MECHANICAL TECHNOLOGY (MCHT)

MCHT 111: Mechanics for Technology: Statics

3 Credits

Forces; moments; resultants; two- and three-dimensional equilibrium of force systems; friction; centroids and moments of inertial of areas.

MCH T 111 Mechanics for Technology: Statics (3) MCH T 111 will provide practical and compressive coverage of elementary statics. In addition to the theoretical approach, the course will demonstrate the practical applications of statics concepts. Students entering this course should have basic knowledge of algebra as well as geometry and trigonometry. Course will introduce the definition of scalar and vector quantities. This will be followed by vector addition, vector subtraction, resolution of vectors, addition of systems of coplanar forces, rectangular components of a vector, etc. Course will also introduce the concept of moments and couples. This will be followed by introducing free-body diagrams as a tool for solving statics problems. Emphasis will be placed on equations of equilibrium for particles and rigid bodies. Students will be exposed to 2D and 3D equilibrium. Course will put emphasis on truss and frame analysis as well as pulleys. Distributed loads will also be discussed. Course will also introduce the concept of friction, angle of friction, wedges, etc. Belt friction and rolling resistance as well as friction in bearings will also be discussed. Course will also introduce the concept of centroids, center of gravity, and moment of inertia of an area. Emphasis will be put on calculating centroidal moment of inertia of composite areas. Polar moment of inertia and mass of moment of inertia will also be introduced. Student will learn not only problem solving strategy but also develop ability to present results in clear manner.

Prerequisite: MATH 026 or MATH 081

MCHT 112: Statics Laboratory

1 Credits

Laboratory experimentation associated with basic engineering mechanics principles and concepts including forces, moments, equilibrium, trusses, frames, friction, and centroids. MCH T 112 Statics Laboratory (1) MCH T 112 facilitates the basic understanding of certain principles and concepts of elementary engineering mechanics. The course provides the hands-on experience essential to learn the fundamental engineering mechanics topics including forces, moments, equilibrium, frames, trusses, friction, and centroids. Laboratory experiments will be supported by lectures presented in MCH T 111 (taken concurrently), demonstrations, and associated computer software utilization.

Prerequisite: MATH 026 or MATH 081; Concurrent: MCH T111

MCHT 213: Strength and Properties of Materials

3 Credits

Axial stress and strain; shear; torsion; beam stresses and deflections; combined axial and bending stresses; columns, ductility, resilience, and toughness. MCH T 213 Strength and Properties of Materials (3) MCH T 213 includes analysis and computations of axial stress and strain, shear and bearing stress; stress-strain diagrams, mechanical properties of materials including yield strength, ultimate strength, modulus of elasticity, percent elongation, poisson's ratio; stress concentration, axial deformations, statically-indeterminate axially loaded members, thermal stress and strain; torsion analysis including shear stress, angle of twist, power, rotational speed; beam bending analysis including shear force and bending moment diagrams, flexure stress, beam shear stress, beam deflections; combined axial and bending stresses; columns.

Prerequisite: MCH T111, MATH 026 or MATH 081

MCHT 214: Strength and Properties of Materials Laboratory

1 Credits

Measurement of mechanical properties of materials; structural testing, data acquisition and analysis; technical laboratory report writing.

Prerequisite: Prerequisite or concurrent: MCH T213 or EMET 222