

2015

JUNE

Catalogue

Engineering

Mechanical, Production

Industrial, Metallurgy

Materials Science



CATALOGUE

Eastern Economy Editions

JUNE 2015

ENGINEERING

Mechanical, Production,
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Engineering

MECHANICAL / PRODUCTION ENGINEERING

Automobile Engineering

DOSHI, et al.

Vehicle Maintenance and Garage Practice

JIGAR A. DOSHI, *Assistant Professor and Officiating Head (In-charge) of the Department of Automobile Engineering, Indus University, Ahmedabad, is a member of SAE and Senior Member of IIE.*

DHRUV U. PANCHAL, *Assistant Professor, Department of Mechanical Engineering, L.D. College of Engineering, Ahmedabad.*

JAYESH P. MANIAR, *Director, Deep Enginmach Pvt. Ltd., Pune.*

The orientation towards vehicle maintenance led to the significant advancements in its engineering applications in the past few decades. With the advent of automation and electronics in automobiles, the study gained more momentum, which led *vehicle maintenance and garage practice* to emerge as a new discipline of automobile engineering. The present book is an attempt to reveal underlying principles and best practices in diagnostic procedures, services, repairs and overhauling of the vehicles. The key techniques and methods described with the help of diagrams and images make the book user-friendly and informative, enabling students to understand the concept easily. The text not only provides theoretical information, but also imparts practical knowledge on vehicle maintenance and repairing, emphasising the role and function of service stations. The book deals with both conventional and non-conventional methods of repairing and overhauling.

Primarily designed for the undergraduate and postgraduate students of automobile and mechanical engineering, the lucid and simple presentation of the book makes it useful for the students pursuing diploma in automobile engineering as well. It can be used as an automobile repair guide by vehicle owners for its step-by-step explanation of repair procedures, which help them to carry out repair and maintenance conveniently.

Contents: Preface. Vehicle Maintenance Practices. Service Station Operations. Tools and Equipments. Measuring Instruments. Engine Service and Repair. Fuel Supply System. Cooling System Maintenance. Ignition System—Service, Repair and Overhaul. Lubrication System. Clutch Repair and Maintenance. Transmission, Drive Shafts and Final Drive—Servicing, Repair and Overhaul. Braking System—Repair and Maintenance. Suspension System.

Wheel and Tyre. Steering System—Servicing, Repair and Overhaul. Heating and Air Conditioning System—Servicing, Repair and Overhaul. Chassis and Body—Servicing, Repair and Overhaul. Electrical Parts—Service and Repair. Index.

Latest Print 2014 / 328 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4982-7 / ₹ 295.00 / (e-book also available)

RAMAKRISHNA

Automobile Engineering

KAMARAJU RAMAKRISHNA, *Professor of Mechanical Engineering at GVP College of Engineering, Visakhapatnam.*

The book is an excellent introduction to the anatomy of an automobile and the functions of its major and minor components. It brings together all the conventional and modern concepts in automobile engineering in a clear, practical style appropriately supported by line sketches, isometric views, cut-away diagrams and photographs. All the recent advances in automobiles such as automatic transmission, anti-lock braking system, traction control, power-assisted brakes, power steering, electric car, electronic control concepts, special fuels, and modern materials are also covered. Important tips for troubleshooting and maintenance are also given in a separate chapter.

The text is designed to provide students with an excellent foundation in automobile engineering, and also to serve as a useful reference for industry personnel engaged in design, manufacturing, repair, maintenance, and marketing of automobiles.

As a **textbook**, it caters to the requirement of undergraduate students of mechanical engineering for their paper on **Automobile Engineering**. For those pursuing degree and diploma courses in the Automobile Engineering branch, this book is an excellent introduction for more advanced studies on different systems of automobiles.

Contents: Preface. Acknowledgements. Introduction. Classification. Chassis and Body. Components of Four-wheeler Automobiles. Power Unit. Engine Lubrication. Fuel Induction. Ignition System. Combustion. Engine Cooling. Emissions and Control. Engine Parameters. Engine Service. Automobile Gearboxes. Propeller Shaft. Differential. Clutch. Braking System. Front Axle. Steering System. Rear Axle. Suspension System. Wheels and Tyres. Electrical System. Ventilation, Heating and Air-conditioning. Special Topics. Troubleshooting and Maintenance. Fuels for IC Engines. Bibliography. Index.

Latest Print 2014 / 364 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4610-9 / ₹ 350.00 / (e-book also available)

Basic Mechanical Engineering

MANGLIK

Elements of Mechanical Engineering

V.K. MANGLIK, *Professor and Head of the Department of Automobile Engineering, INDUS University, Gujarat.*

This book provides a comprehensive and wide-ranging introduction to the fundamental principles of mechanical engineering in a distinct and clear manner. The book is intended for a core introductory course in the area of foundations and applications of mechanical engineering, prescribed for the first-year students of all disciplines of engineering.

The book develops an intuitive understanding of the basic principles of thermodynamics as well as of the principles governing the conversion of heat into energy. Numerous illustrative examples are provided to fortify these concepts throughout. The book gives the students a feel for how thermodynamics is applied in engineering practice in the areas of heat engines, steam boilers, internal combustion engines, refrigeration and air conditioning, and to devices such as turbines, pumps and compressors.

The book also provides a basic understanding of mechanical design, illustrating the principles through a discussion of devices designed for the transmission of motion and power such as couplings, clutches and brakes.

No book on basic mechanical engineering is complete without an introduction to materials science. The text covers the treatment of the common engineering materials, highlighting their properties and applications.

Finally, the role of lubrication and lubricants in reducing the wear and tear of parts in mechanical systems, is lucidly explained in the concluding chapter.

The text features several fully worked-out examples, a fairly large number of numerical problems with answers, end-of-chapter review questions and multiple choice questions, which all enhance the value of the text to the students.

Besides the students studying for an engineering degree, this book is also suitable for study by the students of AMIE and the students of diploma level courses.

Contents: Preface. Introduction. Fuels and Combustion. Properties of Gases. Properties of Steam. Heat Engines. Steam Boilers. Internal Combustion Engines. Speed Control. Pumps. Air Compressor. Refrigeration and Air Conditioning. Coupling, Clutches and Brakes. Transmission of Motion and Power. Important Engineering Materials. Lubrication and Lubricants. Index.

Latest Print 2013 / 576 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4629-1 / ₹ 425.00 / (e-book also available)

SAWHNEY

Fundamentals of Mechanical Engineering: Thermodynamics, Mechanics, Theory of Machines and Strength of Materials, 2nd ed.

G.S. SAWHNEY, *Professor and Head of the Department of Mechanical Engineering at Accurate Institute of Management and Technology, Greater Noida.*

Written with the first-year engineering students at undergraduate level in mind, this well-designed textbook, now in its second edition, explains the fundamentals of mechanical engineering in the areas of thermodynamics, mechanics, theory of machines, and strength of materials. As these subjects form a basic part of an engineer's education, this text is admirably suited to meet the needs of the common course in mechanical engineering prescribed in the curricula of almost all branches of engineering. The thoroughly revised second edition includes:

- Four new chapters—Centroid and Moment of Inertia, Kinematics of Rigid Body, Kinetics of Rigid Body, and Mechanism and Simple Machines—to meet the course requirements.
- More solved problems culled from the latest university and competitive examination papers.

KEY FEATURES

- Presents an introduction to basic mechanical engineering topics required by all engineering students in their studies.
- Provides a large number of worked problems which help in understanding theory.
- Includes objective type questions with explanatory answers to help students in preparing for competitive examinations.

Contents: Preface. Basic Concepts and Zeroth Law of Thermodynamics. First Law of Thermodynamics. Second Law of Thermodynamics. Properties of Steam and Thermodynamics. Vapour Cycles. Thermodynamic Cycles. Mechanism and Simple Machines. Force System and Analysis. Friction. Analysis of Beams. Trusses. Centroid and Moment of Inertia. Kinematics of Rigid Body. Kinetics of Rigid Body. Stress and Strain Analysis. Bending Stresses in Beams. Torsion. Bibliography. Index.

Latest Print 2010 / 844 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3776-3 / ₹ 495.00 / (e-book also available)

CAD/CAM/CIM

ALAVALA

CAD/CAM: Concepts and Applications

CHENNAKESAVA R. ALAVALA, *Professor, Department of Mechanical Engineering, Jawaharlal Nehru Technological University, Hyderabad.*

Primarily intended as a textbook for the undergraduate

students of aeronautical, automobile, civil, industrial, mechanical, mechatronics and production, it provides a comprehensive coverage of all the technical aspects related to CAD/CAM.

Organized in 26 chapters, the textbook covers interactive computer graphics, CAD, finite element analysis, numerical control, computer numerical control, manual part programming, computer-aided part programming, direct numerical control, adaptive control systems, group technology, computer-aided process planning, computer-aided planning of resources for manufacturing, computer-aided quality control, industrial robots, flexible manufacturing systems, cellular manufacturing, lean manufacturing and computer integrated manufacturing. Each chapter begins with objectives and ends with descriptive and multiple-choice questions.

Besides students, this book would be of immense value to practicing engineers and professionals who are interested in the CAD/CAM technology and its applications to design and manufacturing.

KEY FEATURES

- Many innovative illustrations
- Case studies
- Question bank at the end of each chapter
- Good number of worked out examples
- Extensive and carefully selected references

Contents: Preface. Acknowledgements. Fundamentals of CAD/CAM. CAD/CAM Hardware. CAD/CAM Software. Interactive Computer Graphics. Basics of Geometric Modelling. Wireframe Modelling. Surface Modelling. Solid Modelling. Computer-aided Drafting. Finite Element Modelling. Numerical Control. Computer Numerical Control. Manual Part Programming. Turning Centre Programming. Computer-aided Part Programming. Direct Numerical Control. Adaptive Control Machining Systems. Group Technology. Computer-aided Process Planning. Computer-aided Manufacturing Resource Planning. Computer-aided Quality Control. Industrial Robots. Flexible Manufacturing Systems. Cellular Manufacturing. Lean Manufacturing. Computer-integrated Manufacturing. References. Index.

Latest Print 2013 / 564 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3340-6 / ₹ 395.00 / (e-book also available)

ALAVUDEEN & VENKATESHWARAN Computer Integrated Manufacturing

A. ALAVUDEEN, *Senior Lecturer, Department of Mechanical Engineering, Kalasalingam University, Srivilliputtur, Chennai.*

N. VENKATESHWARAN, *Senior Lecturer, Department of Mechanical Engineering, Rajalakshmi Engineering College, Chennai.*

This up-to-date and accessible text deals with the basics of Computer Integrated Manufacturing (CIM) and the many advances made in the field. It begins with a discussion on automation systems, and gives the historical background of many of the automation

technologies. Then it moves on to describe the various techniques of automation such as group technology and flexible manufacturing systems. The text describes several production techniques, for example, just-in-time (JIT), lean manufacturing and agile manufacturing, besides explaining in detail database systems, machine functions, and design considerations of Numerical Control (NC) and Computer Numerical Control (CNC) machines, and how the CIM system can be modelled. The book concludes with a discussion on the industrial application of artificial intelligence with the help of case studies, in addition to giving network application and signalling approaches.

Intended primarily as a text for the undergraduate and graduate students of mechanical, production, and industrial engineering and management, the text should also prove useful for the professionals in the field.

Contents: Preface. Acknowledgements. Introduction. Group Technology. Flexible Manufacturing Systems. Shop Floor Control. Production Planning and Control. Computer Aided Process Planning. JIT-Lean Production. Open System/CIM Data Model. NC and CNC Machines. Design Consideration of CNC Machines. Automated Guided Vehicle (AGV). Robotics. Enterprise Resource Planning (ERP). Product Data Management. Artificial Intelligence and Simulation. Programmable Logic Controller. Concurrent Engineering. Local Area Network Communications. APPENDICES—A: A Simulation Case Study of an FMS Cell. B: Bar Code Technology. C: Stepper Motors. D: AC Variable Drive. Glossary. References. Index.

Latest Print 2013 / 440 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3345-1 / ₹ 350.00 / (e-book also available)

LALIT NARAYAN, RAO & SARCAR Computer Aided Design and Manufacturing

K. LALIT NARAYAN, *Associate Professor, Department of Mechanical Engineering, Sir C.R.R. College of Engineering, Eluru.*

K. MALLIKARJUNA RAO, *Professor and Head of the Department of Mechanical Engineering, Jawaharlal Nehru Technological University (JNTU), Kakinada.*

M.M.M. SARCAR, *Professor, Department of Mechanical Engineering, Andhra University College of Engineering, Visakhapatnam.*

The impact of the technology of Computer-Aided Design and Manufacturing in automobile engineering, marine engineering and aerospace engineering has been tremendous. Using computers in manufacturing is receiving particular prominence as industries seek to improve product quality, increase productivity and to reduce inventory costs. Therefore, the emphasis has been attributed to the subject of CAD and its integration with CAM.

Designed as a textbook for the undergraduate students of mechanical engineering, production engineering and industrial engineering, it provides a description of both the hardware and software of CAD/CAM systems.

The Coverage Includes

- Principles of interactive computer graphics
- Wireframe, surface and solid modelling
- Finite element modelling and analysis
- NC part programming and computer-aided part programming
- Machine vision systems
- Robot technology and automated guided vehicles
- Flexible manufacturing systems
- Computer integrated manufacturing
- Artificial intelligence and expert systems
- Communication systems in manufacturing

PEDAGOGICAL FEATURES

- CNC program examples and APT program examples
- Review questions at the end of every chapter
- A comprehensive Glossary
- A Question Bank at the end of the chapters

Contents: Foreword. Preface. Acknowledgements. Part I: CAD—Fundamentals of Design, Computers and Controllers—Fundamentals of CAD. Computer Systems. Part II: CAD—Hardware and Software Components—Use of Computers in CAD/CAM System. CAD System Hardware. CAD System Software. Principles of Interactive Computer Graphics. Transformation Systems. Wire Frame Modelling. Surface Modelling. Solid Modelling. Part III: CAD—Design Aspects of Industrial Components—Finite Element Modelling and Analysis. Part IV: CAM—Numerical Control Production Systems. Numerical Control in Production Systems. Computer Control of NC Machines. NC Part Programming and Computer Aided Part Programming. Part V: Information Systems in Manufacturing—Group Technology. Computer Aided Process Planning. Part VI: Quality Control and Automated Inspection—Computer-Aided Inspection and Quality Control. Machine Vision. Part VII: Integration of Manufacturing Systems—Computer Integrated Production Planning Systems. Industrial Robots and Automated Guided Vehicle Systems. Flexible Manufacturing Systems. Computer Integrated Manufacturing. Part VIII: Intelligent CAD and Manufacturing Systems—Artificial Intelligence and Expert System. Communication Systems in Manufacturing. Bibliography. Glossary. Question Bank (Computer Aided Design). Question Bank (Computer Aided Manufacturing). Objective Type Questions. Index.

Latest Print 2013 / 728 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3342-0 / ₹ 475.00 / (e-book also available)

VAJPAYEE

Principles of Computer Integrated Manufacturing

S. KANT VAJPAYEE, *University of Southern Mississippi*.

The basic principles of Computer Integrated Manufacturing (CIM) are lucidly presented in this book highlighting the interactions among its various elements. After presenting an introduction to the basics of CIM, the author discusses the principles governing the technologies of computers, communications and

databases, followed by a discussion of the CIM technologies for discrete-parts production.

KEY FEATURES

- Each of the five parts has a preamble and each chapter begins with introductory remarks.
- Boxes throughout the chapters highlight examples and describe industry experiences.
- Each chapter ends with a brief list of trends, a summary, key terms, exercises (including projects), and a list of suggested readings.
- Key terms are explained in the glossary at the end of the text.

Contents: Prologue: The Meaning and Scope of CIM. Manufacturing: An Overview. Brain, Nerves, and Heart of CIM: Computer Technology and Manufacturing. Fundamentals of Communications. Database. Technology and Systems: Product Design. Production Planning. Production. Shop-floor Control. Robotics and Material Handling. Quality. CIM Management: Management of CIM. Personnel. Epilogue: Emerging Technologies. Ramifications of CIM. Appendices. Glossary. Bibliography. Abbreviations. Index.

Latest Print 2015 / 512 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-1476-4 / ₹ 395.00

Control Theory

SINGH

Process Control: Concepts, Dynamics and Applications

S.K. SINGH, *Head, Maintenance Services Group (Electrical) and Telecommunication, Tata Steel Limited, Jamshedpur.*

Process control, a sub-discipline of automatic control, involves tailoring methods for the efficient operation of industrial processes. Proper application of process control improves the safety and profitability of a process, while maintaining consistently high product quality.

This book is a comprehensive introduction to the vast and important field of control systems. The text introduces the theory of automatic control and its applications to the chemical process industries with emphasis on topics that are of use to the process control engineers and specialists. It also covers the advanced control strategies and its practical implementation with an excellent balance of theoretical concepts and engineering practice.

KEY FEATURES

- Extensive coverage of topics such as Feedback control, Modelling, Controller design, and response analysis and stability criterion per evaluating robustness of control systems.
- Large number of illustrative figures and solved examples at the end of the chapters.
- Extensive set of review questions and **self-check quizzes** with answers at the end of each chapter.

- Case studies for bridging the gap between theoretical learning and practical implementation.

Designed to serve as a textbook for both undergraduate and postgraduate students of chemical engineering, this book will also be useful for mechanical, instrumentation and electrical engineers who help design process control systems.

Contents: Foreword. Preface. Acknowledgements. Part I: Process Control Concepts—Introduction to Process Control Systems. Process Control Modelling. Feedback Control System. Part II: Process Control Dynamics and Design—Response Analysis of Control System and Stability Criterion. Design of Process Control Systems. Part III: Advanced Process Control—Advanced Process Control Strategies. Part IV: Computer-Based Control—Computer-Aided Process Control. Computer Hardware for Process Control. Computer Software for Process Control. Microcomputer-Based Process Control—A Programmable Logic Controller (PLC). Microcomputer-Based Process Control—A Distributed Control System (DCS). Part V: Case Studies—Process Control: Case Study. Bibliography. Answers to Self-Check Quizzes. Index.

Latest Print 2010 / 748 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3678-0 / ₹ 450.00 / (e-book also available)

Cryogenic Engineering

MUKHOPADHYAY

Fundamentals of Cryogenic Engineering

MAMATA MUKHOPADHYAY, *Professor Adjunct, Chemical Engineering Department, Indian Institute of Technology Bombay.*

Intended as a text for the undergraduate and post-graduate students of Chemical/Mechanical/Materials Engineering streams, this well-balanced book explains the fundamental principles and the applied aspects of cryogenic engineering. The author, with her vast and varied experience in teaching and allied fields, clearly enunciates the behaviour and various properties of common cryogenic fluids, methods of liquefaction, and separation and applications of cryogenics with thermodynamic analysis for process selection.

This profusely illustrated study with clear-cut diagrams and process charts, should serve not only as a textbook for students but also as an excellent reference for researchers and practising engineers on design of cryogenic refrigeration, and liquefaction and separation process plants for various applications.

KEY FEATURES

- Discusses various application areas of cryogenics including cryogenic propellants used in space propulsion systems.
- Analyzes measurement techniques for temperature, pressure, flow rate, and liquid level, and describes the unique behaviour of cryogenic fluids and materials at cryotemperatures.

- Gives numerous solved problems and exercises that lay emphasis on honing the concepts discussed.

