

Contents :

□ Front Matter

- Preface
- Lists of Examples
- Design Examples
- Class Discussion Items

□ Chapter 1: Introduction

- Mechatronics
- Measurement Systems
- Design approach and examples

□ Chapter 2: Electric Circuits and Components

- Basic electrical elements
- Kirchhoff's laws
- Voltage and current sources
- Thevenin and Norton equivalents
- AC circuit analysis
- Power in circuits
- Transformers
- Impedance matching
- Practical considerations

□ Chapter 3: Semiconductor Electronics

- Semiconductor physics
- Diodes
- Bipolar junction transistors (BJT)
- Field-effect transistors (FET)

□ Chapter 4: System Response

- Linear systems
- Frequency response
- Fourier series
- Bandwidth
- Signal distortion
- Dynamic characteristics

□ Chapter 5: Digital Electronics

- Logic gates

- Number systems
- Digital circuits
- Microcontrollers basics

Chapter 6: Data Acquisition Systems

- Sampling and quantization
- Analog-to-digital conversion
- Data acquisition hardware
- Interfacing

Chapter 7: Sensors and Transducers

- Sensor principles
- Types of sensors
- Displacement, temperature, force sensors
- Signal conditioning

Chapter 8: Actuators

- Electrical actuators
- Motors (DC, stepper, servo)
- Hydraulic and pneumatic actuators

Chapter 9: System Modeling

- Mathematical modeling
- Mechanical systems
- Electrical systems
- Analogies between systems

Chapter 10: Control Systems

- Open-loop and closed-loop systems
- Feedback control
- PID controllers
- Stability

Chapter 11: System Design and Mechatronics Integration

- Integrated system design
- Case studies
- Engineering design process

Back Matter

- Appendices
- References
- Index