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Effective from 2008-09 session,
U.P.T.U. has introduced the subject of

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manufacturing processes for first year engineering students of all streams. This textbook covers the entire course material in a distilled form.

$\rho = \dots$ This book focuses both on the basics and more complex topics in mechanical measurements such as

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measurement errors & statistical analysis of data, regression analysis, heat flux, measurement of pressure, and radiation properties of surfaces. End of chapter problems, solved illustrations, and exercise problems are presented throughout the book to

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augment learning. It is a useful reference for students in both undergraduate and postgraduate programs. ^

Metrology is the scientific study of measurement. It establishes a common understanding of units, crucial in

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linking human activities. The knowledge of this subject is essential for all persons irrespective of the branch of engineering. For engineering purposes, the study is restricted to the measurement of lengths, angles and the quantities which are expressed in linear

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and angular terms. This book gives information about various instruments used for linear as well as angular measurements and corresponding errors. This book also includes concepts of quality, quality control, different tools and techniques for

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quality control, total quality management and various latest methods of quality control. Our hope is that this book, through its careful explanations of concepts, examples and figures bridges the gap between knowledge and proper application of

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that knowledge.

Open loop and closed loop systems, Servomechanism, Basic structure of a feedback control system. Dynamic Models and Responses Dynamic model of an RLC network, State variable model, Impulse response model,

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Transfer function model, Standard test/disturbance signals and their models, Transfer function model and dynamic response of a second order electrical system. Control System Components Basic units of feedback control system, Reduction of system

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block diagrams, Signal flow graph, Mason's gain rule, Block diagram reduction using Mason's gain rule, Operational amplifier used as an error detector, Servo potentiometer, DC and AC servomotors, Tachogenerator, Stepper motor, Synchros, Block

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diagram model of a typical control system using simplified sub-system, Transfer function blocks. Feedback Control System Characteristics Stability, Sensitivity, Disturbance rejection, Steady state accuracy, Transient and steady state responses of

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a second order system, Effect of additional zeros and poles, Desired closed loop pole locations and dominant poles, Steady state error constants, System type numbers and error compensation. System Stability Analysis and Compensator

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Design System stability bounds, Routh stability criterion, Relative stability and range of stability, Root locus concept, System characteristic equation, Plotting root loci, Design of cascade lag-lead compensation, Minor loop (rate) feedback compensation. Nyquist

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Criterion and Stability Margins Nyquist stability criteria, Nyquist plot, Gain and phase margins, Bode plot of magnitude and phase and determination of stability margins. Feedback System Performance Performance specifications

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in frequency domain, Correlation between frequency domain and time domain specifications, Constant - M circles, Nichols chart, Stability margins from sensitivity function. Design of cascade lag-lead compensation using Bode plot. Minor loop (rate) feedback

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compensation.

Industrial Automation: Hands On System Design, Modeling, and Simulation Using Ptolemy II

Highway Engineering

Pulse and Digital Circuits

Introduction to Optimum Design

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About the Book: Written by three distinguished authors with ample academic and teaching experience, this textbook, meant for diploma and degree

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students of Mechanical Engineering as well as those preparing for AMIE examination, incorporates the latest st

A rigorous and thorough

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analysis of the production of air pollutants and their control, this text is geared toward chemical and environmental engineering students.

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Topics include combustion, principles of aerosol behavior, theories of the removal of particulate and gaseous pollutants from effluent streams, and

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air pollution control strategies. 1988 edition. Reprint of the Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1988 edition. The latest ideas in

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machine analysis and design have led to a major revision of the field's leading handbook. New chapters cover ergonomics, safety, and computer-

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aided design, with revised information on numerical methods, belt devices, statistics, standards, and codes and regulations. Key features include: *new

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material on ergonomics, safety, and computer-aided design; *practical reference data that helps machines designers solve common problems--with a minimum

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of theory. *current CAS/CAM applications, other machine computational aids, and robotic applications in machine design. This definitive machine

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design handbook for product designers, project engineers, design engineers, and manufacturing engineers covers every aspect of machine construction and

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operations. Voluminous and heavily illustrated, it discusses standards, codes and regulations; wear; solid materials, seals; flywheels; power screws; threaded

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fasteners; springs;
lubrication; gaskets;
coupling; belt drive;
gears; shafting;
vibration and control;
linkage; and corrosion.
Model, analyze, and