Contents: Preface. Introduction to Cryogenics. Thermodynamic Analysis of Low Temperature Processes. Cryogenic Liquefaction Processes. Separation and Purification Processes for Cryogenics. Thermophysical Properties of Cryogenic Fluids. Cold Exchange in Cryogenic Fluids. Cryogenic Propellants for Rocket Propulsion. Measurement Devices at Cryogenic Temperatures. Storage and Transportation of Cryogenic Fluids. Material Properties at Cryogenic Temperatures. Index.

Latest Print 2010 / 364 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3057-3 / ₹ 350.00 / (e-book also available)

Energy Engineering

CHAKRABARTI

Energy Engineering and Management

AMLAN CHAKRABARTI, *Professor and Head, Department of Electrical Engineering, Narula Institute of Technology, Kolkata.*

This textbook is designed for senior students of B.Tech. in Electrical/Mechanical Engineering and first-year students of M.Tech. in Energy Management. The book will also be useful for MBA courses on Energy Management conducted by some universities through distance education mode.

The book also offers comprehensive study material for the certification examination for certified energy auditor of Bureau of Energy Efficiency, Government of India and for some industrial training programmes in the industry.

The book provides an exhaustive discussion of the energy analysis methodologies and tools to optimize the utilization of energy and how to enhance efficiency during conversion of energy from one form to another. It illustrates the energy analysis methods used in factories, transportation systems and buildings highlighting the various forms of use. It discusses the thermodynamic principles of energy conversion and constitution of energy balance equation for such systems.

The book examines the energy costs in our everyday life in terms of energy inputs in food cultivation. It also discusses similar energy costs of using fuels, other goods and services in our daily life.

KEY FEATURES

- Includes numerous questions and answers on energy management.
- Contains problems and solutions on energy management.
- Provides multiple choice questions useful for preparing for the certified energy auditor examination conducted by the Bureau of Energy Efficiency, Government of India.
- Includes 4 Case Studies.

Contents: Preface. Acknowledgements. Introduction to Global Energy Scenario. Technology and Considerations for Electrical and Fuel Energy. Energy Costs of Food, Fuel,

Materials, Goods and Services. Energy Analysis and Thermodynamics. Energy Analysis of Real Industrial Systems: Factories. Energy Analysis of Real Industrial Systems: Transportation Systems. Energy Analysis of Real Industrial Systems: Buildings. Principles and Objectives of Energy Management. Design of Energy Management Programmes. Procedures for Energy Analysis and Audit. Social and Economic Cost Benefits. Measures for Energy Conservation. Appendices—A: Questions and Answers on Energy Management. B: Problems on Energy Management. C: Multiple Choice Questions on Energy Management. D: Case Studies on Energy Management. Index.

Latest Print 2015 / 264 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4233-0 / ₹ 295.00 / (e-book also available)

Engineering Design

AHMED

Mechanical Engineering Design: Principles and Concepts

SIRAJ AHMED, *Professor and Head, Department of Mechanical Engineering, Maulana Azad National Institute of Technology, Bhopal.*

This textbook is designed to serve as a text for undergraduate students of mechanical engineering. It covers fundamental principles, design methodologies and applications of machine elements. It helps students to learn to analyse and design basic machine elements in mechanical systems.

Beginning with the basic concepts, the book discusses wide range of topics in design of mechanical elements. The emphasis is on the underlying concepts of design procedures. The inclusion of machine tool design makes the book very useful for the students of production engineering. Students will learn to design different types of elements used in the machine design process such as fasteners, shafts, couplings, etc. and will be able to design these elements for each application.

Following a simple and easy to understand approach, the text contains:

- Variety of illustrated design problems in detail
- Step by step design procedures of different machine elements
- Large number of machine design data

Contents: Foreword. Preface. Acknowledgements. Symbols. Part I: Basic Principles and Concepts—Engineering Design. Product Design. Ergonomics: Human Factor Engineering. Economic Consideration. Theories of Elastic Failure. Impact Load. Contact Stresses. Residual Stress. Fatigue. Fracture Mechanics. Creep. Wear. Vibrations. Optimization of Design. Part II: Design of Mechanical Elements—Key and Coupling. Knuckle Joint. Welded Joint. Crane Hook. Power Screw. Belt, Rope and Chain. Clutches, Brakes and Flywheel. Springs. Gear Design. Gear Box. Journal Bearing. Rolling Contact

Bearing. Shaft. Pressure Vessels. Internal Combustion Engine. Design of Centrifugal Pump. Introduction to Machine Tool Design. Appendices—A: Statistical Consideration. B: Material Properties. C: SI Units. Bibliography. Index.

Latest Print 2014 / 576 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4931-5 / ₹ 450.00 / (e-book also available)

de NEUFVILLE & SCHOLTES Flexibility in Engineering Design

RICHARD DE NEUFVILLE is *Professor of Engineering Systems, and Civil and Environmental Engineering at MIT.* STEFAN SCHOLTES is *Dennis Gillings Professor of Health Management and Academic Director of the Centre for Health Leadership and Enterprise at the Judge Business School, University of Cambridge.*

This book provides a high-level overview of why flexibility in design is needed to deliver significantly increased value. It describes in detail methods to identify, select, and implement useful flexibility. The book is unique in that it explicitly recognizes that future outcomes are uncertain. It thus presents forecasting, analysis, and evaluation tools especially suited to this reality. Appendixes provide expanded explanations of concepts and analytic tools.

“Forecasts are a necessary part of planning major capital projects. The problem is these forecasts are almost always wrong. It is very important to recognize this truth and even more important to shield projects from the potential downsides of an uncertain future by building in flexibility. Professors de Neufville and Scholtes have provided a clear and practical guide, well supported by specific examples, on the science of identifying, justifying, and implementing flexibility in design.”

Lloyd A. McCoomb, *President and Chief Executive Officer Toronto Pearson International Airport*

“de Neufville and Scholtes convincingly show us that enhancing flexibility in engineering design can help us a lot to improve our performance. Anchored in their research, the book is an easy read because both authors are also excellent pedagogues who take the reader step by step through some difficult materials. This book is a real must-read for anybody involved in large-scale projects.”

Arnoud de Meyer, *President and Professor Singapore Management University*

Contents: Series Foreword; Acknowledgments; Introduction. Value I: High-Level Overview—Flexible Design: Its Need and Value. Recognition of Uncertainty. Flexibility Can Increase Value II: Method of Analysis—Phase 1: Estimating the Distribution of Future Possibilities. Phase 2: Identifying Candidate Flexibilities. Phase 3: Evaluating and Choosing Flexible Designs. Phase 4: Implementing Flexibility. Epilog: The Way Ahead. Appendices—A: Flaw of Averages. B: Discounted Cash Flow Analysis. C: Economics of Phasing. D: Monte Carlo

Simulation. E: Dynamic Forecasting. F: Financial Options Analysis. Notes. Bibliography. Index.

Latest Print 2013 / 312 pp. / 15.3 × 22.9 cm
ISBN-978-81-203-4751-9 / ₹ 595.00

de WECK, et al. Engineering Systems

OLIVIER L. de WECK is Associate Professor of Aeronautics and Astronautics and Engineering Systems at MIT as well as Associate Director of the Engineering Systems Division. DANIEL ROOS, Founding Director of Engineering Systems Division, is Japan Steel Industry Professor of Engineering Systems and Civil and Environmental Engineering at MIT.

CHRISTOPHER L. MAGEE is Professor of the Practice of Mechanical Engineering and Engineering Systems at MIT, where he is also Codirector of the International Design Center of Singapore University of Technology and Design and MIT.

Engineering Systems is an emerging field that is at the intersection of engineering, management, and the social sciences. Designing complex systems requires not only traditional engineering skills but also knowledge of public policy issues and awareness of societal norms and preference. As scale, scope, and complexity increase, engineers consider technical and social issues together in a highly integrated way as they design flexible, adaptable, robust systems that can be easily modified and reconfigured to satisfy changing requirements and new technological opportunities.

This book offers a comprehensive examination of such systems and the associated emerging field of study. Through scholarly discussion, concrete examples, and history, the authors consider the engineer's changing role, new ways to model and analyze these systems, the impacts on engineering education, and the future challenges of meeting human needs through the technologically enabled systems of today and tomorrow.

"I believe that this book is a *first*. It defines a new and emerging discipline—engineering systems. The authors give us the theories, concepts, and tools that are necessary to situate engineering problems in a broader and fundamentally relevant context, thereby permitting more complete and useful solutions to current challenges."

John S. Reed, Chairman of the Corporation,
MIT

"This book is timely. New thinking is urgently needed in order to manage and thrive in our world of complex systems and systems of systems. Our students, the leaders of tomorrow, must learn and apply engineering systems skills in business, communications, transportation, energy, education, healthcare delivery, public health, and global health. This book marvelously demonstrates why the system-thinking skills required

must include the domains of strategic planning, public policy, social sciences, management, and engineering."

Denis A. Cortese, M.D., Foundation Professor and Director of the Healthcare Delivery and Policy Program, Arizona State University; President of the Healthcare Transformation Institute; Emeritus President and CEO of Mayo Clinic

Contents: Series Foreword. Foreword by Charles M. Vest. Preface. From Inventions to Systems. What Is an Engineering System. (Re)Thinking about Systems. Life-Cycle Properties of Engineering Systems: The Illities. Modeling and Analyzing Engineering Systems. Partially Designed, Partially Evolved. Engineering Systems Research and Education. What the Future Holds. Appendix: Engineering Systems Terms and Definitions. Notes. Index.

2013 / 232 pp. (Hard Cover) / 15.3 × 22.9 cm
ISBN-978-81-203-4753-3 / ₹ 595.00

MISHRA & SIMANT Mechanical System Design

RAMESH CHANDRA MISHRA, Professor and Head of Mechanical Engineering Department, Northern India Engineering College, Lucknow.

SIMANT, Assistant Professor, Department of Mechanical Engineering, Northern India Engineering College, Lucknow.

System design is an activity which fulfils human needs. But in order to fulfil the need, a designer or an engineer has to conceive and implement a plan with an innovative approach, utilizing the available physical resources. This textbook presents the concepts of engineering design process in proven steps of needs assessment, problem formulation, system modelling, analysis and implementation. It discusses in detail the concepts of system development, system modelling, system evaluation, system reliability, system simulation and presents the optimization techniques in a practical manner. The approach presented leads the students and practising engineers to understand and learn the design process and to develop the objective rationale for decision making in order to fulfil their professional role in society.

KEY FEATURES

- Includes chapters on *manufacturing systems* and *concurrent engineering*.
- Provides chapter-end questions to enable students to test their comprehension of the topics discussed.
- Incorporates case studies for clear understanding of the concepts discussed.

Primarily intended as a textbook for the undergraduate students of mechanical engineering having courses in Mechanical System Design, the book would also be quite useful for professional engineers and researchers.

Contents: Preface. Engineering Process and System Approach. Problem Formulation. System Development. System Modelling and Theories. Mathematical

Formulation in System Design. Optimization Concept. System Evaluation. Decision Theory. System Reliability. System Simulation. System Approach to Project Management. Manufacturing Systems. Concurrent Engineering. Bibliography. Index.

Latest Print 2009 / 288 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3784-8 / ₹ 225.00 / (e-book also available)

Engineering Economics

MISHRA

Engineering Economics and Costing, 2nd ed.

SASMITA MISHRA is an Economics faculty, Department of Mathematics and Humanities, College of Engineering and Technology, Bhubaneswar.

This substantially revised and updated edition of *Engineering Economics and Costing* continues to build on the fundamental principles and applications of the subject. Divided into three parts: Part I, Engineering Economics; Part II, Financial System; and Part III, Cost Accounting, the text discusses, in a simple and easy-to-understand language, such topics as interest formulas and their applications, and various methods, for example, the present worth method of comparison, future worth method, annual equivalent method, and the rate of return method. It also includes, in its Appendix, interest tables for a wide range of interest rates (0.25–50%) and for a period ranging from one year to 100 years. These tables, along with the topics discussed, will help students of both Engineering and MCA in evaluating engineering projects.

WHAT IS NEW TO THIS EDITION

- Chapter 2 gives a distinction between Microeconomics and Macroeconomics.
- Chapter 2 also explains the concept of income elasticity, cross elasticity of demand, and elasticity of substitution.
- At the end Chapter 3, a variety of simple numerical problems with solutions are given to illustrate the concepts discussed.
- Chapter 8 provides more examples illustrating the various aspects of break-even analysis.

While the book is intended primarily as a text for B.Tech. and MCA courses of Biju Patnaik University of Technology (BPUT), Orissa, it would also be highly useful for BE/B.Tech. students of other universities/institutes. Besides, practising engineers and project consultants making economic decision analysis would find this well-organized book immensely valuable.

What the Reviewer Says:

The book is very clear in exposition of the concepts and theories of Economics. I am confident that it will be extremely helpful to the engineering students.

—Dr. NIRMAL CHANDRA SAHU

Professor, Postgraduate Department of Economics,
Berhampur University, Orissa

Contents: Preface. Part I: Engineering Economics—Introduction to Engineering Economics. Microeconomics and Macroeconomics. Theory of Production. Time Value of Money. Cash Flows for Investment Analysis: Concepts and Diagrams. Evaluation of Engineering Alternatives. Depreciation Analysis. Break-Even Analysis. Part II: Financial System—Commercial Banking. Reserve Bank of India. Indian Money Market. Part III: Cost Accounting—Costing and Cost Concepts. Marginal Costing. Standard Costing and Variance Analysis. Cost Control and Cost Reduction. Bibliography. Appendix: Interest Tables. Index.

Latest Print 2014 / 348 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4167-8 / ₹ 250.00 / (e-book also available)

PANNEERSELVAM

Engineering Economics, 2nd ed.

R. PANNEERSELVAM, Professor, Department of Management Studies, School of Management, Pondicherry University, Puducherry.

Designed as a textbook for undergraduate students in various engineering disciplines—Mechanical, Civil, Industrial Engineering, Electronics Engineering and Computer Science—and for postgraduate students in Industrial Engineering and Water Resource Management, this comprehensive and well-organized book, now in its Second Edition, shows how complex economic decisions can be made from a number of given alternatives. It provides the managers not only a sound basis but also a clear-cut approach to making decisions. These decisions will ultimately result in minimizing costs and/or maximizing benefits. What is more, the book adequately illustrates the concepts with numerical problems and **Indian cases.**

While retaining all the chapters of the previous edition, the book adds a number of topics to make it more comprehensive and more student friendly.

WHAT'S NEW TO THIS EDITION

- Discusses different types of costs such as average cost, recurring cost, and life cycle cost.
- Deals with different types of cost estimating models, index numbers and capital allowance.
- Covers the basics of non-deterministic decision making.
- Describes the meaning of cash flows with probability distributions and decision making, and selection of alternatives using simulation.
- Discusses the basic concepts of Accounting.

This book, which is profusely illustrated with worked-out examples and a number of diagrams and tables, should prove extremely useful not only as a text but also as a reference for those offering courses in such areas as Project Management, Production Management, and Financial Management.

Contents: Preface to the First Edition. Introduction. Elementary Economic Analysis. Interest Formulas and Their Applications. Present Worth Method of Comparison. Future Worth Method. Annual Equivalent Method. Rate of Return Method. Replacement and

Maintenance Analysis. Depreciation. Evaluation of Public Alternatives. Inflation Adjusted Decisions. Non-deterministic Decision Making. Cash Flows with Probability Distributions. Selection of Alternatives Using Simulation. Inventory Control. Make or Buy Decision. Project Management. Value Analysis/Value Engineering. Linear Programming. Basic Accounting Concepts. References. Appendix. Index.

Latest Print 2014 / 364 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-4837-0 / ₹ 275.00 / (e-book also available)

PANNEERSELVAM

Interest Tables for Engineering Economics

R. PANNEERSELVAM is Professor and Head, Department of Management Studies, School of Management, Pondicherry University.

The different investment analysis approaches require various interest formulas and their values. A fairly large problem involving different types of transactions in its cash-flows may take more time to solve it, if the students compute the values of the related interest formulas and then make substitutions in the respective expressions of the investment analysis. This book gives values of different interest factors, $(F/P, i, n)$, $(P/F, i, n)$, $(F/A, i, n)$, $(A/F, i, n)$, $(P/A, i, n)$, $(A/P, i, n)$ and $(A/G, i, n)$ for different combinations of interest rate (i) and interest period (n) in the form of tables, to serve as an aid for solving problems in "Engineering Economics" in the Examination Hall. These Interest Tables can also be usefully employed for field work while doing engineering economics analysis.

The tables will be useful to students of different B.Tech. programmes and to students of M.Com and M.B.A. programmes for solving different investment analysis problems.

Contents: Preface. Notations. Interest Tables.

Latest Print 2008 / 78 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-3105-1 / ₹ 75.00

Engineering Graphics/ Engineering Drawing

JOHN

Engineering Graphics for Degree

K.C. JOHN, Professor and Head, Department of Mechanical Engineering, Jyothi Engineering College, Cheruthuruthy, Thrissur, Kerala.

This book provides a detailed study of geometrical drawing through simple and well-explained worked-out examples. It is designed for first-year engineering students of all branches.

The book is divided into seven modules. A topic is introduced in each chapter of a module with brief

explanations and necessary pictorial views. Then it is discussed in detail through a number of worked-out examples, which are explained using step-by-step procedure and illustrating drawings. Module A covers the fundamentals of manual drafting, lettering, freehand sketching and dimensioning of views. Module B describes two-dimensional drawings like geometrical constructions, conics, miscellaneous curves and scales. Three-dimensional drawings, such as projections of points, lines, plane lamina, geometrical solids and sections of them are well explained in Module C. Module D deals with intersection of surfaces and their developments. Drawing of pictorial views is illustrated in Module E, which includes isometric projection, oblique projection and perspective projections. Module F covers the fundamentals of machine drawing. Finally, in Module G the book introduces computer-aided drafting (CAD) to make the readers familiar with the state-of-the-art techniques of drafting.

KEY FEATURES

- Follows the International Standard Organization (ISO) code of practice for drawing.
- Includes a large number of dimensioned illustrations, worked-out examples, and university questions and answers to explain the geometrical drawing process.
- Contains chapter-end exercises to help students develop their drawing skills.

Contents: Preface. Module-A (Preliminaries)—Introduction to Engineering Graphics. Lettering. Freehand Drafting. Dimensioning. Module-B (Two-Dimensional Drawings)—Geometrical Constructions. Conic Sections. Miscellaneous Curves. Scales. Module-C (Three-Dimensional Drawings)—Projections of Points. Projections of Straight Lines. Projections of Plane Figures. Projections of Solids. Sections of Solids. Module-D (Drawings of Surfaces)—Intersection of Surfaces. Development of Surfaces. Module-E (Pictorial Drawings)—Isometric Projection. Oblique Projection. Perspective Projection. Module-F (Introduction to Machine Drawing)—Multiview Projection of Objects. Auxiliary View of Objects. Visualization of Objects. Sectional Views of Objects. Threaded Fasteners. Module-G (Computer Aided Drafting)—Introduction to CAD. Starting to Use CAD Software. Drafting of 2D Figures. Appendix—Graphic Symbols. Index.

Latest Print 2014 / 528 pp. / 21.6 × 27.8 cm
ISBN-978-81-203-3788-6 / ₹ 395.00 / (e-book also available)

JOHN

Engineering Graphics for Diploma

K.C. JOHN, Professor and Head, Department of Mechanical Engineering, Jyothi Engineering College, Cheruthuruthy, Thrissur, Kerala.

