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MECHANICAL ENGINEERING



MECHANICAL ENGINEERING



5

Topics



700+

Lessons



183

Scientist-In-Action
Videos



Core Learning Objectives

Grasp statics and mechanics principles, including forces, vectors, and equilibrium.

Calculate force vectors, scalar/vector products, and moments with proficiency.

Apply force and moment concepts to analyze rigid body equilibrium.

Solve equilibrium problems for particles and rigid bodies, analyze structures.

Analyze internal forces in beams, determine shear force, bending moment diagrams, and understand friction effects.

Apply fluid pressure, centroid determination, moment of inertia, and virtual work to solve equilibrium problems and analyze stability.

01

JoVE Core: Mechanical Engineering

List of Chapters

- 1.1 An Introduction To Statics
- 1.2 Force Vectors
- 1.3 Equilibrium Of A Particle
- 1.4 Force System Resultants
- 1.5 Equilibrium Of A Rigid Body
- 1.6 Structural Analysis
- 1.7 Internal Forces
- 1.8 Friction
- 1.9 Center Of Gravity And Centroid
- 1.10 Moment Of Inertia
- 1.11 Virtual Work
- 1.12 Kinematics Of A Particle
- 1.13 Kinetics Of A Particle: Force And Acceleration
- 1.14 Kinetics Of A Particle: Impulse And Momentum
- 1.15 Planar Kinematics Of A Rigid Body
- 1.16 3-Dimensional Kinetics Of A Rigid Body
- 1.17 Concept Of Stress
- 1.18 Stress And Strain - Axial Loading
- 1.19 Torsion
- 1.20 Bending
- 1.21 Analysis And Design Of Beams For Bending
- 1.22 Shearing Stresses In Beams And Thin-Walled Members
- 1.23 Transformations Of Stress And Strain
- 1.24 Principal Stresses Under A Given Loading
- 1.25 Deflection Of Beams
- 1.26 Columns
- 1.27 Energy Methods

02

JoVE Core: Physics

List of Chapters

- 2.1 Units, Dimensions, And Measurements
- 2.2 Vectors And Scalars
- 2.3 Motion Along A Straight Line
- 2.4 Motion In Two Or Three Dimensions
- 2.5 Newton's Laws Of Motion

- 2.6 Application Of Newton's Laws Of Motion
- 2.7 Work And Kinetic Energy
- 2.8 Potential Energy And Energy Conservation
- 2.9 Linear Momentum, Impulse And Collisions
- 2.10 Rotation And Rigid Bodies
- 2.12 Equilibrium And Elasticity
- 2.13 Fluid Mechanics
- 2.14 Gravitation
- 2.15 Oscillations
- 2.16 Waves
- 2.17 Sound
- 2.18 Temperature And Heat
- 2.19 The Kinetic Theory Of Gases
- 2.20 The First Law Of Thermodynamics
- 2.21 The Second Law Of Thermodynamics
- 2.22 Electric Charges And Fields
- 2.23 Gauss's Law
- 2.24 Electric Potential
- 2.25 Capacitance
- 2.26 Current And Resistance
- 2.27 Direct-Current Circuits
- 2.28 Magnetic Forces And Fields
- 2.29 Sources Of Magnetic Fields
- 2.30 Electromagnetic Induction
- 2.31 Inductance
- 2.32 Alternating-Current Circuits
- 2.33 Electromagnetic Waves
- 2.34 Synthetic Polymers

03

Basic Biology.

List of Topics

- 3.1 Lab Safety

04

Engineering

List of Topics

- 4.1 Mechanical Engineering
- 4.2 Aeronautical Engineering

05

Physics

List of Topics

- 5.1 Physics I
- 5.2 Physics II

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You can also email us at:
customersuccess@jove.com

