BAKER COLLEGE
STUDENT LEARNING OUTCOMES

ME 2210 Statics
3 Semester Hours

Student Learning Outcomes & Enabling Objectives

1. Use the fundamental principles of mechanics and fundamental concepts
    a. Describe basic quantities: length, time, mass, force, and the physical significance of each.
    b. Describe important idealizations, e.g. particle, rigid body, and concentrated force.
    c. Define mechanics and its branches- rigid body mechanics, deformable body mechanics, and fluid mechanics.
    d. State Newton's laws of motion and gravitation
    e. Define units of measurement in the SI and U.S customary systems for the basic quantities.
    f. Examine the standard procedures for performing numerical calculations like significant figures and rounding off numbers.
    g. Describe the general procedure of analysis.

2. Analyze force vectors
    a. Solve the resultant of forces and resolve them into components using the Parallelogram Law.
    b. Express force and position in Cartesian vector form and explain how to determine the vector's magnitude and direction.
    c. Define dot product and use it to find the angle between two vectors or the projection of one vector onto another.

3. Analyze equilibrium of a particle
    a. Apply the concept of the free-body diagram for a particle.
    b. Solve 2D and 3D particle equilibrium problems using the equations of equilibrium.

4. Analyze force system resultants
    a. Define moment of a force and calculate it in two and three dimensions.
    b. Calculate moment of a force about a specified axis.
    c. Define the moment of a couple.
    d. Calculate the resultants of nonconcurrent force systems.
    e. Determine the reduction of a simple distributed loading to a resultant force acting at a specified location.

5. Analyze equilibrium of a rigid-body
    a. Apply the concept of the free-body diagram for a rigid-body.
    b. Solve rigid-body problems in 2D and 3D using the equations of equilibrium.
    c. Applying equations of equilibrium for two- and three-force members.
    d. Identify redundant and improper constraints, and define statical determinacy.

6. Analyze structures
    a. Determine the forces in the members of a truss using the method of joints and the method of sections.
    b. Calculate forces acting on the members of frames and machines composed of pin-connected members.

7. Calculate the internal loadings in structural members
    a. Solve for the internal loadings (normal and shear forces, and bending moment) by the method of sections.

8. Apply the concepts of friction
    a. Analyze the equilibrium of rigid bodies subjected to frictional force.
    b. Apply frictional force analysis on wedges.

9. Calculate the centroid and moment of inertia of areas
    a. Define the concept of the center of gravity, center of mass, and centroid.
    b. Determine the location of the center of gravity and centroid for a body of arbitrary shape and one composed of composite parts.
    c. Determine the resultant of a general distributed loading and apply it to calculate the resultant force of a pressure loading caused by a fluid.

These SLOs are not approved for experiential credit.

Effective: Fall 2017