This book provides a detailed study of geometrical drawing through simple and well-explained worked-out examples and exercises. This book is designed for students of first year Engineering Diploma course, irrespective of their branches of study.

The book is divided into seven modules. Module A covers the fundamentals of manual drafting, lettering, freehand sketching and dimensioning of views. Module B describes two-dimensional drawings like geometrical constructions, conics, miscellaneous curves and scales. Three-dimensional drawings, such as projections of points, lines, plane lamina, geometrical solids and their different sections are well-explained in Module C. Module D deals with intersection of surfaces and their developments. Drawing of pictorial views is illustrated in Module E, which includes isometric projection, oblique projection and perspective projections. The fundamentals of machine drawing are covered in Module F. Finally, in Module G, the book introduces computer-aided drafting (CAD) to make the readers familiar with the state-of-the-art techniques of drafting.

KEY FEATURES

- Follows the International Standard Organization (ISO) code of practice for drawing.
- Includes a large number of dimensioned illustrations, worked-out examples, and Polytechnic questions and answers to explain the geometrical drawing process.
- Contains chapter-end exercises to help students develop their drawing skills.

Contents: Preface. Module A: Preliminaries—Introduction to Engineering Graphics. Lettering. Freehand Drafting. Dimensioning. Module B: Two-Dimensional Drawings—Geometrical Constructions. Conic Sections. Miscellaneous Curves. Scales. Module C: Three-Dimensional Drawings—Projections of Points. Projections of Straight Lines. Projections of Plane Figures. Projections of Solids. Sections of Solids. Module-D: Drawing of Surfaces—Intersection of Surfaces. Development of Surfaces. Module E: Pictorial Drawings—Isometric Projection. Oblique Projection. Perspective Projection. Module F: Introduction to Machine Drawing—Multiview Projection of Objects. Auxiliary View of Objects. Visualization of Objects. Sectional Views of Objects. Module G: Computer Aided Drafting—Introduction to CAD. Starting to Use CAD Software. Drafting of 2D Figures. Problems and Solutions. Selected Polytechnic Examination Questions and Answers. Model Polytechnic Questions Paper. Index.

Latest Print 2014 / 376 pp. / 21.6 × 27.8 cm

ISBN-978-81-203-3722-0 / ₹ 350.00 / (e-book also available)

KULKARNI, RASTOGI & SARKAR Engineering Graphics with AutoCAD, Rev. ed.

D.M. KULKARNI, *Assistant Professor, Mechanical Engineering Group, Birla Institute of Technology and Science, Pilani, Goa Campus.*

ANAND P. RASTOGI, *Former Lecturer, Department of Civil Engineering, Birla Institute of Technology and Science (BITS), Pilani.*

A.K. SARKAR, *Professor of Civil Engineering and Dean, Instruction Division and Faculty Division-I, Birla Institute of Technology and Science, Pilani.*

Designed as a text for the undergraduate students of all

branches of engineering, this compendium gives an opportunity to learn and apply the popular drafting software AutoCAD in designing projects.

The textbook is organized in three comprehensive parts. Part I (AutoCAD) deals with the basic commands of AutoCAD which is widely used as drafting software by engineers and architects. Part II (Projection Techniques) contains various projection techniques used in engineering for technical drawings. These techniques have been explained with a number of line diagrams to make them simple to the students. Part III (Descriptive Geometry), mainly deals with 3-D objects that require imagination.

Unlike conventional textbooks, the model solutions and exercise problems are independent of dimensions. Therefore, this book will also be useful for the students who use conventional drafting techniques.

KEY FEATURES

- Explains fundamentals of imagination skill in generic and basic forms to crystallize key concepts in Engineering Graphics.
- Includes chapters on aspects of technical drawing and AutoCAD as a tool.
- Treats problems in the third angle as well as first angle methods of projection in line with the revised code of Indian Standard Code of Practice for General Drawing.

Contents: Preface. Engineering Graphics: An Overview. Part I: AutoCAD—Computer Aided Drafting. Part II: Projection Techniques—Theory of Projection. Aspects of Technical Drawing. Orthographic Projections. Isometric Drawing. Interpretation of Given Views. Auxiliary Projections. Part III: Descriptive Geometry—Projections of Straight Lines. Projections of Planer Surfaces. Various Measurements. Projections of Solids. Sections of Solids. Development of Surfaces of Solids. Intersection of Surfaces. Freehand Sketching. Index.

Latest Print 2014 / 344 pp. / 21.6 × 27.8 cm

ISBN-978-81-203-3783-1 / ₹ 325.00 / (e-book also available)

SIDDIQUEE, KHAN & AHMAD Engineering Drawing with a Primer on AutoCAD

ARSHAD N. SIDDIQUEE *is with the Department of Mechanical Engineering, University Polytechnic, Jamia Millia Islamia, New Delhi.*

ZAHID A. KHAN and MUKHTAR AHMAD, *both are with the Department of Mechanical Engineering, Faculty of Engineering and Technology, Jamia Millia Islamia.*

This self-contained comprehensive book has been written to cover almost all important topics on engineering drawing to introduce polytechnic and undergraduate students of engineering to the standards and convention of technical drawing.

Initial chapters of the book cover basics of line work, engineering scales, engineering curves and dimensioning practices. In the next stage, fundamental principles of projection are discussed in detail. Subsequent chapters

cover topics on orthographic projections of points, lines, planes and solids. First-angle projections have been adopted throughout the chapters covering orthographic projection.

With a strong emphasis on creating accurate and clear drawings, a chapter on AutoCAD software is also included in the book. The chapter is organized such that it describes the application of the software presenting and applying these standards. More importantly, all the elaborations of the software are alone making use of screen captures taken from the AutoCAD screen so that a novice user will be able to understand its application easily.

A large number of solved examples with detailed steps examining methods for solving them have been incorporated to help students solve the unsolved problems.

Contents: Preface. Drawing Instruments and Their Applications. Getting Started with Pencils. Engineering Scales. Engineering Curves. Principles of Orthographic Projections. Projection of Points. Projection of Straight Lines. Projection of Planes. Projection of Solids. Sections of Solids. Isometric Projections. Development of Surfaces. Intersection of Surfaces. Computer-aided Drafting and AutoCAD. Bibliography. Index.

Latest Print 2011 / 324 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2440-4 / ₹ 225.00

Engineering Mechanics

CHANDRAMOULI Engineering Mechanics

P.N. CHANDRAMOULI, *Professor of Civil Engineering at the National Institute of Engineering, Mysore.*

Designed to serve as a textbook for the first-year B.E./B. Tech. students of all branches as well as for the AMIE students, it covers the syllabi of almost all universities and institutes. This book provides a thorough understanding of the principles and applications of Engineering Mechanics. A lucid pattern, both in terms of language and content, has been adopted throughout the text.

Beginning with an introduction to the subject, the book provides a detailed treatment of systems of forces and elaborately explains the concepts of centroid and centre of gravity, moment of inertia, virtual work, friction, kinematics of particle and motion of projectiles. It also discusses the laws of motion, power and energy, and collision of elastic bodies in dynamics. The topics are dealt with in a well-organized sequence with proper explanations and simple mathematical formulations.

KEY FEATURES

- Includes both vector and scalar analyses of topics.
- Emphasizes the practical applicability of Engineering Mechanics to the real-life situations.
- Gives key concepts to help instructors deliver the lecture in a better way.

- Includes a large number of worked-out examples to help students comprehend the concepts with ease.
- Provides chapter-end review questions to test students' understanding of the subject.
- Gives chapter-end numerical problems to enhance problem-solving ability. Many of the problems depict realistic situations encountered in engineering practice.
- Incorporates objective type questions to help students prepare for examinations.

Contents: Preface. Mechanics: An Overview. Forces and Basic Principles of Statics. Coplanar, Concurrent Force System. Coplanar, Non-concurrent Force System. Analysis of Framed Structures. Virtual Work. Centroids and Centre of Gravity. Moments of Inertia. Friction. Kinematics: Plane Rectilinear Motion. Motion in a Vertical Plane Under Gravity Projectile. Laws of Motion. Work, Power and Energy. Collision of Elastic Bodies. Appendix. Bibliography. Index.

Latest Print 2013 / 736 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4422-8 / ₹ 495.00 / (e-book also available)

JAYAKUMAR & KUMAR Engineering Mechanics

V. JAYAKUMAR, *Assistant Professor in the School of Mechanical and Building Sciences, VIT University, Vellore.*
M. KUMAR, *Assistant Professor in the Department of Mechanical Engineering, Velammal Engineering College, Chennai.*

Designed for the first-year undergraduate students of all engineering disciplines, this well-written textbook presents a comprehensive coverage of the fundamental concepts, principles and applications of engineering mechanics in an easy-to-comprehend manner.

The book presents an in-depth analysis of various branches of engineering mechanics and the units of measurements. It discusses the system of forces, its characteristics and graphical representation along with composition of coplanar concurrent/non-concurrent forces in a simple but effective style. Using a self-instructive student-friendly approach, the book describes properties of surfaces which cover centre of gravity and moment of inertia. Separate chapters are devoted to a thorough study of friction, kinematics and kinetics of particles. Finally, this book explains the elements of rigid body dynamics.

KEY FEATURES

- Includes a number of self-explanatory, graded and worked-out examples for practice.
- Incorporates review and summary, key terms and review questions at the end of each chapter to clarify the concepts.
- Presents step-by-step build-up of topics with side-by-side free body diagrams.
- Contains problems for practice at the end of each chapter to consolidate learning.

Contents: Preface. Fundamentals of Mechanics. Statics and Equilibrium of Particles. Statics and Equilibrium of

Rigid Bodies in Two Dimensions. Statics and Equilibrium of Rigid Bodies in Three Dimensions. Properties of Surfaces. Properties of Solids. Friction. Kinematics of Particles. Kinetics of Particles. Elements of Rigid Bodies Dynamics. Appendix: Review of Basic Mathematics. Index.

Latest Print 2014 / 1050 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4294-1 / ₹ 625.00 / (e-book also available)

PAUL, ROY & MUKHERJEE Mechanical Sciences: Engineering Mechanics and Strength of Materials

AKSHOY RANJAN PAUL, *Department of Mechanical Engineering, Kalyani Government Engineering College, Kalyani, West Bengal.*

PIJUSH ROY, *Department of Mechanical Engineering, College of Textile Technology, Serampore, West Bengal.*

SANCHAYAN MUKHERJEE, *Department of Mechanical Engineering, Kalyani Government Engineering College, Kalyani, West Bengal.*

Primarily intended for undergraduate students of all engineering disciplines, this comprehensive and up-to-date text strives to meet the long-felt need for a single book that covers **Engineering Mechanics** as well as **Strength of Materials**.

The text is organized in three parts. Parts I and II provide an easily understandable presentation of the theory along with systematic application of the principles of **statics** and **dynamics** to engineering problems. Part III covers the basic topics in **strength of materials** in a clear, simple, direct fashion that uses an abundance of examples to clarify principles.

KEY FEATURES

- Clear and simple diagrams to explain concepts
- More than 200 graded solved examples to foster understanding of theory
- More than 125 exercises with solution hints and answers to develop students' problem solving skills
- Multiple-choice questions to help students assess their learning.

Contents: Foreword. Preface. Notation. Part I: Statics—Introduction to Engineering Mechanics. Scalar and Vector Analysis. Statics of Particles. Equivalent Systems of Forces of Rigid Bodies. Equilibrium of Rigid Bodies. Analysis of Simple Structures. Centroid and Moment of Inertia. Friction. Virtual Work. Simple Lifting Machines. Part II: Dynamics—Kinematics of Particles and Rigid Bodies. Kinetics of Particles and Rigid Bodies. Mechanical Vibrations. Part III: Strength of Materials—Simple Stresses and Strains. Relations between Elastic Constants. Composite Bars and Temperature Stresses. Strain Energy—Impact Loading. Shear Force and Bending Moment Diagram. Deflection of Beams. Principal Stresses. Stresses in Thin Walled Pressure Vessels. Torsion of Shafts. Multiple-choice Questions. Index.

Latest Print 2009 / 596 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2611-8 / ₹ 395.00 / (e-book also available)

RAIKAR Elements of Civil Engineering and Engineering Mechanics

R.V. RAIKAR, *Professor of Civil Engineering, K.L.E. Society's College of Engineering and Technology, Belgaum, Karnataka.*

This book equips the students with the basic knowledge of certain facets of Civil Engineering and Engineering Mechanics as needed by them in the beginning of their engineering education. The book is primarily tailored to conform to the first-year B.Tech syllabus of Visvesvaraya Technological University (VTU). It will be useful for the students in other universities too.

The first part of the book discusses the fundamentals of civil engineering and the characteristics of some civil structures, such as buildings, roads, bridges, and dams. The second part deals with the topics of engineering mechanics that help in finding the solutions to problems of engineering. It deals with the systems of forces to which rigid bodies are subjected, centroids of plane figures, moment of inertia of some important geometrical figures, and the laws of friction. Worked-out examples, practice problems, and objective-type questions in each chapter are designed to reinforce the learning of the subject matter.

Contents: Preface. Part I: Elements of Civil Engineering—Introduction to Civil Engineering. Roads. Bridges and Dams. Part II: Engineering Mechanics—Engineering Mechanics. Composition of Coplanar Concurrent Force System. Composition of Coplanar Non-concurrent Force System. Centroid of Plane Figures. Equilibrium of Forces. Equilibrium of Coplanar Non-concurrent Force System. Friction. Moment of Inertia of an Area. Model Test Papers. Index.

Latest Print 2011 / 452 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4290-3 / ₹ 350.00 / (e-book also available)

RAO, et al. Engineering Mechanics: Statics and Dynamics

C. LAKSHMANA RAO, *is with the Department of Applied Mechanics and an Adjunct faculty in the Department of Civil Engineering, Indian Institute of Technology Madras.*

J. LAKSHMINARASIMHAN, *is with the Department of Applied Mechanics, IIT Madras.*

RAJU SETHURAMAN, *is with the Mechanical Engineering Department, IIT Madras.*

SRINIVASAN M. SIVAKUMAR, *is a faculty at the Departments of Applied Mechanics and an Adjunct faculty in the Department of Civil Engineering, IIT Madras.*

Designed as a text for the first-year undergraduate students of all branches of engineering for the core course on Engineering Mechanics, this concise and easy-to-read book deals with the principles of equilibrium of rigid bodies in static and dynamic conditions when they are subjected to mechanical loads.

Divided into two parts—*Statics* and *Dynamics*—the text analyzes the equilibrium of structures and the motion of rigid bodies, respectively. It is organized in a structured manner and stresses such important concepts/principles as degrees of freedom, the principle of virtual work (developing it from first principles), energy principles, and mechanical vibrations.

Profusely illustrated with clear-cut diagrams and numerous worked-out examples, the text would be ideal for a one-semester course on engineering mechanics. It can also be profitably used, by a judicious choice of topics, for advanced courses on the subject.

Contents: Preface. Part I: Statics—Equilibrium of Particles and Rigid Bodies. Equilibrium of Structural Systems. Energy Methods in Engineering Mechanics. Frictional Forces in Engineering Systems. Part II: Dynamics—Dynamics of Particles. Plane Kinematics of Rigid Bodies. Kinetics of Rigid Bodies. Mechanical Vibrations. Appendix. Answers to Problems. Bibliography. Index.

Latest Print 2010 / 256 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2189-2 / ₹ 225.00

SAWHNEY

Engineering Mechanics, 2nd ed.

G.S. SAWHNEY, *Professor and Head of the Department of Mechanical Engineering at Accurate Institute of Management and Technology, Greater Noida.*

This book, now in its second edition, is written for B.E./B.Tech. students of various technical universities to address the course curriculum in Engineering Mechanics. It is designed to meet the needs of the first-year undergraduate students of all branches of engineering. The text provides a sound understanding of the fundamentals of the subject in the areas of **mechanics** and **strength of materials**.

The book presents succinct coverage of the theory, definitions and formulae. It is well supported by plenty of clear-cut diagrams, suitable examples and worked problems in order to make the underlying principles comprehensive.

The thoroughly revised second edition includes:

- Topics on moment of inertia of semicircles and quarter circles, relative motion, angular motion of a rigid body, projectiles, impact and non-centroidal rotation.
- More solved problems culled from the latest university and competitive examination papers.

KEY FEATURES

- Presents an introduction to basic engineering mechanics topics required by all engineering students in their studies.
- Provides a large number of worked problems which help in understanding theory.
- Includes objective type questions with explanatory answers to help students in preparing for competitive examinations.

Contents: Preface. Force System and Analysis. Friction. Analysis of Beams. Trusses. Centroid and Moment of Inertia. Kinematics of Rigid Body. Kinetics of Rigid Body. Stress and Strain Analysis. Bending Stresses in Beams. Torsion. Bibliography. Index.

Latest Print 2014 / 632 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4125-8 / ₹ 395.00 / (e-book also available)

SHESHA PRAKASH & MOGAVEER Elements of Civil Engineering and Engineering Mechanics, 3rd ed. (with CD-ROM)

M.N. SHESHA PRAKASH, *Vice Principal and Professor of Civil Engineering, Vidya Vikas Institute of Engineering and Technology, Mysore.*

GANESH B. MOGAVEER, *Professor and Head of Civil Engineering Department, Mangalore Institute of Technology and Engineering, Moodabidri.*

This book, in its third edition, continues to focus on the basics of **civil engineering and engineering mechanics** to provide students with a balanced and cohesive study of the two areas (as needed by them in the beginning of their engineering education). A basic undergraduate textbook for the first-year students of all branches of engineering, this book is specifically designed to conform to the syllabus of Visvesvaraya Technological University (VTU).

Imparting the basic knowledge in various facets of civil engineering and the related engineering structures and infrastructure such as buildings, roads, highways, dams and bridges, the third edition covers the engineering mechanics portion in eleven chapters. Each chapter introduces the concepts to the reader, stepwise. Providing a wealth of practice examples, the book emphasizes the importance of building strong analytical skills. Practice problems, at the end of each chapter, give students an opportunity to absorb concepts and hone their problem-solving skills.

The book comes with a companion CD containing the software developed using MS-Excel, to work out the problems on Forces, Centroid, Friction and Moment of Inertia. The use of this software will enable the students to understand the concepts in a relatively better way.

NEW TO THIS EDITION

- Introduces a chapter on **Kinematics** as per the **revised Civil Engineering syllabus of VTU**
- Updates with the **latest examination Question Papers**, including the one held in the month of **December 2013**

Contents: Preface. Preface to the First Edition. Acknowledgements. Introduction to Civil Engineering. Introduction to Engineering Mechanics. Coplanar Concurrent Force System. Coplanar Non-concurrent Force System. Equilibrium of Coplanar Concurrent Force System. Equilibrium of Coplanar Non-concurrent Force System. Plane Trusses. Friction. Centroid of Plane Figures. Moment of Inertia. Kinematics. Annexures. Objective

Type Questions. Examination Papers of VTU. Solutions to the Examination Papers of VTU. Index.

Latest Print 2014 / 560 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-5001-4 / ₹ 395.00

Engineering Optimization

DEB

Optimization for Engineering Design: Algorithms and Examples, 2nd ed.

KALYANMOY DEB, *Department of Mechanical Engineering, Indian Institute of Technology Kanpur.*

This well-received book, now in its *second edition*, continues to provide a number of optimization algorithms which are commonly used in computer-aided engineering design. The book begins with simple single-variable optimization techniques, and then goes on to give unconstrained and constrained optimization techniques in a step-by-step format so that they can be coded in any user-specific computer language. In addition to classical optimization methods, the book also discusses Genetic Algorithms and Simulated Annealing, which are widely used in engineering design problems because of their ability to find global optimum solutions.

