Course Name: Engineering Statics

Course Number: EGR* E211

Credits: 3

Catalog description: A study of engineering mechanics via vector approach to static forces and their resolution. Topics include: properties of force systems, free-body analysis, first and second moments of areas and mass, and static friction. Applications to trusses, frames, beams and cables included.

Prerequisite: MAT*256 Calculus II (may be taken concurrently)

General Education Competencies Satisfied:

HCC General Education Requirement Designated Competency Attribute Code(s):

None

Additional CSCU General Education Requirements for CSCU Transfer Degree Programs:
None.

Embedded Competency(ies):
None.

Discipline-Specific Attribute Code(s):

☒ MATH **Mathematics elective**

Course objectives:

General Education Goals and Outcomes:

None

Course Specific Objectives:

1. Apply Engineering Mechanics

2. Understand and Use Vector Operations and Definitions

3. Understand Equilibrium of Rigid Bodies and Free Body Diagrams

4. Apply Two-Dimensional Forces and Three-Dimensional Forces to Engineering Mechanics

5. Understand Forces and Moments

6. Understand Distributed Forces, Moments of Inertia, Centroids and Centers of Mass

7. Understand Friction

Course Content:

A. Introduction
   a. Learning Mechanics
   b. Fundamental Concepts
   c. Units
B. Vectors
   a. Scalars and Vectors
   b. Rules for Manipulating Vectors
   c. Dot Product, Cross Product and Triple Product
C. Forces
   a. Types of Forces
   b. Equilibrium and Free Body Diagrams
   c. Two-Dimensional and Three-Dimensional Forces
D. Systems of Forces and Moments
   a. Moment Vector
   b. Moment of a Force about a Line
   c. Couples
   d. Equivalent Systems
E. Objects in Equilibrium
   a. Equilibrium Equations
   b. Two-Force and Three-Force Members
   c. Statically Indeterminate Objects
F. Structures in Equilibrium
   a. Trusses
      i. Method of Joints
      ii. Method of Sections
   b. Space Trusses
   c. Frames and Machines
G. Centroids and Centers of Mass
   a. Centroids

   b. Composites
   c. The Pappus-Guldinus Theorems
H. Moments of Inertia
   a. Areas
      i. Parallel-Axis Theorem
      ii. Rotated and Principal Axes
   b. Masses
      i. Simple Objects
      ii. Parallel-Axis Theorem
I. Distributed Forces
   a. Loads Distributed Along a Line
   b. Internal Forces and Moments of Beams
   c. Shear Force and Bending Moment Diagrams
   d. Relations between Distributed Load, Shear Force and Bending Moment
J. Friction
   a. Theory of Dry Friction
      i. Coefficients of Friction
      ii. Angles of Friction
   b. Applications
      i. Wedges
      ii. Threads
      iii. Journal Bearings
      iv. Thrust Bearings and Clutches
      v. Belt Friction

Date Course Created:

Date of Last Revision: 03/03/2017