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solve vibration problems, using modern computer tools. Featuring clear explanations, worked examples, applications, and modern computer

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tools, William Palm's Mechanical Vibration provides a firm foundation in vibratory systems. You'll learn how to apply knowledge of mathematics and

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science to model and analyze systems ranging from a single degree of freedom to complex systems with two and more degrees of freedom. Separate MATLAB sections

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at the end of most chapters show how to use the most recent features of this standard engineering tool, in the context of solving vibration problems. The

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text introduces Simulink where solutions may be difficult to program in MATLAB, such as modeling Coulomb friction effects and simulating systems that contain non-

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linearities. Ample problems throughout the text provide opportunities to practice identifying, formulating, and solving vibration problems. KEY

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FEATURES Strong pedagogical approach, including chapter objectives and summaries Extensive worked examples illustrating applications Numerous

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realistic homework problems Up-to-date MATLAB coverage The first vibration textbook to cover Simulink Self-contained introduction to MATLAB in Appendix A

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Special section dealing with active vibration control in sports equipment Special sections devoted to obtaining parameter values from experimental

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data

Reliability Engineering

Control System

Engineering

Fluid Power Engineering

Software Testing and

Quality Assurance

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Solid Waste Technology and Management, 2 Volume Set

Engineering Metrology and Measurements is a textbook designed for students of mechanical, production and allied

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disciplines to facilitate learning of various shop-floor measurement techniques and also understand the basics of mechanical measurements. Introduction to state-space methods covers feedback control; state-space

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representation of dynamic systems and dynamics of linear systems; frequency-domain analysis; controllability and observability; shaping the dynamic response; more. 1986 edition.

This book is a revision and

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extension of my 1995 Sourcebook of Control Systems Engineering. Because of the extensions and other modifications, it has been retitled Handbook of Control Systems Engineering, which it is intended to be for its prime audience: advanced

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undergraduate students, beginning graduate students, and practising engineers needing an understandable review of the field or recent developments which may prove useful. There are several differences between this edition and the first. • Two

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new chapters on aspects of nonlinear systems have been incorporated. In the first of these, selected material for nonlinear systems is concentrated on four aspects: showing the value of certain linear controllers, arguing the

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suitability of algebraic linearization, reviewing the semi-classical methods of harmonic balance, and introducing the nonlinear change of variable technique known as feedback linearization. In the second chapter, the topic of variable

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structure control, often with sliding mode, is introduced. • Another new chapter introduces discrete event systems, including several approaches to their analysis. • The chapters on robust control and intelligent control have been extensively

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revised. • Modest revisions and extensions have also been made to other chapters, often to incorporate extensions to nonlinear systems.

Noise and Vibration Control Engineering: Principles and Applications, Second Edition is

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the updated revision of the classic reference containing the most important noise control design information in a single volume of manageable size. Specific content updates include completely revised material on noise and vibration standards,

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updated information on active noise/vibration control, and the applications of these topics to heating, ventilating, and air conditioning.

Systems in Mechanical Engineering

Noise and Vibration Control

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Engineering Mechatronic Systems Principles and Practice Textbook Of Control Systems Engineering (Vtu)

Mechanical engineering, as its name suggests, deals with the mechanics of operation of mechanical systems. This is

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the branch of engineering which includes design, manufacturing, analysis and maintenance of mechanical systems. It combines engineering physics and mathematics principles with material science to design, analyse, manufacture and maintain mechanical systems. This book covers the field requires an

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understanding of core areas including thermodynamics, material science, manufacturing, energy conversion systems, power transmission systems and mechanisms. This book includes basic knowledge of various mechanical systems used in day to day life. My hope is that this book, through its careful

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explanations of concepts, practical examples and figures bridges the gap between knowledge and proper application of that knowledge.

A superior primer on software testing and quality assurance, from integration to execution and automation This important new work fills the pressing need for a

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user-friendly text that aims to provide software engineers, software quality professionals, software developers, and students with the fundamental developments in testing theory and common testing practices. Software Testing and Quality Assurance: Theory and Practice equips readers with a solid

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*understanding of: Practices that support the production of quality software
Software testing techniques Life-cycle models for requirements, defects, test cases, and test results Process models for units, integration, system, and acceptance testing How to build test teams, including recruiting and retaining test engineers*

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Quality Models, Capability Maturity Model, Testing Maturity Model, and Test Process Improvement Model Expertly balancing theory with practice, and complemented with an abundance of pedagogical tools, including test questions, examples, teaching suggestions, and chapter summaries, this book is a

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valuable, self-contained tool for professionals and an ideal introductory text for courses in software testing, quality assurance, and software engineering.

