C-ID Descriptor
Statics

Descriptor Details

- **Descriptor Title**: Statics
- **C-ID Number**: 130
- **Units**: 3
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General 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.

Prerequisites

Calculus-Based Physics for Scientists and Engineers: A (C-ID PHYS 205); Single Variable Calculus II – Early Transcendentals (C-ID MATH 220) or Single Variable Calculus II – Late Transcendentals (C-ID MATH 221)

Corequisites

None

Advisories

No information provided

Content

- Vector Operations
- Concurrent two- and three-dimensional force systems
- Moments and couples
- Equivalent force systems
- Equilibrium of rigid bodies (two- and three-dimensional)
- Center of mass; center of gravity
- Centroids of areas and volumes
- Distributed force systems
- Trusses
- Frames and machines
- Beams; shear and bending moment diagrams
- Principles of friction
- Friction in machines
- Area and mass moments of inertia
- Cables (optional)
- Mohr’s circle (optional)
- Virtual work (optional)
- Fluid statics (optional)

Lab Activities

No information provided

Objectives

Upon successful completion of the course, students will be able to:

1. A significant introduction to the formulation and solution of engineering problems. To effectively 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.

Evaluation Methods

Tests, examinations, homework or projects where students demonstrate their mastery of the learning objectives and their ability to devise, organize and present complete solutions to problems.

Textbooks

Bedford and Fowler, Engineering Mechanics: Statics,

Beer and Johnston, Vector Mechanics for Engineers - Statics

Hibbler, Engineering Mechanics - Statics

Meriam and Kraige, Engineering Mechanics: Statics