The second edition adds several new topics of optimization such as design and manufacturing, data fitting and regression, inverse problems, scheduling and routing, data mining, intelligent system design, Lagrangian duality theory, and quadratic programming and its extension to sequential quadratic programming. It also extensively revises the linear programming algorithms section in the Appendix. This edition also includes more number of exercise problems.

The book is suitable for senior undergraduate/postgraduate students of mechanical, production and chemical engineering. Students in other branches of engineering offering optimization courses as well as designers and decision-makers will also find the book useful.

KEY FEATURES

- Algorithms are presented in a step-by-step format to facilitate coding in a computer language.
- Sample computer programs in FORTRAN are appended for better comprehension.
- Worked-out examples are illustrated for easy understanding.
- The same example problems are solved with most algorithms for a comparative evaluation of the algorithms.

Contents: Preface. Preface to the First Edition. Introduction. Single-variable Optimization Algorithms. Multivariable Optimization Algorithms. Constrained Optimization Algorithms. Specialized Algorithms.

Nontraditional Optimization Algorithms. Appendix: Linear Programming Algorithms. Index.

Latest Print 2014 / 440 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-4678-9 / ₹ 350.00 / (e-book also available)

RAJU

Optimization Methods for Engineers

N.V.S. RAJU, *Professor and Head, Department of Mechanical Engineering, JNTUH College of Engineering, Nachupally-Kodagattu, Kodimial Mandal, Karimnagar, Andhra Pradesh.*

Primarily designed as a text for the postgraduate students of mechanical engineering and related branches, it provides an excellent introduction to optimization methods—the overview, the history, and the development. It is equally suitable for the undergraduate students for their electives. The text then moves on to familiarize the student with the formulation of optimization problems, graphical solutions, analytical methods of nonlinear optimization, classical optimization techniques, single variable (one-dimensional) unconstrained optimization, multidimensional problems, constrained optimization, equality and inequality constraints.

With complexities of human life, the importance of optimization techniques as a tool has increased manifold. The application of optimization techniques creates an efficient, effective and a better life.

FEATURES

- Includes numerous illustrations and unsolved problems.
- Contains university questions.
- Discusses the topics with step-by-step procedures.

Contents: Preface. Acknowledgements. Overview of Optimization Techniques. Formulation of Optimization Problems. Solutions by Graphical Methods for Optimization Problems. Nonlinear Programming Problems (Classical Optimization Techniques and Basic Concepts). Analytical One-dimensional (Single Variable) Unconstrained Optimization. Analytical Multidimensional (Multivariable) Unconstrained Optimization. Analytical Multidimensional Optimization with Equality Constraints. Analytical Multidimensional Optimization with Inequality Constraints. Numerical Methods for One-dimensional Nonlinear Programming. Numerical Methods for Unconstrained Optimization of Multivariate Nonlinear Programming Problem. Constrained Optimization Techniques for Nonlinear Programming Problems. Pivotal Reduction Method for Linear Programming Problems. Simplex Method for Linear Programming Problems. Regeneracy and Duality in Simplex. Dynamic Programming I. Dynamic Programming II. Simulation. Monte Carlo Simulation. Index.

Latest Print 2014 / 520 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4744-1 / ₹ 495.00

SPEYER & CHUNG

Stochastic Processes, Estimation, and Control

JASON L. SPEYER is a Distinguished Professor in the Mechanical and Aerospace Engineering Department and the Electrical Engineering Department at the University of California, Los Angeles.

WALTER H. CHUNG currently works in the aerospace industry.

Uncertainty and risk are integral to engineering because real systems have inherent ambiguities that arise naturally or due to our inability to model complex physics. In this book, the authors discuss probability theory, stochastic processes, estimation, and stochastic control strategies and show how probability can be used to model uncertainty in control and estimation problems. The material is practical and rich in research opportunities.

The book provides a comprehensive treatment of stochastic systems from the foundations of probability to stochastic optimal control. It covers discrete- and continuous-time stochastic dynamic systems leading to the derivation of the Kalman filter, its properties, and its relation to the frequency domain Wiener filter as well as the dynamic programming derivation of the linear quadratic Gaussian (LQG) and the linear exponential Gaussian (LEG) controllers and their relation to H_2 and H_∞ controllers and system robustness.

This book is divided into three related sections. First, the concepts of probability theory, random variables, and stochastic processes, which lead to the topics of expectation, conditional expectation, and discrete-time estimation and the Kalman filter, are dealt. After establishing this foundation, stochastic calculus and continuous-time estimation are introduced. Finally, dynamic programming for both discrete-time and continuous-time systems leads to the solution of optimal stochastic control problems, resulting in controllers with significant practical application.

The book is suitable for postgraduate students in electrical, mechanical, chemical, and aerospace engineering specializing in systems and control. Students in computer science, economics, and business management will also find it useful.

Contents: Preface. Probability Theory. Random Variables and Stochastic Processes. Conditional Expectations and Discrete-Time Kalman Filtering. Least Squares, the Orthogonal Projection Lemma, and Discrete-Time Kalman Filtering. Stochastic Processes and Stochastic Calculus. Continuous-Time Gauss-Markov Systems: Continuous-Time Kalman Filter, Stationarity, Power Spectral Density, and the Wiener Filter. The Extended Kalman Filter. A Selection of Results from Estimation Theory. Stochastic Control and the Linear Quadratic Gaussian Control Problem. Linear Exponential Gaussian and Estimation. Bibliography. Index.

Latest Print 2012 / 400 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4682-6 / ₹ 350.00

**SRINIVASA RAJU & NAGESH KUMAR
Multicriterion Analysis in Engineering and Management**

K. SRINIVASA RAJU, Associate Professor in the Department of Civil Engineering, Birla Institute of Technology and Science, Pilani, Hyderabad Campus, Hyderabad.

D. NAGESH KUMAR, Professor in the Department of Civil Engineering, Indian Institute of Science, Bangalore.

Multicriterion Decision-Making (MCDM) can be perceived as a process of evaluating real-world situations based on various qualitative/quantitative criteria in certain/uncertain/risky environments in order to find a suitable course of action/choice/strategy/policy among the several available options.

This book concentrates on the basic principles of multicriterion analysis and acquaints the reader with the recent trends in MCDM analysis. It explains the basics of Structured Decision-Making (SDM) and describes the various features of traditional optimization methods such as linear and non-linear programming, and dynamic programming, as well as non-traditional optimization methods such as genetic algorithms, differential evolution, and simulated annealing and quenching. The text elaborates the normalization methods, weight estimation methods and multiobjective optimization methods both in traditional and non-traditional environments. Classification approaches with cluster validation indices, discrete MCDM methods both in deterministic and fuzzy approach and group decision-making methods are discussed in detail. Advanced topics in decision-making such as data envelopment analysis, Taguchi methodology, ant colony optimization, and particle swarm optimization are also covered. In addition, the book includes many case studies for better comprehension of the procedures involved in the methods.

KEY FEATURES

- Introduces relevant software to keep the students updated and aware of its potentiality and applicability in multicriterion analysis.
- Includes a summary at the end of each chapter to facilitate quick revision of the key learning points.
- Provides a number of solved problems to enable students to acquire a clear understanding of the concepts and methods discussed.
- Offers several problems at the end of each chapter with answers to help students develop problem-solving skills.
- PowerPoint presentations for each chapter are available for instructors.

This book is designed for undergraduate and postgraduate courses in operations research, optimization, soft computing, fuzzy logic and other related courses in engineering and management programmes. It will also be useful to researchers and professionals working in the fields of operations research and management studies.

Contents: Foreword. Preface. Introduction. Single Objective Optimization. Estimation of Weights.

Multiobjective Optimization. Methods of Classification. Discrete Multicriterion Decision-Making. Fuzzy Logic-Based Discrete MCDM. Correlation Coefficients and Group Decision-Making. Advanced Topics of Decision-Making. Case Studies. Appendix. Bibliography. Index.

Latest Print 2014 / 280 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3976-7 / ₹ 325.00 / (e-book also available)

Engineering Practices/ Workshop Practice

JOHN

Mechanical Workshop Practice, 2nd ed.

K.C. JOHN, *Professor and Head, Department of Production Engineering, Vidya Academy of Science and Technology, Thalakkottukara, Thrissur, Kerala.*

Designed for the core course on Workshop Practice offered to all first-year diploma and degree level students of engineering, this book presents clear and concise explanation of the basic principles of manufacturing processes and equips students with overall knowledge of engineering materials, tools and equipment commonly used in the engineering field.

The book describes the general principles of different workshop processes such as primary and secondary shaping processes, metal joining methods, surface finishing and heat treatment. The workshop processes covered also include the hand-working processes such as benchwork, fitting, arc welding, sheet metal work, carpentry, blacksmithy and foundry. It also explains the importance of safety measures to be followed in workshop processes and details the procedure of writing the records of the practices. The tools and equipment used in each hand-working process are enumerated before elaborating the process. Finally, the book discusses the machining processes such as turning operations, the cutting tools and the tools used for measuring and marking, and explains the working principle of Engine Lathe. An appendix for advanced level practice and assessment of work has also been included.

New to This Edition

- A separate chapter on Plumbing as per the revised syllabus of Indian Universities
- Method for sketching isometric single line piping layout
- Neatly-drawn illustrations and examples on Plumbing

KEY FEATURES

- Follows the International Standard Organization (ISO) code of practice for drawings.
- Includes a large number of illustrations to explain the methods and processes discussed.
- Contains chapter-end questions for viva voce test and exercises for making models.

Contents: Preface. Module A: Introduction to Workshop Practice—Workshop Processes. Workshop Practice and Record Writing. Hand Working Processes. Fitting. Arc

Welding. Sheet Metal Work. Carpentry. Blacksmithy. Foundry. Plumbing. Module C: Machining Processes—Turning. Appendix. Suggested Reading. Index.

Latest Print 2013 / 244 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4166-1 / ₹ 195.00 / (e-book also available)

SUYAMBAZHAHAN

Engineering Practices, 2nd ed.

S. SUYAMBAZHAHAN, *Principal, S.A. Engineering College, Chennai.*

This book helps students acquire hands-on skills in the following areas of workshop practices:

- Plumbing and carpentry.
- Arc and gas welding, sheet metal work and machining operations.
- Smithy, foundry, machine assembly and fitting operations.
- Methods of household and industrial wiring, use of measuring instruments, identification of electronic components and devices, and the study of their characteristics through experimentation, soldering of electronic components, etc.

The book is intended for the first-year undergraduate engineering students of all disciplines.

KEY FEATURES

- Includes a large number of figures and examples for easy understanding of operations of tools and equipment.
- Offers viva questions with answers for practical examination.

Contents: Preface. Group A: Civil and Mechanical Engineering Practices—Plumbing. Carpentry. Welding. Basic Machining. Sheet Metal Work. Machine Assembly Practice. Smithy. Foundry. Fitting. Group B: Electrical and Electronics Engineering Practices—Electrical Engineering Practice. Electronics Engineering Practice. Viva Questions and Answers.

Latest Print 2013 / 372 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4509-6 / ₹ 295.00 / (e-book also available)

Ergonomics/ Human Factors Engineering

KHAN

Industrial Ergonomics

M.I. KHAN, *Professor and Head, Department of Mechanical Engineering and Dean, Faculty of Engineering at Integral University, Lucknow.*

Ergonomics (or human factors) as a discipline aims to design jobs, equipment and workplace to facilitate easy-to-use human-machine interfaces. This book presents the fundamental principles and practice of ergonomics in the industrial environment. It effectively covers the concepts,

basic human physiology and human capabilities, analyzing the design of the workplace with suitable examples.

The book explains muscular work and movements along with the relevant physiological principles. It describes practical guidelines for work layout and workplace design in relation to human body dimensions in order to optimize human well-being and working efficiency. Keeping in mind human capabilities and limitations to work efficiently and effectively, the book also discusses tools and techniques for skilled work, design principles of human-machine systems, and physiological and psychological effects of noise. In addition, it describes importance of indoor comfort and the various aspects of mental activity for maximum work efficiency.

This book is designed for undergraduate and postgraduate students of mechanical engineering, industrial engineering, and production and industrial engineering. It can also be useful to practising ergonomists as a ready reference.

Contents: Preface. Introduction. Human Body. Nervous System and Control of Movements. Working Efficiency. Anthropometry and Workplace Design. Heavy Work. Handling Loads. Skilled Work. Man-Machine Systems. Noise and Vibrations. Indoor Climate. Mental Activity. Index.

Latest Print 2014 / 144 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4084-8 / ₹ 150.00 / (e-book also available)

Finite Element Analysis

ALAVALA

Finite Element Methods: Basic Concepts and Applications

CHENNAKESAVA R. ALAVALA, *Professor, Department of Mechanical Engineering, Jawaharlal Nehru Technological University, Hyderabad.*

Finite Element Methods form an indispensable part of engineering analysis and design. The strength of FEM is the ease and elegance with which it handles the boundary conditions. This compact and well-organized text presents a comprehensive analysis of Finite Element Methods (FEM).

The book gives a clear picture of structural, torsion, free-vibration, heat transfer and fluid flow problems. It also provides detailed description of equations of equilibrium, stress-strain relations, interpolation functions and element design, symmetry and applications of FEM. The text is a synthesis of both the physical and the mathematical characteristics of finite element methods. A question bank at the end of each chapter comprises descriptive and objective type questions to drill the students in self-study.

KEY FEATURES

- Includes step-by-step procedure to solve typical problems using ANSYS® software.

- Gives numerical problems in SI units.
- Elaborates shaper functions for higher-order elements.
- Furnishes a large number of worked-out examples and solved problems.

This profusely illustrated, student-friendly text is intended primarily for undergraduate students of Mechanical/Production/Civil and Aeronautical Engineering. By a judicious selection of topics, it can also be profitably used by postgraduate students of these disciplines. In addition, practising engineers and scientists should find it very useful besides students preparing for competitive exams.

Contents: Preface. Acknowledgements. Introduction. Finite Element Modelling. One Dimensional Bar Elements. Plane Truss Elements. Plane Beam Elements. Plane Frame Elements. Plane Stress and Plane Strain Problems. Linear Triangular Elements. Isoparametrization Two Dimensional Elements. Numerical Integration. Axisymmetric Elements. Three Dimensional Stress Analysis. Free Vibration Analysis. Review Questions. Torsion Analysis. Heat Transfer Analysis. Fluid Flow Analysis. Error Analysis. Solution of FE Equations. Postprocessing. Appendix: Matrix Algebra. Bibliography. Index.

Latest Print 2014 / 408 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3584-4 / ₹ 325.00 / (e-book also available)

SESHU

Textbook of Finite Element Analysis

P. SESHU, *Associate Professor, Mechanical Engineering Department, IIT Bombay.*

This accessible, easy-to-read text presents finite element method (FEM) as a tool to find approximate solutions to differential equations rather than presenting it as a tool to solve structural mechanics problems alone. Such an approach provides the students a better perspective on the technique and its wide range of applications in engineering.

The text draws many worked-out examples from the field of structural mechanics, heat transfer and fluid flow, which illustrate the important concepts.

Illustrated primarily as a textbook for postgraduate/senior undergraduate students of mechanical, civil and aeronautical engineering for a one-semester course in FEM, the book would also be useful to the practising engineers in the industry.

Contents: Preface. Introduction. Finite Element Formulation Starting from Governing Differential Equations. Finite Element Formulation Based on Stationarity of a Functional. One-Dimensional Finite Element Analysis. Two-Dimensional Finite Element Analysis. Dynamic Analysis Using Finite Elements. Application Examples. Appendices—A: Suggested Mini-project Topics, B: Review of Preliminaries. C: Typical Finite Element Program. Index.

Latest Print 2014 / 340 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2315-5 / ₹ 295.00 / (e-book also available)

SRINIVAS, et al. Finite Element Analysis Using ANSYS® 11.0

PALETI SRINIVAS, *Associate Professor in the Department of Mechanical Engineering, GITAM Institute of Technology, GITAM University, Visakhapatnam.*

KRISHNA CHAITANYA SAMBANA, *Design Engineer and presently working in the Piping Engineering Department of Jacobs Engineering India Pvt. Ltd.*

RAJESH KUMAR DATTI *is presently working with the Engineering & Industrial Services division of TATA Consultancy Services Ltd.*

This book is designed for students pursuing a course on Finite Element Analysis (FEA)/Finite Element Methods (FEM) at undergraduate and postgraduate levels in the areas of mechanical, civil, and aerospace engineering and their related disciplines. It introduces the students to the implementation of finite element procedures using ANSYS® FEA software. The book focuses on analysis of **structural mechanics** problems and imparts a thorough understanding of the functioning of the software by making the students interact with several real-world problems. To this end:

- 38 problems have been solved thoroughly in ANSYS® Multiphysics™, two problems solved in ANSYS® Workbench™, and 12 problems solved using FEM.
- 135 problems have been given as exercises.

Besides students, the book will be also immensely useful as a reference to practising engineers and consultants.

Organized into eight chapters, the book begins with an introduction to the finite element method and discusses its application to solid and structural mechanics problems through simple examples. The readers are then exposed to the ANSYS® graphical user interface along with a general procedure for solving static structural problems. A generalized step-by-step procedure is presented throughout the book for analysis of trusses, beams, plane stress and plane strain analysis, axisymmetric and three-dimensional solids, etc. Finally, the book ends with an analysis of miscellaneous engineering problems using pipe, cable, link elements, etc., and also provides the procedure for the generation of engineering reports using ANSYS®.

Contents: Preface. Fundamental Concepts. ANSYS® Graphical User Interface. Analysis of Trusses. Analysis of Beams and Frames. Plane Stress and Plane Strain Analysis. Analysis of Axisymmetric Solids. Analysis of Three-Dimensional Solids. Miscellaneous Problems. Bibliography. Index.

Latest Print 2014 / 548 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4108-1 / ₹ 525.00 / (e-book also available)

Fluid Mechanics

BALACHANDRAN Engineering Fluid Mechanics

P. BALACHANDRAN, *Senior Scientist and a Divisional Head, Propulsion Research Division in LPSC—Indian Space Research Organisation (ISRO), Trivandrum.*

Engineering Fluid Mechanics provides the basic concept of fluids and fluid flow which is essential for almost all engineering disciplines. This comprehensive and systematically organized book presents a thorough, concise and accurate discussion of the fundamentals and principles in fluid mechanics. It analyses the problems involving fluid flow using simple mathematical formulations to help students follow the methodologies for future work.

Along with the fundamental principles, the book discusses in detail, the analysis of incompressible and compressible flows, dimensional analysis and similarity, measurements in fluid flow and hydraulic machinery.

The book is designed to serve as a textbook for undergraduate students of civil, mechanical, electrical and electronics, chemical and aeronautical engineering. The book will also be extremely useful for practising engineers.

KEY FEATURES

- Incorporates more than 275 illustrative examples
- Includes more than 500 simple diagrams illustrating basic principles and applications
- Review questions at the end of each chapter to drill students in self study
- Numerical problems and their answers to develop students' problem-solving approach

Contents: Preface. Fundamental Concepts and Fluid Properties. Analysis of Fluid at Rest. Kinematic Analysis of Fluid Flow. Dynamic Analysis of Flow. Analysis of Incompressible Flow. Analysis of Flow in Pipes, Ducts, Orifices and Mouth Pieces. Analysis of Flow in Open Channels. Analysis of Compressible Flow. Measurements in Fluid Mechanics. Dimensional Analysis and Model Studies. Basics of Hydro-Turbomachines. Hydraulic Turbines. Hydraulic Pumps. Index.