Mechanical Vibrations: Theory and Applications takes an applications-based approach at teaching students to apply

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previously learned engineering principles while laying a foundation for engineering design. This text provides a brief review of the principles of dynamics so that terminology and notation are consistent and applies these principles to derive mathematical models of dynamic mechanical systems. The methods of

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application of these principles are consistent with popular Dynamics texts. Numerous pedagogical features have been included in the text in order to aid the student with comprehension and retention. These include the development of three benchmark problems which are revisited in each chapter, creating a coherent chain

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linking all chapters in the book. Also included are learning outcomes, summaries of key concepts including important equations and formulae, fully solved examples with an emphasis on real world examples, as well as an extensive exercise set including objective-type questions. Important Notice: Media

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content referenced within the product description or the product text may not be available in the ebook version.

An Integrated Approach to Product Development Reliability Engineering presents an integrated approach to the design, engineering, and management of reliability activities throughout the life

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cycle of a product, including concept, research and development, design, manufacturing, assembly, sales, and service. Containing illustrative guides that include worked problems, numerical examples, homework problems, a solutions manual, and class-tested materials, it demonstrates to product development and

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manufacturing professionals how to distribute key reliability practices throughout an organization. The authors explain how to integrate reliability methods and techniques in the Six Sigma process and Design for Six Sigma (DFSS). They also discuss relationships between warranty and reliability, as well as legal

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and liability issues. Other topics covered include: Reliability engineering in the 21st Century Probability life distributions for reliability analysis Process control and process capability Failure modes, mechanisms, and effects analysis Health monitoring and prognostics Reliability tests and reliability estimation Reliability

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Engineering provides a comprehensive list of references on the topics covered in each chapter. It is an invaluable resource for those interested in gaining fundamental knowledge of the practical aspects of reliability in design, manufacturing, and testing. In addition, it is useful for implementation and

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management of reliability programs.

Standard Handbook of Machine Design

Metrology & Quality Control

Mechanical Vibration

Intelligent Control of Robotic Systems

*Automotive Mechatronics: Operational
and Practical Issues*

This book covers the theory

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and mathematics needed to understand the concepts in control system design.

Chapter 1 deals with compensation network design.

Nonlinear control systems, including phase-plane analysis and the Delta

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method are presented in chapter 2. The analysis and design aspects based on the state variable approach are presented in Chapter 3. The discrete time control systems form the basis for the study of digital control

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systems in Chapter 4, covering the frequency response, root locus analysis, and stability considerations for discrete-time control systems. The stability analysis based on the Lyapunov method is given

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in chapter 5. The appendices include two US government articles on industrial control systems (NIST) and the control system design for a solar energy storage system (U.S. Dept. of Energy). Concepts in the

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text are supported by numerical examples.

Features:

- Covers the theory and mathematics needed to understand the concepts in control system design
- Includes two U.S. government articles on

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industrial control systems (NIST) and the control system design for a solar energy storage system (U.S. Department of Energy)

The book is written for an undergraduate course on the Feedback Control Systems. It

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provides comprehensive explanation of theory and practice of control system engineering. It elaborates various aspects of time domain and frequency domain analysis and design of control systems. Each

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chapter starts with the background of the topic. Then it gives the conceptual knowledge about the topic dividing it in various sections and subsections. Each chapter provides the detailed explanation of the

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topic, practical examples and variety of solved problems. The explanations are given using very simple and lucid language. All the chapters are arranged in a specific sequence which helps to build the

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understanding of the subject in a logical fashion. The book starts with explaining the various types of control systems. Then it explains how to obtain the mathematical models of various types of systems

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such as electrical, mechanical, thermal and liquid level systems. Then the book includes good coverage of the block diagram and signal flow graph methods of representing the various

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systems and the reduction methods to obtain simple system from the analysis point of view. The book further illustrates the steady state and transient analysis of control systems. The book covers the

