Perform vector analysis methods addressing forces acting on rigid bodies, trusses, frames, and machines.
5. Analyze two- and three-dimensional force systems on rigid bodies in static equilibrium.

Course Content

Topic Titles / Suggested Time Topic

Lecture

<u>Topics</u>	<u>Lec Hrs</u>
Vector Operations	1.00
Concurrent two- and three-dimensional force systems	3.00
Equivalent force systems	2.00
Center of mass; center of gravity	2.00
Beams; shear and bending moment diagrams	4.00
Cables	1.00
Virtual work	1.00
Area and mass moments of inertia	2.00
Moments and couples	2.00
Equilibrium of rigid bodies (two- and three-dimensional)	2.00
Centroids of areas and volumes	2.00
Distributed force systems	2.00
Trusses	2.00
Frames and machines	2.00
Principles of friction	2.00
Friction in machines	2.00
Fluid statics	1.00
Mohr's circle	1.00
Total Hours:	
34.00	

Lab

<u>Topics</u>	<u>Lab Hrs</u>
Force Systems 2 dimensions	3.00
Equilibrium, Mechanical System Isolation 2 dimensions	5.00
Structures: Trusses	6.00
Beams and distributed forces: external effects	4.00
Friction	6.00

Topics	Lab Hrs
Virtual Work	3.00
Area Moment of Inertia	6.00
Force Systems 3 dimensions	6.00
Equilibrium, Mechanical System Isolation 3 dimensions	6.00
Beams and distributed forces: internal effects	6.00
Total Hours: 51.00	

Methods of Instruction

- A. Class Activities
- B. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- C. Instructor Demonstrations
- D. Laboratory Experiments
- E. Lecture
- F. Problem-Solving Sessions

Methods of Evaluation

- A. Exams/Tests
- B. Quizzes
- C. Homework
- D. Group Participation (Inactive)
- E. Class participation
- F. Mid-term and final examinations

Examples of Assignments

Reading Assignments

1. Read the chapter on equilibrium in your text and be prepared to discuss in two dimensions along with their free body representations.
2. Read the chapter in your text on the area of moments of inertia and be prepared to discuss in class how they are found and defined.

Writing Assignments

1. In a 2-3 page paper create a sketch of the braking system of a regular car and analyze the force and moments involved.
2. Describe the internal effects on a beam under a given load and discuss the relationship between shear stress and bending moment in a 2-3 page paper.

Out-of-Class Assignments

1. Create a diagram showing the shear stress and bending moment of a beam under a given load.
2. Solve equilibrium problems in 2- and 3-dimensions by using the method of the free body diagram.

Recommended Materials of Instruction

Meriam J.L., Kraige L.G., Bolton J.N. (2018). Engineering Mechanics: Statics. *Wiley, 9th Edition*. 978-1119723516.
Hibbeler, R. (2022). Engineering Mechanics: Statics. *Pearson, 15th Edition*. 9780134814971.

Minimum Qualifications

Engineering (Masters Required)
Physics/Astronomy (Masters Required)

Created/Revised by: Bryant, Jennifer

Date: 05/02/2022