Latest Print 2014 / 872 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4072-5 / ₹ 495.00 / (e-book also available)

MAJUMDAR Fluid Mechanics (with Laboratory Manual)

BIRESWAR MAJUMDAR, *Professor, Department of Power Engineering, Jadavpur University, Kolkata.*

Primarily intended for the undergraduate students of mechanical engineering, civil engineering, chemical engineering and other branches of applied science, this book presents a comprehensive coverage of the basic laws of fluid mechanics. The text also discusses the solutions of fluid-flow problems that are modelled by

differential equations. Emphasis is placed on formulating and solving typical problems of engineering practice.

The text introduces the principle of fluid mechanics in a well organized manner, beginning with the simple and proceeding to the complex. The aim of laboratory manual at the end of chapters is to teach the students, how to conduct experiments in fluid mechanics. It provides the step-wise details of experiments which include objective, theory of the experiment, apparatus used in the experiment, procedure, observations, and graphs to be plotted. Chapter-end exercises enable the students to recapture the topics discussed and drill them in the theory. Finally, the worked-out examples with solutions are useful to readers in comprehending the problems discussed.

The book would also prove to be a useful ready reference for the first-level postgraduate student.

Contents: Preface. Introduction. Fluid Static. Fluid Kinematics. Inviscid Fluid Flow. Integral Analysis of Fluid Flow. Differential Analysis of Fluid Flow. Exact Solutions of Newtonian Fluid Flow. Low Reynolds Number Flow. Large Reynolds Number Flow. Transition and Turbulent Flows. Fundamentals of Compressible Fluid Flow. Dimensional Analysis and Similitude. Instrumentation and Measuring Techniques. CFD for Practical Flows. Fluid Energy Conversion System. Laboratory Manual. Index.

Latest Print 2010 / 512 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4034-3 / ₹ 325.00 / (e-book also available)

MOHANTY

Fluid Mechanics, 2nd ed.

A.K. MOHANTY, *formerly Professor and Principal, Regional Engineering College, Rourkela.*

In this second edition of *Fluid Mechanics*, which is a revised and substantially expanded version of the first edition, several new topics such as Open Channel Flow, Hydraulic Turbines, Hydraulic Transients, Flow Measurements, Pumps and Fans, and One-Dimensional Viscous Flow have been added.

After a comprehensive introduction, the book goes on to present a thorough analysis of such topics as fluid statics, fluid kinematics, analysis of finite control volumes and the mechanical energy equation. It also provides a comprehensive description of, among others, one-dimensional viscous flow, dimensional analysis, two-dimensional flow of ideal fluids, and normal and oblique shocks.

The summary and exercises provided at the end of each chapter enable the student to recapture the topics presented. The worked-out examples help the reader in comprehending the problems discussed. The book is a happy fusion of theory and applications and should prove to be an ideal text for undergraduate students of civil and mechanical engineering and as a ready reference for the first-level postgraduate students.

Contents: Preface. Preface to the First Edition. Introduction. Fluid Statics. Fluid Kinematics. Analysis of

Finite Control Volumes. Mechanical Energy Equation. One-Dimensional Viscous Flow. Dimensional Analysis. Two-Dimensional Flow of Ideal Fluids. Two-Dimensional Viscous Flow. Laminar Boundary Layers. Turbulent Flow. Introduction to Compressible Flows. One-Dimensional Compressible Flows. Normal and Oblique Shocks. Fluid Machines. Hydraulic Turbines. Pumps and Fans. Open Channel Flow. Hydraulic Transients. Flow Measurements. Appendix. Suggested Further Reading. Index.

Latest Print 2015 / 544 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-0894-7 / ₹ 350.00 / (e-book also available)

MUKHERJEE & PAUL

Fundamentals of Mechanical Sciences: Engineering Thermodynamics and Fluid Mechanics

SANCHAYAN MUKHERJEE, *Department of Mechanical Engineering, Kalyani Government College, Kalyani, West Bengal.*

AKSHOY RANJAN PAUL, *Department of Applied Mechanics, Motilal Nehru National Institute of Technology, Allahabad.*

The book is primarily intended for the first-year undergraduate students of all branches of engineering as per the course curriculum of the West Bengal University of Technology (WBUT). It is a comprehensive textbook on fundamental concepts of thermodynamics and fluid mechanics. It gives a detailed description of the theory along with the systematic applications of laws of thermodynamics and fluid mechanics to engineering problems. The text is amply illustrated with worked-out examples, tables and diagrams to enable the students to comprehend the subject with ease. It is designed to take students from an elementary level to a level of sound understanding required for the analysis of practical problems.

KEY FEATURES

- Deals with basic principles in a clear and easy-to-understand style.
- Provides plenty of solved problems in each chapter.
- Unsolved problems with hints and answers are included at the end of each chapter, to develop students' problem-solving skills.
- Multiple choice questions with answers are provided to help students assess their comprehension of the subject.
- To make the students familiar with the examination pattern, previous years' WBUT Examination Question Papers are given along with the solutions.

Contents: Preface. Part I: Engineering Thermodynamics—Introductory Concepts and Definitions. First Law of Thermodynamics. The Second Law of Thermodynamics—Entropy. Properties of a Pure Substance. Air Standard Cycles. Vapour and Combined Power Cycles. Part II: Engineering Fluid Mechanics—Introduction to Fluid Mechanics. Fluid Statics. Kinematics of Fluid. Dynamics of

Fluid Flow. Supplementary Reading: Basic Refrigeration Cycles. Multiple Choice Questions. Solved Test Papers of WBUT Examinations (2005 to 2008). Appendix. Bibliography. Index.

Latest Print 2009 / 304 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3756-5 / ₹ 225.00 / (e-book also available)

PAUL, MUKHERJEE & ROY Mechanical Sciences: Engineering Thermodynamics and Fluid Mechanics

AKSHOY RANJAN PAUL, *is with the Department of Mechanical Engineering, Kalyani Government Engineering College, Kalyani, West Bengal.*

SANCHAYAN MUKHERJEE, *is with the Department of Mechanical Engineering, Kalyani Government Engineering College, Kalyani, West Bengal.*

PIJUSH ROY, *is with the Department of Mechanical Engineering, College of Textile Technology, Serampore, West Bengal.*

Primarily intended for the first-year undergraduate students of various engineering disciplines, this comprehensive and up-to-date text also serves the needs of second-year undergraduate students (Mechanical, Civil, Aeronautical, Chemical, Production and Marine Engineering) studying Engineering Thermodynamics and Fluid Mechanics.

The whole text is divided into two parts and gives a detailed description of the theory along with the systematic applications of laws of Thermodynamics and Fluid Mechanics to engineering problems. Part I (Chapters 1–6) deals with the energy interaction between system and surroundings, while Part II (Chapters 7–15) covers the fluid flow phenomena. This accessible and comprehensive text is designed to take the student from an elementary level to a level of sophistication required for the analysis of practical problems.

KEY FEATURES

- More than 150 graded solved examples to foster understanding of theory.
- Multiple-choice questions to help students assess their comprehension of the topics.
- Unsolved problems with hints and answers to develop students' problem solving skills.

Contents: Foreword. Preface. Part I: Engineering Thermodynamics—Introductory Concepts and Definitions. First Law of Thermodynamics. The Second Law of Thermodynamics—Entropy and Availability. Properties of a Pure Substance. Gas Power Cycles. Vapour and Combined Power Cycles. Part II: Engineering Fluid Mechanics—Introduction to Fluid Mechanics. Fluid Statics. Kinematics of Fluid. Dynamics of Fluid Flow. Viscous Incompressible Flow. Viscous Flow Through Pipes. Dimensional Analysis and Similitude. Open Channel Flow. Compressible Flow. Multiple-choice Questions. Supplementary Reading. Appendix. Bibliography. Index.

Latest Print 2010 / 604 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2727-6 / ₹ 450.00 / (e-book also available)

PERSEN

Pragmatic Approach to Turbulence, A: A Short Course in Fluid Mechanics

LEIF N. PERSEN *is Professor Emeritus, Department of Energy and Process Engineering, Norwegian University of Science and Technology (NTNU), Trondheim, Norway.*

Intended for senior undergraduate students of mechanical, civil and aeronautical engineering and for postgraduate students of applied mathematics and physics for an advanced course in Fluid Mechanics focusing on the physics of turbulent fluid flow, this systematically organized text shows the fundamental difference between the conventional approach and the pragmatic approach discussed in the book. Professor Persen, with his wealth of experience and expertise, skilfully explains the concept of virtual velocities replacing the concept of Reynolds stresses.

In addition, the book analyzes, free jet flow and shows that the discrepancies that originate from the concept of Reynolds stresses are non-existent with the new interpretation of the fluctuation terms. Professor Persen also provides a detailed account of his own approach to the turbulent boundary layer problem as the approach, originally given along with the Reynolds stress concept, is even more representative of the reality with the introduction of the new concept of virtual velocities. Finally, the book demonstrates the possibility of finding the regions of similarity conditions in energy transfer in complex situations.

Illustrated with cases and large number of diagrams, the book emphasizes the importance of proper understanding of the physics of the flow based on logic and mathematical interpretation of experimental data.

Contents: Preface. Fundamental Equations Governing the Fluid Flow. Appendices—I: Basic Equations of Turbulent Flow. II: Closure Problem of Turbulent Flow. III: Free Turbulence. Turbulence Boundary Layer I (Flat Plate). IV: Turbulent Boundary Layer II. V: Analysis of Experimental Data. VI: Thermal Boundary Layer. VII: Fundamental Aspects of Thermal Jet. VIII. References. Index.

Latest Print 2015 / 280 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4092-3 / ₹ 250.00 / (e-book also available)

RATHAKRISHNAN

Fluid Mechanics: An Introduction, 3rd ed.

ETHIRAJAN RATHAKRISHNAN, *Professor of Aerospace Engineering at the Indian Institute of Technology Kanpur.*

The third edition of this easy-to-understand text continues to provide students with a sound understanding of the fundamental concepts of various physical phenomena of science of fluid mechanics. It adds a new chapter (Vortex Theory) which presents a vivid interpretation of vortex motions that are of fundamental importance in aerodynamics and in the performance of

many other engineering devices. It elaborately explains the dynamics of vortex motion with the help of Helmholtz's theorems and provides illustrations of how the manifestations of Helmholtz's theorems can be observed in daily life.

Several new problems along with answers are added at the end of Chapter 4 on Boundary Layer.

The book is suitable for a one-semester course in fluid mechanics for undergraduate students of mechanical, aerospace, civil and chemical engineering students.

A Solutions Manual containing solutions to end-of-chapter problems is available for use by instructors.

Contents: Preface. Preface to the Second Edition. Preface to the First Edition. Some Basic Facts about Fluid Mechanics. Fundamentals of Fluid Mechanics. Dimensional Analysis and Similarity. Boundary Layer. Vortex Theory. Bibliography. Index.

Latest Print 2013 / 336 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4593-5 / ₹ 275.00 / (e-book also available)

SINGH

Experiments in Fluid Mechanics, 2nd ed.

SARBJIT SINGH, *Associate Professor of Civil Engineering at the Thapar University, Patiala.*

This **Second Edition** contains 18 experiments in Fluid Mechanics, selected from the prescribed curriculum of various universities and institutes. The laboratory work in Fluid Mechanics is undertaken by the undergraduate engineering students of several branches such as civil, mechanical, production, aerospace, chemical, biotechnology, electrical (wherever prescribed), and instrumentation and control (wherever prescribed).

The first part of the book allows the students to review the fundamental theory before stepping into the laboratory environment. The second part enumerates the experimental set-ups, and provides a concluding discussion of each experiment. Appendix A gives various questions based on each experiment to test the student's understanding of the learned material. Appendix B gives data on physical properties of water, air and some commonly used fluids in the laboratory, and also lists other standard data to be used in various experiments.

Contents: Preface. Part I: Theory of Fluid Mechanics—Fluid Mechanics: An Introduction. Part II: Experiments—1. Flow Through a Variable Duct Area—Bernoulli's. 2. Calibration of Venturimeter. 3. Calibration of Orificemeter. 4. Determination of Friction Factor for Pipes of Different Materials. 5. Determination of Loss coefficients for Pipe Fittings. 6. Verification of Momentum Equation. 7. Calibration of V-notch. 8. Determination of Hydrostatic Force on a Vertically Submerged Surface. 9. Determination of Hydraulic Coefficients of Orifice. 10. Determination of Coefficient of Discharge of Circular Orifice Using Variable Head Method. 11. Determination of Metacentric Height. 12. Drawing of Flow Net: Hele-Shaw Method and Electrical Analogy

Method. 13. Calibration of Rotameter. 14. Transition of Flow—Reynolds Experiment. 15. Free Vortex Flow. 16. Forced Vortex Flow. 17. Centrifugal Pump Test Rig. 18. Flow in a Pipe Bend. Appendix A. Appendix B.

Latest Print 2014 / 156 pp. / 21.6 × 27.8 cm

ISBN-978-81-203-4511-9 / ₹ 225.00 / (e-book also available)

Fluid Mechanics and Hydraulic Machines

DAS

Fluid Mechanics and Turbomachines

MADAN MOHAN DAS, *formerly Professor, Civil Engineering Department, Assam Engineering College, Guwahati. An Emeritus Fellow of AICTE, Director of Technical Education, Government of Assam.*

Primarily designed as a text for the undergraduate students of aeronautical engineering, mechanical engineering, civil engineering, chemical engineering and other branches of applied science, this book provides a basic platform in fluid mechanics and turbomachines.

The book begins with a description of the fundamental concepts of fluid mechanics such as fluid properties, its static and dynamic pressures, buoyancy and floatation, and flow through pipes, orifices, mouthpieces, notches and weirs. Then, it introduces more complex topics like laminar flow and its application, turbulent flow, compressible flow, dimensional analysis and model investigations. Finally, the text elaborates on impact of jets and turbomachines like turbines, pumps and miscellaneous fluid machines.

KEY FEATURES

- Comprises twenty four methods of flow measurements.
- Presents derivations of equations in an easy-to-understand manner.
- Contains numerous solved numerical problems in S.I. units.
- Includes unsteady equations of continuity and dynamic equation of gradually varied flow in open channel.

Contents: Preface. Fluid Properties. Fluid Pressure and Its Measurement. Hydrostatic Forces on Surfaces. Buoyancy and Floatation. Kinematics of Fluid Flow. Dynamics of Fluid Flow. Flow Through Pipes. Flow Through Orifices and Mouthpieces. Flow Over Notches and Weirs. Open Channel Flow. Laminar Flow. Turbulent Flow. Boundary Layer in Incompressible Flow. Dimensional Analysis and Model Investigation. Compressible Flow. Flow of Fluid Around Submerged Objects. Impact of Jets. Turbomachines: Hydraulic Turbines. Centrifugal Pumps. Reciprocating Pumps. Miscellaneous Fluid Machines. Discharge Measurements: Principles, Techniques and Instruments. Index.

Latest Print 2014 / 556 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3523-3 / ₹ 450.00 / (e-book also available)

SAWHNEY

Thermal and Hydraulic Machines, 2nd ed.

G.S. SAWHNEY, *Professor and Head of the Department of Mechanical Engineering at Accurate Institute of Management and Technology, Greater Noida.*

The second edition of this well-received book, continues to present the operating principles and working aspects of thermal and hydraulic machines. First, it covers the laws and the essential principles of thermodynamics that form the basis on which thermal machines operate. It subsequently presents the principles, construction details and the methods of control of hydraulic and thermal machines.

The coverage of thermal machines includes steam turbines, gas turbines, IC engines, and reciprocating and centrifugal compressors. The coverage of hydraulic machines includes hydraulic turbines, reciprocating pumps and centrifugal pumps. The classification, construction and efficiency of these machines have been discussed with plenty of diagrams and worked problems. This will help the readers understand easily the underlying principles. This new edition includes substantially updated chapters and also introduces additional text as per the syllabus requirement.

The book is intended for the undergraduate engineering students pursuing courses in mechanical, electrical and civil branches.

KEY FEATURES

- Provides succinct coverage of all operating aspects of thermal and hydraulic machines.
- Includes a large number of worked problems at the end of each chapter to help students achieve a sound understanding of the subject matter.
- Gives objective type questions with explanatory answers to assist students in preparing for competitive examinations.

Contents: Preface. Preface to the First Edition. Basic Concepts and Zeroth Law of Thermodynamics. First Law of Thermodynamics. Second Law of Thermodynamics. Properties of Steam and Thermodynamics. Vapour Cycles. Thermodynamic Cycles. Steam Turbine. Gas Turbine. Compressor. Impact of Jet. Hydraulic Turbines. Centrifugal Pumps. Reciprocating Pumps. Bibliography. Index.

Latest Print 2014 / 588 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4473-0 / ₹ 495.00 / (e-book also available)

SHESHA PRAKASH

Experiments in Hydraulics and Hydraulic Machines: Theory and Procedures (with CD-ROM)

M.N. SHESHA PRAKASH, *Professor in the Department of Civil Engineering, and Vice Principal, Vidya Vikas Institute of Engineering and Technology, Mysore.*

Primarily intended for the Civil engineering students of all

universities, this laboratory manual can be equally useful for the students of mechanical engineering as well. The manual comprises Flow side experiments (Experiment 1–Experiment 11) and Machine experiments (Experiment 12–Experiment 17).

Written in a very easy-to-understand language, each experiment of the book is arranged in step-by-step procedures, with adequate theory, and detailed apparatus and calculations needed to conduct it in a lab.

KEY FEATURES

- A record book comprising Tabular column and specimen calculations so that students can enter the values and compute the results directly on it.
- Students can plot the curve in the Graph sheets provided then and there as per the requirement or explanation.
- Viva Voce Questions (with Answers) are provided at the end of the book.

Contents: Preface. Acknowledgements. Introduction. **Experiments**—Calibration of Collecting Tank (Gravimetric and Volumetric Method). Calibration of Pressure Gauges (Dead Weight Method). Flow Through a Variable Area Duct. Calibration of Notches. Calibration of Weirs. Calibration of Venturiflume. Calibration of Venturimeter. Calibration of a Rotameter. Determination of Friction Factor in Pipes. Hydraulic Coefficient of an Orifice. Impact of Jet on Vanes. Performance Test on Centrifugal Pump. Determination of Minor Losses in Pipes due to Sudden Enlargement and Sudden Contraction. Performance Test on Reciprocating Pump. Performance Test on Pelton Wheel. Performance Test on Francis Turbine. Performance Test on Kaplan Turbine. Characteristic Curves of a Turbine. Viva-Voce Questions and Answers.

Latest Print 2011 / 152 pp. / 21.6 × 27.8 cm

ISBN-978-81-203-4184-5 / ₹ 195.00 / (e-book also available)

Fluid Power Engineering

ILANGO & SOUNDARARAJAN

Introduction to Hydraulics and Pneumatics, 2nd ed. (with CD-ROM)

S. ILANGO, *Senior Lecturer, Department of Mechanical and Industrial Engineering, Caledonian College of Engineering, Sultanate of Oman.*

V. SOUNDARARAJAN, *Principal, VLB Janakiammal College of Engineering and Technology, Coimbatore.*

This introductory textbook is designed for undergraduate courses in Hydraulics and Pneumatics/Fluid Power/Oil Hydraulics taught in Mechanical, Industrial and Mechatronics branches of Engineering disciplines. Besides focusing on the fundamentals, the book is a basic, practical guide that reflects field practices in design, operation and maintenance of fluid power systems—making it a useful reference for practising engineers specializing in the area of fluid power technology.

