



Syllabus

ESC 211 Statics

General Information

Date

March 7th, 2018

Author

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Department

Science and Technology

Course Prefix

ESC

Course Number

211

Course Title

Statics

Course Information

Credit Hours

3

Lecture Contact Hours

3

Lab Contact Hours

0

Catalog Description

This course is the first semester of a two-semester sequence in Engineering Mechanics. It presents the theory and application of the principles of statics for use in subsequent courses and in engineering practice. The subject of statics deals with bodies at rest or in equilibrium, including a study of force systems, vectors, analytical methods of solution, friction, center of gravity, centroids, and moments of inertia of areas.

Key Assessment

This course contains a Key Assessment for the AS Engineering Science program

Prerequisites

MAT 272 and PHY 151

Co-requisites

None

Grading Scheme

Letter

First Year Experience/Capstone Designation

This course DOES NOT satisfy the outcomes applicable for status as a FYE or Capstone.

SUNY General Education

This course is designated as satisfying a requirement in the following SUNY Gen Ed category

None

FLCC Values

Institutional Learning Outcomes Addressed by the Course

Inquiry

Perseverance

Interconnectedness

Course Learning Outcomes

Course Learning Outcomes

1. Draw free body diagrams and apply the principles of equilibrium to determine the magnitude and direction of the unknown forces.
2. Determine the location of the center of gravity of a body.
3. Evaluate the moment of inertia of a cross-section about any given axis.
4. Perform a force analysis on a simple truss and other types of engineering structures and mechanisms by means of the principle of equilibrium

Outline of Topics Covered

- I. Forces in a plane, vectors, addition of vectors, resolution of force into components
- II. Rectangular components, unit vectors, addition by rectangular components
- III. Equilibrium of a particle, free-body diagram
- IV. Forces in space, direction cosines

- V. External, internal forces, equivalent forces
- VI. Vector product, moment of a force about a point
- VII. Scalar product, mixed triple product, moment of a force about an axis
- VIII. Moment of a couple, resolution of a force into a force and a couple
- IX. Reduction of system of forces to one force and one couple, further reduction forces
- X. Equilibrium of a rigid body in two-dim
- XI. Equilibrium of two and three force bodies
- XII. Equilibrium in three dimensions
- XIII. Center of gravity and centroids of areas and lines, composite plates and wires
- XIV. Centroids by integration, theorems of Pappus-Guldinus
- XV. Distributed loads on beams, forces on submerged surfaces
- XVI. Center of gravity and centroid of a volume
- XVII. Trusses - analysis by method of joints
- XVIII. Trusses - analysis by method of sections
- XIX. Frames
- XX. Machines
- XXI. Internal forces in members
- XXII. Coulomb friction, angles of friction
- XXIII. Wedges, square-threaded screws
- XXIV. Axle friction, disk friction, rolling resistance
- XXV. Belt friction
- XXVI. Moment of inertia, polar moment of inertia, radius of gyration