General Information

Date
March 7th, 2018

Author
Selim Araci

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