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fundamental knowledge of controllers used in practice to optimize the performance of the systems. The book emphasizes the detailed analysis of second order systems as these systems are common in practice and

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higher order systems can be approximated as second order systems. The book teaches the concept of stability and time domain stability analysis using Routh-Hurwitz method and root locus method. It further explains

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the fundamentals of frequency domain analysis of the systems including co-relation between time domain and frequency domain. The book gives very simple techniques for stability analysis of the systems in

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the frequency domain, using Bode plot, Polar plot and Nyquist plot methods. It also explores the concepts of compensation and design of the control systems in time domain and frequency domain. The classical

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approach loses the importance of initial conditions in the systems. Thus, the book provides the detailed explanation of modern approach of analysis which is the state variable analysis of the systems

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including methods of finding the state transition matrix, solution of state equation and the concepts of controllability and observability. The variety of solved examples is the feature of this book which

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helps to inculcate the knowledge of the design and analysis of the control systems in the students. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and

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makes the subject more interesting.

This third edition of what has become a modern classic presents a lively overview of Materials Science which is ideal for students of Structural Engineering. It

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contains chapters on the structure of engineering materials, the determination of mechanical properties, metals and alloys, glasses and ceramics, organic polymeric materials and composite materials. It

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contains a section with thought-provoking questions as well as a series of useful appendices. Tabulated data in the body of the text, and the appendices, have been selected to increase the value of

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Materials for engineering as a permanent source of reference to readers throughout their professional lives. The second edition was awarded Choice's Outstanding Academic Title award in

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2003. This third edition includes new information on emerging topics and updated reading lists.

Introduction to Optimum Design, Third Edition describes an organized approach to engineering

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design optimization in a rigorous yet simplified manner. It illustrates various concepts and procedures with simple examples and demonstrates their applicability to engineering design problems.

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Formulation of a design problem as an optimization problem is emphasized and illustrated throughout the text. Excel and MATLAB® are featured as learning and teaching aids. Basic concepts of optimality

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conditions and numerical methods are described with simple and practical examples, making the material highly teachable and learnable Includes applications of optimization methods for structural,

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mechanical, aerospace, and industrial engineering problems Introduction to MATLAB Optimization Toolbox Practical design examples introduce students to the use of optimization methods early in the book New

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example problems throughout the text are enhanced with detailed illustrations

Optimum design with Excel Solver has been expanded into a full chapter New chapter on several advanced optimum design topics serves

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the needs of instructors who teach more advanced courses
Principles Of Control Systems
Theory and Practice
Fundamentals and Applications
Devices, Design, Control,

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Operation and Monitoring

Process Dynamics and Control

This book introduces the principles and practices in automotive systems, including modern automotive systems that

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incorporate the latest trends in the automobile industry. The fifteen chapters present new and innovative methods to master the complexities of the vehicle of the future.

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Topics like vehicle classification, structure and layouts, engines, transmissions, braking, suspension and steering are illustrated with modern concepts, such as

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battery-electric, hybrid electric and fuel cell vehicles and vehicle maintenance practices. Each chapter is supported with examples, illustrative figures,

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multiple-choice questions and review questions.

Aimed at senior undergraduate and graduate students in automotive/automobile engineering, mechanical

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*engineering, electronics
engineering, this book
covers the following:*

*Construction and working
details of all modern as
well as fundamental
automotive systems*

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Complexities of operation and assembly of various parts of automotive systems in a simplified manner Handling of automotive systems and integration of various

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components for smooth functioning of the vehicle Modern topics such as battery-electric, hybrid electric and fuel cell vehicles Illustrative examples, figures,

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multiple-choice questions and review questions at the end of each chapter
A practical guide to industrial automation concepts, terminology, and applications
Industrial

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Automation: Hands-On is a single source of essential information for those involved in the design and use of automated machinery. The book emphasizes control systems

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and offers full coverage of other relevant topics, including machine building, mechanical engineering and devices, manufacturing business systems, and job functions

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in an industrial environment. Detailed charts and tables serve as handy design aids. This is an invaluable reference for novices and seasoned automation professionals

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alike. COVERAGE INCLUDES:

** Automation and manufacturing * Key concepts used in automation, controls, machinery design, and documentation * Components*

