

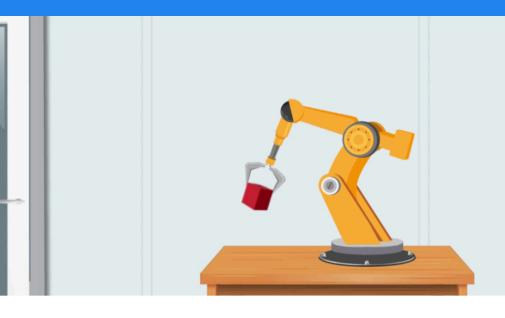
### TABLE OF CONTENTS

### MECHANICAL ENGINEERING ENUISIONS





# **ECHANICAL ENGINEERING**





5

**Topics** 



700+

Lessons



183

Scientist-In-Action Videos

### Core Learning Objectives

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

Apply force and moment concepts to analyze rigid body equilibrium.

Analyze internal forces in beams, determine shear force, bending moment diagrams, and understand friction effects. Calculate force vectors, scalar/vector products, and moments with proficiency.

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

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

## ENGINEERIN

### **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

### **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

### MECHANICAL ENGINEERING *IABLE OF CONTENTS*

- 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

Basic Biology
List of Topics
3.1 Lab Safety

Engineering
List of Topics

- 4.1 Mechanical Engineering
- 4.2 Aeronautical Engineering



### MECHANICAL ENGINEERING TABLE OF CONTENTS

Physics
List of Topics
5.1 Physics I
5.2 Physics II

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