With the trends in industrial production, fluid power components have also undergone modifications in designs. To keep up with these changes, additional information and materials on proportional solenoids have been included in the second edition. It also updates drawings/circuits in the pneumatic section. Besides, the second edition includes a CD-ROM that acquaints the readers with the engineering specifications of several pumps and valves being manufactured by industry.

KEY FEATURES

- Gives step-by-step methods of designing hydraulic and pneumatic circuits.
- Provides simple and logical explanation of programmable logic controllers used in hydraulic and pneumatic circuits.
- Explains applications of hydraulic circuits in machine tool industry.
- Elaborates on practical problems in a chapter on troubleshooting.
- Chapter-end review questions help students understand the fundamental principles and practical techniques for obtaining solutions.

Contents: Preface. Abbreviations. Part I: Hydraulics—Fluid Power Systems and Fundamentals. Basics of Hydraulics. Hydraulic Systems and Components. Fluid Power Actuators. Hydraulic Elements in the Design of Circuits-I. Hydraulic Elements in the Design of Circuits-II. Accumulators and Intensifiers. Design of Hydraulic Circuits. Drawing of Hydraulic Circuits. Fluid Power in Machine Tools and Other Equipment. Part II: Pneumatics: Pneumatic Systems—Concepts and Components. Design of Pneumatic Circuits-I. Design of Pneumatic Circuits-II. Multicylinder Pneumatic Circuits. Electropneumatics. Part III: Applications of Hydraulics and Pneumatics—Servo System. PLC Applications in Fluid Power. Failure and Troubleshooting in Fluid Power Systems. Part IV: Appendices—Terminologies Used in Fluid Power. Hydraulic Symbols. Useful Data and Units. Multiples and Submultiples. Hydraulic Fluid Characteristics. Standard and Popular Bore and Rod Diameters of Hydraulic Cylinders. Popular Symbols Used in Pneumatic Circuits. Solutions to Selected Pneumatic/Electropneumatic Circuit Problems. Bibliography. Index.

Latest Print 2011 / 320 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4406-8 / ₹ 295.00 / (e-book also available)

Gas Dynamics

BALACHANDRAN Fundamentals of Compressible Fluid Dynamics

P. BALACHANDRAN, *Senior Scientist and a Divisional Head, Propulsion Research Division in LPSC—Indian Space Research Organisation (ISRO), Trivandrum.*

Compressible Fluid Dynamics (or Gas Dynamics) has a wide range of applications in Mechanical, Aeronautical

and Chemical Engineering. It plays a significant role in the design and development of compressors, turbines, missiles, rockets and aircrafts. This comprehensive and systematically organized book gives a clear analysis of the fundamental principles of Compressible Fluid Dynamics. It discusses in rich detail such topics as isentropic, Fanno, Rayleigh, simple and generalised one dimensional flows. Besides, it covers topics such as conservation laws for compressible flow, normal and oblique shock waves and measurement in compressible flow. Finally, the book concludes with detailed discussions on propulsive devices.

The text is amply illustrated with worked-out examples, tables and diagrams to enable the students to comprehend the subject with ease.

Intended as a text for undergraduate students of Mechanical, Aeronautical and Chemical Engineering, the book would also be extremely useful for practising engineers.

KEY FEATURES

- The basic principles are dealt with in a clear and easy-to-understand style.
- Review questions are given at the end of each chapter to drill the students in self study.
- Problems with hints have been provided to develop the students' problem solving skills.

Contents: Preface. Fundamental Principles. Conservation Laws for Compressible Flow. Concepts of Compressible Flow. Isentropic Flow. Fanno Flow. Rayleigh Flow. Simple Flow with Mass Addition. Generalised One-Dimensional Flow. Normal Shock Waves. Oblique Shock Waves. Flow through Nozzles and Diffuser. Measurement in Compressible Flow. Air Breathing Propulsion. Rocket Propulsion. Appendices. Index.

Latest Print 2014 / 596 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2857-0 / ₹ 475.00 / (e-book also available)

BALACHANDRAN Gas Dynamics for Engineers

P. BALACHANDRAN, *Senior Scientist and a Divisional Head, Propulsion Research Division in LPSC—Indian Space Research Organisation (ISRO), Trivandrum.*

Intended as a textbook for undergraduate students of aerospace/mechanical engineering and as a reference book for practising engineers, this book provides the most readable approach to the study of gas dynamics with emphasis on the fundamental concepts that help readers develop a strong conceptual base.

This concise and well-organised text covers a wide range of interesting topics such as isentropic flow, Fanno flow, Rayleigh flow, simple flow with mass addition, waves in supersonic flow and measurement techniques in gas dynamics. The topics are dealt with in a carefully designed sequence with proper explanations along with simple mathematical formulations.

KEY FEATURES

- Explains the fundamentals through extensive use of line drawings.
- Contains a large number of solved illustrative examples to help students comprehend the concepts with ease.
- Includes review questions to test students comprehension of the subject.
- Provides answers to unsolved problems.
- Presents flow tables in appendices.

Contents: Preface. Basic Laws and Concepts. Isentropic Flow. Fanno Flow. Rayleigh Flow. Simple Flow with Mass Addition. Normal Shock Waves. Oblique Shock Waves. Flow Through Nozzles and Diffusers. Measurements in Compressible Flow. Appendices—A1: Isentropic Flow Table ($\gamma = 1.4$). A2: Fanno Flow Table ($\gamma = 1.4$). A3: Isothermal Flow Table ($\gamma = 1.4$). A4: Rayleigh Flow Table ($\gamma = 1.4$). A5: Simple Mass Addition Table ($\gamma = 1.4$). A6: Normal Shock Table ($\gamma = 1.4$). A7: Prandtl-Meyer Flow Table ($\gamma = 1.4$). Index.

Latest Print 2015 / 320 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4021-3 / ₹ 295.00 / (e-book also available)

BALACHANDRAN**Gas Tables for Steady One-dimensional Flow of Perfect Gas**

P. BALACHANDRAN, *Senior Scientist and a Divisional Head, Propulsion Research Division in LPSC—Indian Space Research Organisation (ISRO), Trivandrum.*

This data book on gas tables covers the subject matter in eleven well organized chapters supported with a number of graphical depictions. It contains tabulated values of parameters obtained by solving one-dimensional equations of compressible fluid flow. It is useful as a reference data book for solving problems in compressible fluid dynamics or gas dynamics and propulsion engineering. This book is designed for use by the students and professionals engaged in the fields of mechanical, aerospace and chemical engineering.

KEY FEATURES

- Contains tabulated values and charts of compressible flow functions.
- Equations used in preparing the tables are presented separately.
- Separate table for standard atmosphere is given.

The present book can be used as a reference data table for university examinations.

Contents: Preface. Nomenclature. Equations Used for Preparing Tables. Isentropic Flow Chart and Tables. Fanno Flow Chart and Tables. Isothermal Flow Chart and Tables. Rayleigh Flow Chart and Tables. Simple Mass Addition Chart and Tables. Normal Shock Chart and Tables. Oblique Shock Charts and Tables. Prandtl-Meyer Flow Chart and Tables. Table of Standard Atmosphere. Table of Influence Coefficients. Index.

Latest Print 2014 / 64 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4008-4 / ₹ 75.00 / (e-book also available)

RATHAKRISHNAN**Gas Dynamics, 5th ed.**

ETHIRAJAN RATHAKRISHNAN, *Professor of Aerospace Engineering at the Indian Institute of Technology Kanpur.*

This revised and updated fifth edition continues to provide the most accessible and readable approach to the study of all the vital topics and issues associated with gas dynamic processes. At every stage, the physics governing the process, its applications and limitations are discussed in depth.

With a strong emphasis on the basic concepts and problem-solving skills, this text is suitable for a course on Gas Dynamics/Compressible Flows/High-speed Aerodynamics at both undergraduate and postgraduate levels in aerospace engineering, mechanical engineering, chemical engineering and applied physics. The elegant and concise style of the book, along with illustrations and worked examples, makes it eminently suitable for self-study by scientists and engineers working in the field of gas dynamics in industries and research laboratories.

In this edition, several new solved examples on stationary and moving shocks have been introduced. Besides, the book contains an example that highlights the application of shock-expansion theory and thin aerofoil theory. New problems have been added in a number of chapters to help students practice application of the theory studied. The computer program to calculate the coordinates of contoured nozzle, with the method of characteristics, has been given in C-language. The program listing along with a sample output is given in the Appendix.

Some of the Distinguishing Features of the Book

- Concise coverage of the thermodynamic concepts to serve as a revision of the background material.
- Logical and systematic treatment of fundamental aspects of gas dynamics, waves in the supersonic regime and gas dynamic processes.
- In-depth presentation of potential equations for compressible flows, similarity rule and two-dimensional compressible flows.
- Introduction to measurements in compressible flows and optical flow visualization techniques.
- Introduction to rarefied gas dynamics and high-temperature gas dynamics.
- Solution Manual for instructors containing the complete worked-out solutions to chapter-end problems.

Contents: Preface. Preface to the Third Edition. Preface to the Second Edition. Preface to the First Edition. Some Preliminary Thoughts. Basic Equations of Compressible Flow. Wave Propagation. Steady One-Dimensional Flow. Normal Shock Waves. Oblique Shock and Expansion Waves. Potential Equation for Compressible Flow. Similarity Rule. Two-Dimensional Compressible Flows. Prandtl-Meyer Flow. Flow with Friction and Heat Transfer. Method of Characteristics. Measurements in Compressible Flow. Rarefied Gas Dynamics. High Temperature Gas Dynamics. Appendices—A: Table-A1:

Isentropic Flow of Perfect Gas ($\gamma = 1.4$). A2: Normal Shock in Perfect Gas ($\gamma = 1.4$). A3: Oblique Shock in Perfect Gas ($\gamma = 1.4$). A4: One-Dimensional Flow with Friction ($\gamma = 1.4$). A5: One-Dimensional Frictionless Flow with Change in Stagnation Temperature ($\gamma = 1.4$). B: Listing of the Method of Characteristics Program. C: Output for Mach 2.0 Nozzle Contour. D: Oblique Shock Chart I, Oblique Shock Chart II. Selected References. Index.

Latest Print 2013 / 548 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-4839-4 / ₹ 475.00 / (e-book also available)

Heat Transfer and Mass Transfer

ANANTHARAMAN & SHERIFFA BEGUM Mass Transfer: Theory and Practice

N. ANANTHARAMAN, *Professor in the Department of Chemical Engineering, National Institute of Technology, Tiruchirappalli.*

K.M. MEERA SHERIFFA BEGUM, *Associate Professor in the Department of Chemical Engineering, National Institute of Technology, Tiruchirappalli.*

Mass transfer operations are of great importance in a process industry as it has a direct impact on the cost of the final product. A chemical/process engineer therefore should have sound knowledge of the basics of mass transfer and its applications. This book is designed to equip the reader with sufficient knowledge of mass transfer operations and face the challenges ahead.

The objective of this textbook is to teach a budding chemical engineer the principles involved in analyzing a process and apply the desired mass transfer operation to separate the components involved. It deals with operations involving diffusion, interphase mass transfer, humidification, drying, crystallization, absorption, distillation, extraction, leaching and adsorption. The principles and equipment used for different mass transfer operations have been lucidly explained.

Designed for a two-semester course, this text is primarily intended for the undergraduate students of chemical, pharmaceutical, petrochemical engineering as well as biotechnology and industrial biotechnology. It will also be useful to plant engineers and design professionals.

KEY FEATURES

1. Explains the theoretical concepts with full derivation of equations.
2. Illustrates the application of theory through worked-out numerical examples.
3. Provides exercise problems with answers at the end of each chapter for practice.

Contents: Foreword. Preface. Acknowledgements. Introduction to Mass Transfer. Diffusion. Mass Transfer Coefficient and Interphase Mass Transfer. Equipments for

Gas—Liquid Operating. Humidification. Drying. Crystallization. Absorption. Distillation. Extraction. Leaching. Adsorption. Appendix. Index.

Latest Print 2013 / 440 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-4169-2 / ₹ 375.00 / (e-book also available)

DUTTA

Heat Transfer: Principles and Applications

BINAY K. DUTTA, *Ex-Chairman, West Bengal Pollution Control Board, Kolkata.*

This textbook is intended for courses in heat transfer for undergraduates, not only in chemical engineering and related disciplines of biochemical engineering and chemical technology, but also in mechanical engineering and production engineering. The author provides the reader with a very thorough account of the fundamental principles and their applications to engineering practice, including a survey of the recent developments in heat transfer equipment.

The three basic modes of heat transfer—conduction, convection and radiation—have been comprehensively analyzed and elucidated by solving a wide range of practical and design-oriented problems. A whole chapter has been devoted to explain the concept of the heat transfer coefficient to give a feel of its importance in tackling problems of convective heat transfer. The use of the important heat transfer correlations has been illustrated with carefully selected examples.

A collection of short questions at the end of chapters allows students to measure their learning. The exercise problems relate to various industrial processes and have been carefully designed to offer challenge and stimulus to the students.

Contents: Preface. Notations. Introduction. Steady State Conduction in One Dimension. Heat Transfer Coefficient. Forced Convection. Free Convection. Boiling and Condensation. Radiation Heat Transfer. Heat Exchangers. Evaporation and Evaporators. Unsteady State and Multidimensional Heat Conduction. Boundary Layer Heat Transfer. Answers to Selected Problems. Index.

Latest Print 2015 / 544 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-1625-6 / ₹ 350.00

DUTTA

Principles of Mass Transfer and Separation Processes

BINAY K. DUTTA, *Ex-Chairman, West Bengal Pollution Control Board, Kolkata.*

This book is a comprehensive introduction to the principles of mass transfer and their applications to major separation processes. Presenting sufficient theory and design fundamentals to ensure a sound understanding of

basic concepts, this clearly written and well-organized text is suitable for courses in Mass Transfer, Separation Processes, Transport Processes, and Unit Operations offered to undergraduate students in chemical engineering. It will also be useful to postgraduate students of chemical engineering, students of allied disciplines, and practising engineers.

Progressive in approach, the phenomenon of diffusion and the concept of mass transfer coefficient have been elucidated by drawing numerous examples from diverse areas. Separation processes relevant to chemical and allied industries have been discussed in considerable depth, and the design methodologies have been illustrated. Adequate emphasis has been placed on practical applications. Details of construction and operation of various separation equipment including recent developments have been explained.

The book has about one hundred and fifty solved problems and over three hundred exercise problems, many of which directly pertain to process industries. In addition, over five hundred short and multiple choice questions have been designed to stimulate students' understanding.

KEY FEATURES

- Provides balanced coverage of the theoretical principles and applications.
- Includes important recent developments in mass transfer equipment and practice.
- Emphasizes strong problem solving skills.
- Chapter-end problems have been superscripted 1, 2 or 3 to represent various levels of difficulty.
- Contains answers/hints to short questions, multiple choice questions and selected problems.

Solutions Manual containing the complete worked-out solutions to problems is available for instructors.

Contents: Preface. Introduction. Molecular Diffusion. Convective Mass Transfer and Mass Transfer Coefficient. Interphase Mass Transfer. Gas-Liquid Contacting Equipment. Gas Absorption and Stripping. Distillation. Liquid-Liquid Extraction. Solid-Liquid Extraction. Humidification and Water Cooling. Drying of Wet Solids. Adsorption. Crystallization. Membrane Separation. Multicomponent Distillation. Transient Diffusion and Mass Transfer with Chemical Reaction. Appendix. Answers/Hints to Selected Questions and Problems. Index.

Latest Print 2015 / 960 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2990-4 / ₹ 550.00 / (e-book also available)

SHARMA

Principles of Mass Transfer

KAL RENGANATHAN SHARMA, *Professor at School of Chemical and Biotechnology, Shanmugha Arts Science Technology & Research Academy, Sastra University, Tamil Nadu.*

This book addresses the specific needs of undergraduate chemical engineering students for the two courses in

Mass Transfer I and Mass Transfer II. It is also suitable for a course in Downstream Processing for biotechnology students.

This self-contained textbook is designed to provide single-volume coverage of the full spectrum of techniques for chemical separations. The operations covered include vapour distillation, fluid adsorption, gas absorption, liquid extraction, solid leaching, gas humidification, solid drying, foam separation, solution crystallization, metal alloying, reverse osmosis, molecular sieves, electro dialysis, and ion exchange.

The text also discusses emerging applications such as drug delivery, gel electrophoresis, bleaching, membrane separations, polymer devolatilization, solution crystallization, and gas chromatography.

Equipment selection is discussed for different operations. A table of industrial applications for each and every mass transfer unit operation is provided. The worked examples illustrate problems from chemical process and biotechnology industries. Review questions encourage critical thinking, and end-of-chapter problems emphasize grasping of the fundamentals as well as illustrate applications of theory to a wide variety of scenarios.

KEY FEATURES

- Includes several case studies ranging from manufacture of vitamin C, prilling tower to granulate urea to vanaspati discolouration and wilting of the lettuce.
- Introduces generalized Fick's law of diffusion.
- Discusses hollow fibre mass exchangers.
- Introduces new concepts such as cosolvent factor, Z step procedure for multistage cross-current extraction.

Contents: Preface. Fick's Laws of Diffusion. Generalized Fick's Laws of Diffusion. Mass Transfer Coefficients. Distillation. Adsorption, Chromatography and Ion Exchange. Reverse Osmosis, Molecular Sieves and Electro dialysis. Gas Humidification and Solid Drying. Liquid Extraction and Solid Leaching. Gas Absorption, Foam Separation and Solution Stripping. Solution Crystallisation and Metal Alloying. Emerging Applications in Mass Transfer. Appendix A. Appendix B. Index.

Latest Print 2007 / 452 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3142-6 / ₹ 295.00

SINHA & DE

Mass Transfer: Principles and Operations

Late A.P. SINHA served as Dean, Faculty of Engineering, Burdwan University, West Bengal.

PARAMESWAR DE, *Professor in the Department of Chemical Engineering at the University of Calcutta.*

This book introduces the fundamental principles of the mass transfer phenomenon and its diverse applications in process industry. It covers the full spectrum of techniques for chemical separations and extraction.

Beginning with molecular diffusion in gases, liquids and solids within a single phase, the mechanism of inter-phase mass transfer is explained with the help of several

theories. The separation operations are explained comprehensively in two distinct ways—stage-wise contact and continuous differential contact. The primary design requirements of gas–liquid equipment are discussed.

The book provides a detailed discussion on all individual gas–liquid, liquid–liquid, solid–gas, and solid–liquid separation processes. The students are also exposed to the underlying principles of the membrane-based separation processes.

The book is replete with real applications of separation processes and equipment. Problems are worked out in each chapter. Besides, problems with answers, short questions, multiple choice questions with answers are given at the end of each chapter.

The text is intended for a course on mass transfer, transport and separation processes prescribed for the undergraduate and postgraduate students of chemical engineering.

Contents: Preface. Introduction. Diffusion. Mass Transfer Coefficients and Analogy Equations. Interphase Mass Transfer. Methods of Operation and Computation. Equipment for Gas–Liquid Contact. Gas Absorption. Distillation. Humidification Operations. Liquid–Liquid Extraction. Leaching. Drying. Crystallization. Adsorption and Chromatography. Membrane Separation. Index.

