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ELECTRICAL ENGINEERING



4

Topics



400+

Lessons



126

Scientist-In-Action
Videos



Core Learning Objectives

Understand charge, current, voltage, Ohm's Law, and circuit elements.

Analyze op-amp configurations, integrators, differentiators, and instrumentation amplifiers.

Solve first-order RC, RL, second-order RLC circuits, and responses.

Apply nodal and mesh analysis, source transformation, and theorems.

Explain capacitors, inductors, energy storage, and configurations.

Analyze AC circuits using phasors, Kirchhoff's Laws, and theorems.

01

JoVE Core: Electrical Engineering

List of Chapters

- 1.1 Basics of Electric Circuits
- 1.2 DC Circuit Analysis
- 1.3 Operational Amplifiers
- 1.4 Energy Storage Elements
- 1.5 First and Second-Order Circuits
- 1.6 AC Circuit Analysis
- 1.7 AC Steady State Power
- 1.8 Three-Phase Circuits
- 1.9 Frequency Response
- 1.10 Basics of Semiconductors
- 1.11 Diodes
- 1.12 Transistors
- 1.13 Introduction to Signals and Systems
- 1.14 Linear Time-Invariant Systems
- 1.15 The Laplace Transform
- 1.16 Fourier Series
- 1.17 The Fourier Transform
- 1.18 Sampling
- 1.19 z-Transform
- 1.20 Introduction to Control Systems
- 1.21 Modeling in Time and Frequency Domain
- 1.22 Diagrams and Signal Flow Graphs
- 1.23 Transient and Steady-state Response Analysis
- 1.24 Root-Locus Method
- 1.25 Design of Control Systems
- 1.26 Power Transformers
- 1.27 Transmission Line Parameters
- 1.28 Steady-State Transmission Lines and Power Flows
- 1.29 Symmetrical and Unsymmetrical Faults
- 1.30 System Protection
- 1.31 Transient Stability and System Controls
- 1.32 Transmission Lines: Transient Operation
- 1.33 Power Distributions

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
- 2.11 Dynamics Of Rotational Motions
- 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

03

Engineering

List of Topics

3.1 Electrical Engineering

04

Physics

List of Topics

4.1 Physics I

4.2 Physics II

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