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systems * Process systems
and automated machinery *
Software * Occupations and
trades * Industrial and
factory business systems,
including Lean*

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*manufacturing * Machine
and system design **

Applications

*A clear explanation of the
technology for producing
and delivering electricity
Electric Power Systems*

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explains and illustrates how the electric grid works in a clear, straightforward style that makes highly technical material accessible. It begins with a thorough

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discussion of the underlying physical concepts of electricity, circuits, and complex power that serves as a foundation for more advanced material. Readers

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are then introduced to the main components of electric power systems, including generators, motors and other appliances, and transmission and

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distribution equipment such as power lines, transformers, and circuit breakers. The author explains how a whole power system is managed and coordinated, analyzed

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mathematically, and kept stable and reliable.

Recognizing the economic and environmental implications of electric energy production and public concern over

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disruptions of service, this book exposes the challenges of producing and delivering electricity to help inform public policy decisions. Its discussions of complex

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concepts such as reactive power balance, load flow, and stability analysis, for example, offer deep insight into the complexity of electric grid operation and

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demonstrate how and why physics constrains economics and politics. Although this survival guide includes mathematical equations and formulas, it discusses

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their meaning in plain English and does not assume any prior familiarity with particular notations or technical jargon. Additional features

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*include: * A glossary of symbols, units, abbreviations, and acronyms * Illustrations that help readers visualize processes and better understand complex*

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*concepts * Detailed analysis of a case study, including a Web reference to the case, enabling readers to test the consequences of manipulating various*

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parameters With its clear discussion of how electric grids work, Electric Power Systems is appropriate for a broad readership of professionals, undergraduate and graduate

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*students, government
agency managers,
environmental advocates,
and consumers.*

*Control System
Engineering Technical
Publications*

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Machine Drawing

Electric Power Systems

Volume I

Mechanical Measurements

Principles and

Applications

Develop high-performance hydraulic

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and pneumatic power systems Design, operate, and maintain fluid and pneumatic power equipment using the expert information contained in this authoritative volume. Fluid Power Engineering presents a comprehensive approach to hydraulic systems engineering with a solid

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grounding in hydrodynamic theory. The book explains how to create accurate mathematical models, select and assemble components, and integrate powerful servo valves and actuators. You will also learn how to build low-loss transmission lines, analyze system performance, and

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optimize efficiency. Work with hydraulic fluids, pumps, gauges, and cylinders Design transmission lines using the lumped parameter model Minimize power losses due to friction, leakage, and line resistance Construct and operate accumulators, pressure switches, and filters Develop

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mathematical models of electrohydraulic servosystems Convert hydraulic power into mechanical energy using actuators Precisely control load displacement using HSAs and control valves Apply fluid systems techniques to pneumatic power systems

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This book is a definitive introduction to models of computation for the design of complex, heterogeneous systems. It has a particular focus on cyber-physical systems, which integrate computing, networking, and physical dynamics. The book captures more than twenty years of experience in the

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Ptolemy Project at UC Berkeley, which pioneered many design, modeling, and simulation techniques that are now in widespread use. All of the methods covered in the book are realized in the open source Ptolemy II modeling framework and are available for experimentation through links provided

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in the book. The book is suitable for engineers, scientists, researchers, and managers who wish to understand the rich possibilities offered by modern modeling techniques. The goal of the book is to equip the reader with a breadth of experience that will help in understanding the role that such

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techniques can play in design. Power Electronics Handbook: Components, Circuits, and Applications is a collection of materials about power components, circuit design, and applications. Presented in a practical form, theoretical information is given as formulae. The book is

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divided into three parts. Part 1 deals with the usual components found in power electronics such as semiconductor devices and power semiconductor control components, their electronic compatibility, and protection. Part 2 tackles parts and principles related to circuits such as

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switches; link frequency chargers; converters; and AC line control, and Part 3 covers the applications for semiconductor circuits. The text is recommended for engineers and electricians who need a concise and easily accessible guide on power electronics.