Latest Print 2012 / 616 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4541-6 / ₹ 450.00 / (e-book also available)

SOM

Introduction to Heat Transfer

S.K. SOM, *Professor (Mechanical Engineering) and Head of the Department, Mechanical Engineering, Indian Institute of Technology Kharagpur.*

This comprehensive easy-to-read text covers the essential fundamentals of heat and mass transfer phenomena, balancing the theoretical content with practical engineering applications. It presents appropriate problem-solving methodologies and numerous worked examples which help students to understand the relationship of heat and mass transfer to the disciplines of thermodynamics and fluid mechanics.

The book is appropriate for heat and mass transfer courses conducted for undergraduate students in mechanical engineering.

SALIENT FEATURES

- Presents the different methods of solution of one-dimensional and multidimensional heat conduction problems.
- Presents analytical solutions to the problems of transient heat flow.
- Discusses different theories and their mathematical background related to forced convection heat transfer in external and internal flows.
- Analyses free convection problems.
- Discusses heat transfer processes in condensation and boiling under different situations.

- Explains the basic mechanisms of radiation energy transfer.
- Develops mathematical formulations to obtain the solution to simple mass transfer problems.
- End-of-chapter Review Questions and Problems for self-assessment.

Contents: Preface. Fundamental Concepts. One-dimensional Steady-state Heat Conduction. Multi-dimensional Steady-state Heat Conduction. Unsteady Conduction. Introduction to Convection. A Brief Review of Incompressible Viscous Flow. Principles of Forced Convection. Principles of Free Convection. Heat Transfer in Condensation and Boiling. Principles of Heat Exchangers. Radiation Heat Transfer. Principles of Mass Transfer. Index.

Latest Print 2013 / 572 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3060-3 / ₹ 495.00 / (e-book also available)

VENKANNA

Fundamentals of Heat and Mass Transfer

B.K. VENKANNA, *Professor of Mechanical Engineering at Basaveshwar Engineering College, Bagalkot, Karnataka.*

This comprehensive text on the basics of heat and mass transfer provides a well-balanced treatment of theory and mathematical and empirical methods used for solving a variety of engineering problems. The book helps students develop an intuitive and practical understanding of the processes by emphasizing the underlying physical phenomena involved.

Focusing on the requirement to clearly explain the essential fundamentals and impart the art of problem-solving, the text is written to meet the needs of undergraduate students in mechanical engineering, production engineering, industrial engineering, automobile engineering, aeronautical engineering, chemical engineering, and biotechnology.

KEY FEATURES

- Covers the theoretical material systematically and in a step-by-step approach.
- Focuses on problem-solving techniques.
- Provides an excellent selection of more than 300 graded solved examples to foster understanding of the theory.
- Gives over 100 chapter-end problems, useful for self-assessment.
- Summarizes the important equations at the end of each chapter.

Contents: Preface. Acknowledgements. Introductory Concepts and Definitions. Conduction: Basic Equations. One-Dimensional Steady State Conduction. One-dimensional Transient Conduction. Convection Concepts and Basic Relations in Boundary Layers. Forced Convection. Free Convection. Condensation and Boiling. Heat Exchangers. Radiation Heat Transfer. Mass Transfer. Model Question Papers. Index.

Latest Print 2014 / 508 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4031-2 / ₹ 425.00 / (e-book also available)

IC Engines

GUPTA

Fundamentals of Internal Combustion Engines, 2nd ed.

H.N. GUPTA, *Professor of Mechanical Engineering at the Indian Institute of Technology (Banaras Hindu University), Varanasi.*

Providing a comprehensive introduction to the basics of Internal Combustion Engines, this book is suitable for:

- Undergraduate-level courses in mechanical engineering, aeronautical engineering, and automobile engineering.
- Postgraduate-level courses (Thermal Engineering) in mechanical engineering.
- A.M.I.E. (Section B) courses in mechanical engineering.
- Competitive examinations, such as Civil Services, Engineering Services, GATE, etc.

In addition, the book can be used for refresher courses for professionals in automobile industries.

COVERAGE INCLUDES

Analysis of processes (thermodynamic, combustion, fluid flow, heat transfer, friction and lubrication) relevant to design, performance, efficiency, fuel and emission requirements of internal combustion engines.

Special topics such as reactive systems, unburned and burned mixture charts, fuel-line hydraulics, side thrust on the cylinder walls, etc.

Modern developments such as electronic fuel injection systems, electronic ignition systems, electronic indicators, exhaust emission requirements, etc.

The Second Edition includes new sections on geometry of reciprocating engine, engine performance parameters, alternative fuels for IC engines, Carnot cycle, Stirling cycle, Ericsson cycle, Lenoir cycle, Miller cycle, crankcase ventilation, supercharger controls and homogeneous charge compression ignition engines. Besides, air-standard cycles, latest advances in fuel-injection system in SI engine and gasoline direct injection are discussed in detail. New problems and examples have been added to several chapters.

KEY FEATURES

- Explains basic principles and applications in a clear, concise, and easy-to-read manner
- Richly illustrated to promote a fuller understanding of the subject
- SI units are used throughout
- Example problems illustrate applications of theory
- End-of-chapter review questions and problems help students reinforce and apply key concepts
- Provides answers to all numerical problems

Contents: Preface. Preface to the First Edition. Introduction to Internal Combustion Engines. Air-Standard

Cycles and Their Analysis. Reactive Systems. Fuel-Air Cycles and Their Analysis. The Actual Cycle. Combustion in Spark-Ignition Engines. Combustion in Compression-Ignition Engines. Fuels for Internal Combustion Engines. Carburetors and Fuel Injection in SI Engines. CI Engines: Fuel-Injection System. Two-Stroke Engines. Ignition Systems. Engine Friction and Lubrication. Heat Transfer in Engines and Cooling Systems. Air Capacity and Supercharging. Engine Testing and Performance. Exhaust Emissions. Alternative Potential Engines. Bibliography. Answers to Problems. Index.

Latest Print 2015 / 676 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4680-2 / ₹ 525.00 / (e-book also available)

MISHRA

Fundamentals of Combustion (Rev. ed.)

D.P. MISHRA, *faculty member of Propulsion Group in the Department of Aerospace Engineering, Indian Institute of Technology Kanpur.*

Designed for both undergraduate and postgraduate students of mechanical, aerospace, chemical and metallurgical engineering, this compact and well-knitted textbook provides a sound conceptual basis in fundamentals of combustion processes, highlighting the basic principles of natural laws.

In the initial part of the book, chemical thermodynamics, kinetics, and conservation equations are reviewed extensively with a view to preparing students to assimilate quickly intricate aspects of combustion covered in later chapters. Subsequently, the book provides extensive treatments of 'pre-mixed laminar flame', and 'gaseous diffusion flame', emphasizing the practical aspects of these flames. Besides, liquid droplet combustion under quiescent and convective environment is covered in the book. Simplified analysis of spray combustion is carried out which can be used as a design tool. An extensive treatment on the solid fuel combustion is also included. Emission combustion systems, and how to control emission from them using the latest techniques, constitute the subject matter of the final chapter.

Appropriate examples are provided throughout to foster better understanding of the concepts discussed. Chapter-end review questions and problems are included to reinforce the learning process of students.

Contents: Preface. Introduction. Thermodynamics of Combustion. Physics of Combustion. Chemistry of Combustion. Premixed Flame. Diffusion Flame. Combustion and Environment. Appendices A–F. Index.

Latest Print 2013 / 280 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3348-2 / ₹ 275.00 / (e-book also available)

Industrial Drives

SARKAR

Fundamentals of Industrial Drives

B.N. SARKAR, *Professor in the Department of Electronics and Communication Engineering, The Oxford College of Engineering, Bangalore.*

This book is a comprehensive treatment of the basic concepts of electric motor drives and their industrial applications. It is well developed to assist the students in a thorough understanding of the subject matter from fundamental principles. Both the conventional and the modern schemes of drive mechanisms, employing power electronic devices, have been explained in great detail.

Besides the speed control and braking characteristics of electric motors, their thermal characteristics, and transient and dynamic behaviour have also been explained. The procedure for the selection of a motor for a particular application, with the comparative characteristics of all such motors, has been elaborately discussed.

The book is primarily designed for the undergraduate students of electrical engineering. It will also be useful for the diploma students of electrical engineering as well as those preparing for the AMIE examinations.

KEY FEATURES

- Explains basic concepts through a large number of illustrations and worked-out examples.
- Derives system equations step-by-step from fundamentals.
- Discusses the development of the power electronic devices, DC choppers and the applications of electric drives in various industries.
- Gives chapter-end questions and problems with answers to reinforce a student's grasp of the subject matter.

Contents: Preface. Introduction to Electrical Drives. Motor Characteristics. Electric Braking. Selection of Motors. Transients and Dynamics. Thermal Characteristics of Electric Motors. Rectifier Controlled DC Drives. DC-DC Converters. Unbalanced Operation of AC Motors. Speed Control of AC Motors. Traction Systems. Appendices—I: Development of Power Electronic Devices. II: DC Choppers. III: Application of Drives in Industrial Plants. Index.

Latest Print 2012 / 388 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4433-4 / ₹ 350.00 / (e-book also available)

Industrial Organization

BASU, et al.

Industrial Organization and Management

S.K. BASU, *Professor Emeritus at College of Engineering Pune (formerly known as Government College of Engineering).*

K.C. SAHU, *former Director of NITIE Bombay. He has also served as former Professor, VG School of Management and former Professor/Founder-Chair, Industrial Engineering and Management (IIT Kharagpur).*

B. RAJIV, *Associate Professor, Department of Production Engineering, College of Engineering, Pune.*

This comprehensive text provides a glimpse of various theories and principles of management along with their applications in engineering industries. The authors have explained classical management, economic analysis, techno-economic life and various quantitative techniques associated with plant and facilities layout, behavioural studies, and human relations. Ergonomics and human factors in engineering has assumed a new dimension to design and manufacturing of products. The application of these principles, in relation to human effort and plant efficiency, has been discussed at length. It also discusses the biodynamic analyses of man-machine system in a stress-free environment.

This practice-oriented book, which contains a large number of worked-out examples, exercises and other pedagogic features, is intended for the undergraduate students of Industrial and Production Engineering. It can also be used as a reference by practising engineers.

Contents: Preface. Management. Organisation Structures. Formation of Company and its Legal Aspects. Financial Planning: Finance and Economic Analysis. Depreciation and Replacement. Product Engineering. Physical Facilities. Production Planning and Control. Inventory Control. Work Study. Job Evaluation, Merit Rating and Wage Incentives. Personnel Management. Assurance Engineering and Sciences: Reliability, Quality Control and Maintainability. Sales Forecasting. Financial Control. Plant Engineering and Maintenance. Behavioural Aspects of Management. Productivity. Automation. Engineering Economy. Ergonomics and Human Factors in Engineering. Operations Research. References. Index.

Latest Print 2012 / 432 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4421-1 / ₹ 350.00 / (e-book also available)

Interaction Design

MURRAY

Inventing the Medium: Principles of Interaction Design as a Cultural Practice

JANET H. MURRAY is *Ivan Allen College Dean's Recognition Professor of Digital Media and Director of the Experimental Television Lab at Georgia Institute of Technology.*

Digital artifacts from iPads to databases pervade our lives, and the design decisions that shape them affect how we think, act, communicate, and understand the world. But the pace of change has been so rapid that technical innovation is outstripping design. Interactors are often mystified and frustrated by their enticing but confusing new devices; meanwhile, product design teams

struggle to articulate shared and enduring design goals. With *Inventing the Medium*, the author provides a unified vocabulary and a common methodology for the design of digital objects and environments. It is be an essential guide for both students and practitioners in the evolving field of interaction design.

The author explains that innovative interaction designers should think of all objects made with bits—whether games or Web pages, robots or the latest killer apps—as belonging to a single new medium: the digital medium. Designers can speed the process of useful and lasting innovation by focusing on the collective cultural task of inventing this new medium. Exploring strategies for maximizing the expressive power of digital artifacts, Murray identifies and examines four representational affordances of digital environments that provide the core palette for designers across applications: computational procedures user participation, navigable space, and encyclopedic capacity.

Each chapter includes a set of Design Explorations—creative exercises for students and thought experiments for practitioners—that allow readers to apply the ideas in the chapter to particular design problems. *Inventing the Medium* also provides more than 200 illustrations of specific design strategies drawn from multiple genres and platforms and a glossary of design concepts.

Inventing the Medium gathers humanistic insights from Murray's pioneering scholarship, demonstrates how they apply to a wide range of digital design problems, and invites readers to begin using these conceptual tools themselves in an engaging and broadly accessible manner. I've already seen it have a powerful impact on my students.

—Noah Wardrip-Fruin

Computer Science Department, University of California,
Santa Cruz author of *Expressive Processing*

Contents: Acknowledgments. Introduction: A Cultural Approach to Interaction Design. I: Changing Technologies, Lasting Innovations—Design in an Evolving Medium. Affordances of the Digital Medium. Maximizing the Four Affordances. II: Designing Expressive Procedures—Computational Strategies of Representation. Building Procedural Complexity. III: Spatial Design Strategies—Defining and Navigating Spaces and Places. The Library Model for Collocating Information. IV: Designing Encyclopedic Resources—The Database Model: Strategies for Segmentation and Juxtaposition of Information. The Structural Document Model: Using Standardized Metadata to Share Knowledge. V: Scripting Interaction—The Tool Model: Augmenting the Expressive Power of the Hand. The Machine Model: Visibility and Control as Design Goals. The Companion Model: Helpful Accompaniment as a Design Goal. The Game Model: Scripting Interaction as Structured Play. Glossary. Bibliography. Image Credits. Index.

Latest Print 2012 / 500 pages (Hard Cover) / 17.8 x 23.5 cm
ISBN-978-81-203-4599-7 / ₹ 995.00

Kinematics of Machines/ Dynamics of Machines/ Theory of Machines

AMBEKAR

Mechanism and Machine Theory

ASHOK G. AMBEKAR, *Technical Advisor and Former Director, Swami Vivekanand College of Engineering, Indore.*

This book meets the requirements of undergraduate and postgraduate students pursuing courses in mechanical, production, electrical, metallurgical and aeronautical engineering. This self-contained text strikes a fine balance between conceptual clarity and practice problems, and focuses both on conventional graphical methods and emerging analytical approach in the treatment of subject matter. In keeping with technological advancement, the text gives detailed discussion on relatively recent areas of research such as function generation, path generation and mechanism synthesis using coupler curve, and number synthesis of kinematic chains.

The text is fortified with fairly large number of solved examples and practice problems to further enhance the understanding of the otherwise complex concepts. Besides engineering students, those preparing for competitive examinations such as GATE and Indian Engineering Services (IES) will also find this book ideal for reference.

KEY FEATURES

- Exhaustive treatment given to topics including gear drive and cam follower combination, analytical method of motion and conversion phenomenon.
- Simplified explanation of complex subject matter.
- Examples and exercises for clearer understanding of the concepts.

Contents: Preface. Introduction to Kinematics and Mechanisms. Planar Mechanisms and Geometry of Motion. Velocity and Acceleration Analysis (Graphical Approaches). Velocity and Acceleration Analysis (Analytical Approach). Mechanisms with Lower Pairs. Elements of Kinematic Synthesis of Mechanisms (Graphical and Algebraic Methods). Cams. Gears. Gear Trains. Gyroscopic Effects. Friction Gears. Belt, Rope and Chain Drives. Brakes and Dynamometers. Dynamics of Machines, Turning Moment, Flywheel. Governors. Balancing. Vibration Analysis. Appendix I: Units. Appendix II: Mathematics. Appendix III: S.I. and M.K.S. Units. Bibliography. Index.

Latest Print 2013 / 1004 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3134-1 / ₹ 550.00 / (e-book also available)

RAVI

Theory of Machines (Kinematics)

V. RAVI, *Professor and Head, Department of Mechanical Engineering, Ballari Institute of Technology and Management, Bellary.*

The subject theory of machines forms the basis for understanding the working principles of a machine. The theoretical principles involved in machines have immediate application to practical problems.

Designed as a text for the undergraduate students of mechanical engineering, it covers all the basics of mechanism and machine theory in a simple and logical manner. The basic theory presented in the book has been evolved out of simple and readily understood principles. The text begins with the discussion on various types of mechanisms and their working principles. Further it discusses the working of Oldham's coupling, automobiles steering gears, engine pressure indicators, and estimation of velocity and acceleration using relative velocity method, complex algebra method and instantaneous centre method. Types of friction and power transmission by belt drives are also explained in detail. Finally it concludes with cam and follower mechanism.

KEY FEATURES

- Balanced presentation of the graphical and algebraic approaches
- Numerous solved and unsolved problems in each chapter
- Wide coverage of topics as per the latest syllabi of various universities

Contents: Preface. Kinematics of Simple Mechanisms. Velocity and Acceleration Analysis (Relative Velocity Method). Velocity and Acceleration by Klein's Construction. Velocity Analysis of Mechanisms (Instantaneous Centre Method). Velocity and Acceleration Analysis of Mechanism (Analytical and Complex Algebra Method). Toothed Gearing. Gear Trains. Cam Mechanism. Friction. Index.

Latest Print 2011 / 400 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4404-7 / ₹ 325.00 / (e-book also available)

SHARMA & PUROHIT

Theory of Mechanisms and Machines

C.S. SHARMA, *was Formerly Professor, Department of Mechanical Engineering, Jai Narain Vyas University, Jodhpur (Rajasthan).*

KAMLESH PUROHIT, *Associate Professor, Department of Mechanical Engineering, Jai Narain Vyas University, Jodhpur.*

Intended to cater to the needs of undergraduate students in mechanical, production, and industrial engineering disciplines, this book provides a comprehensive coverage of the fundamentals of analysis and synthesis (kinematic and dynamic) of mechanisms and machines. It clearly describes the techniques needed to test the suitability

of a mechanical system for a given task and to develop a mechanism or machine according to the given specifications. The text develops, in addition, a strong understanding of the kinematics of mechanisms and discusses various types of mechanisms such as cam-and-follower, gears, gear trains and gyroscope.

KEY FEATURES

- The text devotes separate chapters to Force Analysis and Mechanical Vibrations.
- Numerous worked-out examples are interspersed throughout the text to illustrate the concepts.
- The Exercises and Multiple Choice Questions are incorporated at the end of each chapter to drill the students in self-study.

Contents: Preface. Introduction to Mechanisms and Machines. Kinematic Analysis of Mechanisms. Synthesis of Mechanisms. Lower Pair Mechanisms. Friction. Belts, Ropes and Chains. Brakes and Dynamometers. Governors. Cams. Gears. Gear Trains. Force Analysis. Balancing. Mechanical Vibrations. Gyroscope. Bibliography. Index.

Latest Print 2013 / 720 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2901-0 / ₹ 425.00 / (e-book also available)

Lean Manufacturing

DEVADASAN, et al.

Lean and Agile Manufacturing: Theoretical, Practical and Research Futurities

S.R. DEVADASAN, *Professor in the Production Engineering Department at the PSG College of Technology, Coimbatore.*

V. MOHAN SIVAKUMAR, *Faculty of Mechanical Engineering Department at the PSG Polytechnic College, Coimbatore.*

R. MURUGESH, *Principal of Darshan Institute of Engineering and Technology, Rajkot.*

P.R. SHALI, *Assistant Professor in the Production Engineering Department at the Government Engineering College, Thrissur, Kerala.*

Contemporary fastidious companies are required to eliminate wastes and offer value-added products and services to the customers, which requirement is fulfilled by adopting the paradigm called 'lean manufacturing'. On the other side, futuristic companies surge towards reaching the twenty-first century mission by reacting quickly in accordance with the dynamic demands of the modern customers, for which researchers have been developing a paradigm called 'agile manufacturing'. Although various techniques and tools are applied, cohesive procedures are yet to be evolved to implement these paradigms systematically and successfully in companies. In this context, this book is evolved to address students, academics, practitioners and researchers for gaining theoretical, practical and research

futuristic knowledge on lean and agile manufacturing paradigms.

