MCET150C : Statics and Strength of Materials

Analysis of external force systems acting on bodies in equilibrium with subsequent treatment of the stresses and strains induced. Lab projects will involve the use of nondestructive and destructive testing equipment to determine the various mechanical properties of materials and their behavior under load.

Credits 4
Lab/Practicum/Clinical Hours 2
Lecture Hours 3
Prerequisites
Students are required to pass prerequisite courses with a grade of C or higher. Exceptions apply; please consult your department chair.
MATH124C
PHYS133C
Learning Outcomes
- Understand engineering mechanics as it applies to statics.
- Define and describe the qualities and types of forces that act on a solid body.
- Determine and analyze the resultants of concurrent, parallel, and nonconcurrent force systems.
- Determine and analyze the moment of a force.
- Develop a free-body diagram for a given body or structural system.
- Analyze forces and perform stress and strain analyses on structures and basic machine elements.
- Identify and analyze reaction forces for concurrent, parallel, and nonconcurrent coplanar force systems using the concepts of equilibrium.
- Analyze trusses, frames, and machines using various methods and the concepts of equilibrium.
- Calculate direct and shear stress on objects as well as determine acceptable design limits based on the allowable and ultimate stresses of a material.
- Determine strain and deformation of objects when subjected to loads and stresses.
- Calculate the location of the centroid of a complex shape
- Calculate the moment of inertia of a composite shape about its centroidal axis.
- Select and understand engineering materials based upon the composition, behavior, physical and mechanical properties.
- Use mechanical test methods to determine material properties.
- Calculate torsional shear stresses due to applied torque.
- Determine the internal shear and bending at any point along the length of a beam