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The collection, transportation and subsequent processing of waste materials is a vast field of study which incorporates technical, social, legal, economic, environmental and regulatory issues. Common waste management practices include landfilling, biological treatment,

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incineration, and recycling – all boasting advantages and disadvantages. Waste management has changed significantly over the past ten years, with an increased focus on integrated waste management and life-cycle assessment (LCA), with the aim of reducing the reliance on landfill with

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its obvious environmental concerns in favour of greener solutions. With contributions from more than seventy internationally known experts presented in two volumes and backed by the International Waste Working Group and the International Solid Waste Association, detailed chapters

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*cover: Waste Generation and
Characterization Life Cycle
Assessment of Waste Management
Systems Waste Minimization Material
Recycling Waste Collection
Mechanical Treatment and Separation
Thermal Treatment Biological
Treatment Landfilling Special and*

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Hazardous Waste Solid Waste Technology & Management is a balanced and detailed account of all aspects of municipal solid waste management, treatment and disposal, covering both engineering and management aspects with an overarching emphasis on the life-cycle

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approach.

Automotive Systems

*An Introduction to State-Space
Methods*

PLCs & SCADA : Theory and Practice

Components, Circuits and Applications

This book presents operational and

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practical issues of automotive mechatronics with special emphasis on the heterogeneous automotive vehicle systems approach, and is intended as a graduate text as well as a reference for scientists and engineers involved in the design of automotive mechatronic control systems. As the complexity of automotive vehicles

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increases, so does the dearth of high competence, multi-disciplined automotive scientists and engineers. This book provides a discussion into the type of mechatronic control systems found in modern vehicles and the skills required by automotive scientists and engineers working in this environment. Divided into

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two volumes and five parts, Automotive Mechatronics aims at improving automotive mechatronics education and emphasises the training of students' experimental hands-on abilities, stimulating and promoting experience among high education institutes and produce more automotive mechatronics

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and automation engineers. The main subject that are treated are: VOLUME I: RBW or XBW unibody or chassis-motion mechatronic control hypersystems; DBW AWD propulsion mechatronic control systems; BBW AWB dispulsion mechatronic control systems; VOLUME II: SBW AWS diversion mechatronic

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control systems; ABW AWA suspension mechatronic control systems. This volume was developed for undergraduate and postgraduate students as well as for professionals involved in all disciplines related to the design or research and development of automotive vehicle dynamics, powertrains, brakes, steering,

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and shock absorbers (dampers). Basic knowledge of college mathematics, college physics, and knowledge of the functionality of automotive vehicle basic propulsion, dispulsion, conversion and suspension systems is required.

This book illustrates basic principles, along with the development of the

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advanced algorithms, to realize smart robotic systems. It speaks to strategies by which a robot (manipulators, mobile robot, quadrotor) can learn its own kinematics and dynamics from data. In this context, two major issues have been dealt with; namely, stability of the systems and experimental validations. Learning

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algorithms and techniques as covered in this book easily extend to other robotic systems as well. The book contains MATLAB- based examples and c-codes under robot operating systems (ROS) for experimental validation so that readers can replicate these algorithms in robotics platforms.

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Based on the popular Artech House classic, Digital Communication Systems Engineering with Software-Defined Radio, this book provides a practical approach to quickly learning the software-defined radio (SDR) concepts needed for work in the field. This up-to-date volume guides readers on how to quickly prototype

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wireless designs using SDR for real-world testing and experimentation. This book explores advanced wireless communication techniques such as OFDM, LTE, WLA, and hardware targeting. Readers will gain an understanding of the core concepts behind wireless hardware, such as the radio

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frequency front-end, analog-to-digital and digital-to-analog converters, as well as various processing technologies.

Moreover, this volume includes chapters on timing estimation, matched filtering, frame synchronization message decoding, and source coding. The orthogonal frequency division multiplexing is

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explained and details about HDL code generation and deployment are provided. The book concludes with coverage of the WLAN toolbox with OFDM beacon reception and the LTE toolbox with downlink reception. Multiple case studies are provided throughout the book. Both MATLAB and Simulink source code are

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included to assist readers with their projects in the field.

Mechatronics has emerged as its own discipline over the past decade, yet no reference has lived up to the demands of being a working guide for designing and implementing the new generation of mechatronic systems. Uniting an

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international team of leading experts, Mechatronic Systems: Devices, Design, Control, Operation and Monitoring rises to the ch

Handbook of Control Systems Engineering
Mechanical Vibrations: Theory and Applications

Materials for Engineering

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INDUSTRIAL ENGINEERING AND
QUALITY CONTROL Course Code 22657
Engineering Metrology and Measurements