

Course Syllabus

Department: Science & Technology

Date: 02-02-2015

I. Course Prefix and Number: ESC 211

Course Name: Statics

Credit Hours and Contact Hours: 3 credit hrs (3 lec hrs, 0 lab hr)

Catalog Description including pre- and co-requisites: *supporting data required for grade prerequisite of 'C' or higher.*

This introductory course 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 and centroids, moments of inertia of areas.

Pre-requisites: MAT 272, PHY 151.

Relationship to Academic Programs and Curriculum including SUNY Gen Ed designation if applicable:

This course is primarily a required course for the A.S. in Engineering Science program. Other students from other programs may also take the course if they have the appropriate background.

II. Course Student Learning Outcomes: *State the student learning outcome(s) for the course (e.g. Student will be able to identify...)*

Upon completion of the course the student will be able to:

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

College Learning Outcomes Addressed by the Course: *(check each College Learning Outcome addressed by the Student Learning Outcomes)*

- | | |
|--|--|
| <input type="checkbox"/> writing | <input type="checkbox"/> computer literacy |
| <input type="checkbox"/> oral communications | <input type="checkbox"/> ethics/values |

- | | |
|---|--|
| <input type="checkbox"/> reading | <input type="checkbox"/> citizenship |
| <input checked="" type="checkbox"/> mathematics | <input type="checkbox"/> global concerns |
| <input checked="" type="checkbox"/> critical thinking | <input type="checkbox"/> information resources |

III. Assessment Measures (Summarize how the college and student learning outcomes will be assessed): For each identified outcome checked, please provide the specific assessment measure.

List identified College Learning Outcomes(s)	Specific assessment measure(s)
<i>eg: writing</i>	<i>eg: student will complete a research paper</i>
Mathematics	Student will answer specific test questions correctly
Critical Thinking	Student will answer specific test questions correctly

IV. Instructional Materials and Methods

Types of Course Materials:

Current edition of Beer and Johnston, "Vector Mechanics for Engineers - Statics and Dynamics" is used as the textbook. Instructor notes are used as the supplemental source of information for the course content. Each student is required to have a scientific calculator (a minimum of TI-83 or equivalent). A course website is maintained on the internet for lecture schedule, test solutions, and other supplemental learning material.

Methods of Instruction (e.g. Lecture, Lab, Seminar ...):

Main avenue used to convey knowledge to the student are lectures. They are presented in the traditional way, using either whiteboard or smartboard, supplemented with models, material samples, or power point presentations. Plenty of example problems are solved in class and the students are allowed to practice the problem solutions through various homework assignments.

V. General Outline of Topics Covered:

Forces in a plane, vectors, addition of vectors, resolution of force into components
 Rectangular components, unit vectors, addition by rectangular components
 Equilibrium of a particle, free-body diagram
 Forces in space, direction cosines
 External, internal forces, equivalent forces

Vector product, moment of a force about a point
Scalar product, mixed triple product, moment of a force about an axis
Moment of a couple, resolution of a force into a force and a couple
Reduction of system of forces to one force and one couple, further reduction forces
Equilibrium of a rigid body in two-dim
Equilibrium of two and three force bodies
Equilibrium in three dimensions
Center of gravity and centroids of areas and lines, composite plates and wires
Centroids by integration, theorems of Pappus-Guldinus
Distributed loads on beams, forces on submerged surfaces
Center of gravity and centroid of a volume
Trusses - analysis by method of joints
Trusses - analysis by method of sections
Frames
Machines
Internal forces in members
Coulomb friction, angles of friction
Wedges, square-threaded screws
Axle friction, disk friction, rolling resistance
Belt friction
Moment of inertia, polar moment of inertia, radius of gyration

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