Organised in 18 chapters, the text opens with a historical overview of lean and agile manufacturing paradigms. It then discusses the lean manufacturing principles with their application procedures. The book comprehensively analyses the methods of implementation of lean manufacturing paradigm in both traditional and moderate organisations. It also gives an equal treatment to the implementation of agile manufacturing paradigm under four drivers such as management driver, technology driver, manufacturing strategy driver and competition driver through the adoption of appropriate agile manufacturing criteria. The book concludes with a discussion of lean and agile manufacturing paradigms from the perspectives of academia, researchers and practitioners.

The text is well supported by a large number of self-test questions with their answers. A unique feature of the book is the inclusion of *research avenues* at the end of each chapter, which enable the readers to carry out researches on these paradigms.

This book is intended for the undergraduate and postgraduate students of industrial, manufacturing, production and mechanical engineering.

Contents: Preface. Acknowledgements. List of Abbreviations and Expansions. Introduction. Lean Manufacturing through Waste Elimination. Value Stream Mapping. 5S Concepts. Kaizen in Lean Manufacturing Paradigm. Single Minute Exchange of Die. Pull Production through *Kanban* Card System. One-Piece Flow Production System. Visual Management. Lean Manufacturing through Total Productive Maintenance. Implementation of Lean Manufacturing Paradigm in Traditional and Moderate Organisations. The Fundamental Structure of Agile Manufacturing Paradigm. Agile Manufacturing through Management Driver. Agility through Technology Driver. Agility through Manufacturing Strategy Driver. Agility through Competitive Driver. Implementation of Agile Manufacturing Paradigm in Moderate and Smart Organisations. Conclusion. Appendix. Further Reading. Index.

Latest Print 2012 / 288 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-4611-6 / ₹ 350.00 / (e-book also available)

GOPALAKRISHNAN Simplified Lean Manufacture: Elements, Rules, Tools and Implementation

N. GOPALAKRISHNAN is *President of Projects India, Bangalore, a company specializing in training and implementing lean manufacture globally.*

This compact and concise text, based on the rich and vast experience of the author gathered while training thousands of individuals, discusses what lean manufacture is and its elements, rules and tools. It shows how any manufacturing industry, irrespective of its size

and the kind of products it manufactures, can adapt to lean manufacturing. The book explains in easy to understand language that, with the help of lean manufacture, an organization can improve its delivery time to the customers, reduce the cost of manufacture, minimize inventory, and raise profitability.

The book introduces the concept of value and waste and details the symptoms which indicate the necessity for an organization to adapt to lean manufacturing. It also shows how seven types of wastes are identified globally and how they can be eliminated. In addition, the book examines the primary tools and the secondary tools of lean manufacture.

KEY FEATURES

- Gives the rules of lean manufacture, the kind of training that should be given to employees and duration of such training.
- Provides ready-to-use formats which will help an organization to calculate waste in terms of cost of quality.
- Explains, with the help of process maps, the categories of activities which do not add value to the customers.
- Analyzes value flow and the obstacles that have to be removed in achieving it.

This book should prove extremely useful for undergraduate students of engineering and postgraduate students of management, as well as for managers and the shop floor personnel.

Contents: Preface. Abbreviations Used in Text. What is Lean? Symptoms Indicating the Requirement for Lean Manufacture. How to Meet Customer Requirement? What are the Elements of Lean Manufacturing? Primary Tools Used in Lean Manufacturing. Primary Tools—Total Productive Maintenance. Primary Tools—Process Mapping and Value Stream Mapping. Primary Tools—Work Cell. Secondary Tools Used in Lean Manufacturing. The Lean Manufacturing Rules. Training and Implementation. Implementation of Lean Manufacturing—Planning. Implementation of Lean Manufacturing—Production and Productivity. Implementation of Lean Manufacturing—Inventory Management. How to Succeed with Lean Manufacturing? Bibliography. Index.

Latest Print 2012 / 248 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3943-9 / ₹ 225.00 / (e-book also available)

Machine Design

GOPE Machine Design: Fundamentals and Applications

P.C. GOPE, *Professor in Mechanical Engineering at the College of Technology, G.B. Pant University of Agriculture and Technology, Pantnagar.*

This comprehensive text on principles and practice of mechanical design discusses the concepts, procedures,

data, tools, and analytical methodologies needed to perform design calculations for the most frequently encountered mechanical elements such as shafts, gears, belt, rope and chain drives, bearings, springs, joints, couplings, brakes and clutches, flywheels, as well as design calculations of various IC engine parts. The book focuses on all aspects of design of machine elements including material selection and life or performance estimation under static, fatigue, impact and creep loading conditions.

The book also introduces various engineering analysis tools such as MATLAB, AutoCAD, and Finite Element Methods with a view to optimizing the design. It also explains the fracture mechanics based design concept with many practical examples.

Pedagogically strong, the book features an abundance of worked-out examples, case studies, chapter-end summaries, review questions as well as multiple choice questions which are all well designed to sharpen the learning and design skills of the students.

This textbook is designed to appropriately serve the needs of undergraduate and postgraduate students of mechanical engineering, agricultural engineering, and production and industrial engineering for a complete course in Machine Design (Papers I and II), fully conforming to the prescribed syllabi of all universities and institutes.

Contents: Preface. Introduction. Engineering Materials and Material Selection Processes. Stress, Strain and Deflection. Design against Static Failure. Design against Fatigue Loading. Design against Creep, Impact and Fracture. Design against Shaft, Axle and Keyways. Riveted Joints. Welded Joints. Design of Fasteners. Cotter and Knuckle Joints. Mechanical Spring Design. Coupling, Clutch and Brakes. Power Transmission Drive: Belt Drive. Rope Design. Chain Drives. Fundamentals of Gear Drives and Gear Force Analysis. Design of Spur and Helical Gears. Bevel and Worm Gear Design. Rolling Bearing Selection. Journal Bearing. Design of Internal Combustion Engine Parts. Miscellaneous Machine Elements. Engineering Analysis Tools. Appendix. Index.

Latest Print 2014 / 1328 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4517-1 / ₹ 725.00 / (e-book also available)

SHARMA & PUROHIT Design of Machine Elements

C.S. SHARMA, *was Formerly Professor, Department of Mechanical Engineering, Jai Narain Vyas University, Jodhpur (Rajasthan).*

KAMLESH PUROHIT, *Associate Professor, Department of Mechanical Engineering, Jai Narain Vyas University, Jodhpur.*

This thorough and comprehensive textbook on machine elements presents the concepts, procedures, data, tools, and techniques students need to design safe, efficient and workable mechanical components of machines.

Covering both the conventional design methodology and the new tools such as CAD, optimization and FEM, design procedures for the most frequently encountered mechanical elements have been explained in meticulous detail. The text features an abundance of thoroughly worked-out examples, end-of-chapter questions and exercises, and multiple-choice questions, framed to not only enhance students' learning but also hone their design skills.

Well-written and eminently readable, the text is admirably suited to the needs of undergraduate students in mechanical, production and industrial engineering disciplines.

Contents: Preface. Introduction to Engineering Design. Computer-Aided Design and Drafting. Engineering Materials. Mechanics of Machine Elements. Fundamentals of Machine Design. Manufacturing and Other Aspects in Design. Design of Joints. Screw Fastenings and Power Screws. Mechanical Springs. Levers. Belt Drives. Gears. Shafts, Keys and Splines. Couplings, Clutches and Brakes. Bearings. Pressure Vessels. Design of I.C. Engine Components. Flywheel and Rotating Disc. Design Optimization. Introduction to Finite Element Method. Bibliography. Answers to Multiple Choice Questions. Index.

Latest Print 2015 / 780 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-1955-4 / ₹ 450.00 / (e-book also available)

Machine Drawing

JOHN

Textbook of Machine Drawing

K.C. JOHN *is Professor and Head, Department of Mechanical Engineering, Jyothi Engineering College Cheruthuruthy, Thrissur, Kerala.*

This book provides a detailed study of technical drawing and machine design to acquaint students with the design, drafting, manufacture, assembly of machines and their components.

The book explains the principles and methodology of converting three-dimensional engineering objects into orthographic views drawn on two-dimensional planes. It describes various types of sectional views which are adopted in machine drawing as well as simple machine components such as keys, cotters, threaded fasteners, pipe joints, welded joints, and riveted joints. The book also illustrates the principles of limits, fits and tolerances and discusses geometrical tolerances and surface textures with the help of worked-out examples. Besides, it describes assembly methods and drafting of power transmission units and various mechanical machine parts of machine tools, jigs and fixtures, engines, valves, etc. Finally, the text introduces computer aided drafting (CAD) to give students a good start on professional drawing procedure using computer.

KEY FEATURES

- Follows the International Standard Organization (ISO) code of practice for drawing.

- Includes a large number of dimensioned illustrations and worked-out examples to explain the design and drafting process of various machines and their components.
- Contains chapter-end exercises to help students develop their design and drawing skills.

This book is designed for degree and diploma students of mechanical, production, automobile, industrial and chemical engineering. It is also useful for mechanical draftsmen and designers.

Contents: Preface. Module A: Preliminaries—Objectives and Methods of Analysis and Design. Dimensioning. Module B: Fundamentals of Machine Drawing—Multiview Projection. Sectional Views. Module C: JOINTS—Threaded Fasteners and Joints. Keys, Cotters and Pin Joints. Welded Joints. Riveted Joints. Pipe Joints and Layouts. Module D: Production Drawings—Limits, Fits and Tolerances. Geometrical Tolerancing. Surface Texture. Shop Floor Drawings. Module E: Assembly of Power Transmission Units—Shaft Couplings. Shaft Bearings. Pulleys. Module F: Assembly of Machine Parts—Machine Tools. Jigs and Fixtures. Engine Parts. Valves. Miscellaneous Machine Parts. Module G: Computer Aided Drafting—Introduction to CAD. Starting to Use CAD Software. Drafting of 2D Figures. Appendix: Drawing Data Tables. Index.

Latest Print 2012 / 448 pp. / 21.6 × 27.8 cm

ISBN-978-81-203-3721-3 / ₹ 350.00 / (e-book also available)

SINGH & SAH Fundamentals of Machine Drawing, 2nd ed.

SADHU SINGH, *formerly Professor and Head of Mechanical Engineering Department of G.B. Pant University of Agriculture and Technology, Pantnagar.*

P.L. SAH, *Professor and Head Mechanical Engineering, College of Technology, G.B. Pant University of Agriculture and Technology, Pantnagar.*

This richly illustrated textbook, now in its Second Edition, continues to provide a solid fundamental treatment of the essential concepts of machine drawing.

The book is suitable for students pursuing courses in mechanical engineering (and its related branches) both at the undergraduate degree and diploma levels.

The students are first introduced to the standards and conventions of basic engineering drawing. The machine elements such as fasteners, bearings, couplings, shafts and pulleys, pipes and pipe joints are discussed in depth before moving on to detailed drawings of components of steam engines, IC engines, boilers, and machine tools. Gears are covered in a separate chapter. Finally, the book introduces the students to the principles of computer-aided drafting and designing (CADD) to prepare them to use software tools effectively for the production of computerised accurate drawings.

This Second Edition includes three new chapters, namely *Fits and Tolerances*, *Assembly Drawings*, and *Freehand*

Sketching, and a revamped chapter on *Gears*. Besides, all the earlier chapters have been revised and enlarged with numerous new topics and worked-out examples.

KEY FEATURES

- Provides first and third angle projections
- Follows the standards set by the Bureau of Indian Standards as per IS:696–1972/SP:46–1988
- Contains multiple-choice questions and practice exercises

Contents: Preface. Preface to the First Edition. Basics of Machine Drawing. Theory of Projections. Sectional Views. Fits and Tolerances. Assembly Drawings. Freehand Sketching. Temporary Fasteners. Permanent Fasteners. Bearings. Couplings and Clutches. Shafts and Pulleys. Pipes and Pipe Joints. Gears. Steam Engine and I.C. Engine Parts. Boiler Mountings and Accessories. Machine Tool Parts. Computer-Aided Drafting. Index.

Latest Print 2013 / 388 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4679-6 / ₹ 350.00 / (e-book also available)

Maintenance Management

GOPALAKRISHNAN & BANERJI Maintenance and Spare Parts Management, 2nd ed.

P. GOPALAKRISHNAN, *Formerly, Senior Professor, Administrative Staff College of India, Hyderabad.*

Late A.K. BANERJI *was Senior Faculty with the Administrative Staff College of India, Hyderabad. He was also a consultant to several organisations.*

This well-received text, designed for the students of MBA, BTech (Mechanical Engineering and Industrial and Production Engineering) and MTech (Industrial Engineering and Management), has been revised and reorganized in its second edition.

The book, divided into six sections, deals with the concepts of core maintenance and related auxiliary functions, core spares issues, related auxiliary spares functions, caselets and policy cases. This research-based study attempts to impart a comprehensive knowledge of maintenance and spare parts management, particularly in the Indian context.

Illustrations, tables, caselets, cases and presentation of several topics in A-Z points add pedagogic value to the text.

Contents: Preface. Preface to the First Edition. Acknowledgements. SECTION I: Core Maintenance—Maintenance Management and Challenges. Maintenance Objectives/Functions. Maintenance Organisation. Maintenance Systems. Design of Maintenance Systems. Condition Monitoring. Non-Destructive Testing (NDT). Total Planned Maintenance (TPM). Maintenance Turnaround. SECTION II: Related Auxiliary Functions—Inspection and Lubrication. Calibration and Quality. Maintenance Training and HR. Safety and Maintenance.

Computers and Maintenance. Industrial Engineering and Productivity. Activity Sampling for Work Measurement. Energy Saving by Maintenance. Facilities Investment Decisions (FID) and Life Cycle Costing (LCC). Evaluation of Maintenance Function. SECTION III: Core Spares Issues—Indian Spares Scenario. Spares Practices Survey. Cost Reduction in Spares. Beyond Cost Criticality Method. Inventory Control of Spares. Maintenance Spares. Simulation for Spares Control. Insurance Spare. Rotable Spares. Overhauling and PERT. SECTION IV: Related Auxiliary Spares Function—Reliability and Quality. Procurement of Spares. Logistics and Warehousing. Pricing and Marketing of Spares. After Sales Service (ASS). Multiechelon Distribution. Management of Obsolete Spares. Reconditioning of Equipment and Spares. Information System of Spares. Organisation and Evaluation of Spares Function. Discussion Points. SECTION V: Caselets/Short Cases—A Hazare Fertilisers Ltd. (AHFL). Vasanthi ASS Ltd. Bhushan Refineries Ltd. Middle East Air Transport. Arun Gas Oil Ltd. Mahatma Gandhi Road Transport Corporation. SECTION VI: Integrated Management Policy Cases—Ganapathy Ram Port Trust. Ganapathy Ram Steels Ltd. Bibliography. Index.

Latest Print 2015 / 400 pp. / 15.3 × 22.9 cm

ISBN-978-81-203-4739-7 / ₹ 325.00 / (e-book also available)

MISHRA & PATHAK

Maintenance Engineering and Management, 2nd ed.

R.C. MISHRA, *Former Director, Aryavart Institute of Technology and Management, Lucknow. Earlier he has been Professor and Head, Department of Engineering and Mining Machinery, Indian School of Mines, Dhanbad.*

K. PATHAK, *Professor in the Department of Mining Engineering at the Indian Institute of Technology, Kharagpur.*

Maintenance of equipment, machinery systems and allied infrastructure comprises the ways and means of optimizing the available resources of manpower, materials, tools and test equipment, within a set of constraints, to help achieve the targets of an organization by minimizing the downtimes. Whether the goal is to produce and sell a product at a profit or is simply to perform a mission in a cost-effective manner, the maintenance principles discussed in this text apply equally to all such types of organizations. In consonance with the growth of the industry and its modernization and the need to minimize the downtimes of machinery and equipment, the engineering education system has included maintenance engineering as a part of its curriculum.

This second edition of the book continues to focus on the basics of this expanding subject, with a broad discussion of management aspects as well, for the benefit of the engineering students. It explains the concept of a maintenance system, the evaluation of its maintenance functions, maintenance planning and scheduling, the

importance of motivation in maintenance, the use of computers in maintenance and the economic aspects of maintenance. This book also discusses the manpower planning and energy conservation in maintenance management. Presented in a readable style, the book brings together the numerous aspects of maintenance functions emphasizing the importance of this discipline in the engineering education.

In this edition a new chapter titled, *Advances in Maintenance* (Chapter 21), has been included to widen the coverage of the book.

Besides the students of engineering, especially those in streams of mechanical engineering and its related disciplines such as mining, industrial and production, this book will be useful to the practising engineers as well.

Contents: Preface. Preface to the First Edition. Maintenance Concept. Planned Preventive Maintenance. Maintenance Evaluation. Condition Monitoring. Maintenance Planning and Scheduling. Motivation in Maintenance. Computers in Maintenance. Reliability in Maintenance. Development of Maintenance Practices. Economic Aspects of Maintenance. Organizational Structure of Maintenance. Maintenance Equipment and Facilities. Maintainability. Lubricants and Maintenance. Maintenance Material, Planning and Control. Decision Making in Maintenance. Environmental Impact on Maintenance. Manpower Planning for Maintenance. Energy Conservation and Maintenance. Maintenance of Mechanical and electrical Systems. Advances in Maintenance. Bibliography. Index.

Latest Print 2013 / 312 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4573-7 / ₹ 295.00 / (e-book also available)

TELANG & TELANG

Comprehensive Maintenance Management: Policies, Strategies and Options

A.D. TELANG, *former Professor and Head, Department of Mechanical Engineering, Maulana Azad National Institute of Technology (MANIT), Bhopal.*

AMIT TELANG is *Lecturer, Department of Applied Mechanics, MANIT, Bhopal.*

Maintenance has become one of the most important aspects of industrial activities. It directly affects quality, productivity, profit, safety and environment. This compact yet comprehensive book deals with almost all the maintenance systems available in literature. These systems are divided into groups and subgroups, and the text gives, for better understanding, a comparison of these on the basis of their advantages and disadvantages. Besides, the text discusses the methods of selecting a maintenance system for industrial plants as well as for individual equipment. It focuses on the policies, strategies and options that can be adopted for selecting a proper maintenance system.

KEY FEATURES

- Presents the maintenance system in the form of a simple and logical flow chart that is easy to understand, follow and use.
- Discusses Total Productive Maintenance (TPM), Reliability Centred Maintenance (RCM), and Quality Maintenance (QM).
- Describes the various systems along with explanation, comparison and stages.

The book is intended for undergraduate and postgraduate students of Engineering (Mechanical/Industrial and Production Engineering) and postgraduate students of management. In addition, practising managers should find the book quite useful.

Contents: Foreword. Preface. Introduction. Effective Maintenance Management: An Overview. Policies, Strategies and Options: Maintenance Management Perspectives. Comprehensive Maintenance Management: The Chart. Contracted Out Maintenance. Unplanned Maintenance. Planned Maintenance. Common Planned Maintenance. Special Planned Maintenance: Stage I. Special Planned Maintenance: Stage II. Special Planned Maintenance: Stage III. Quality of Maintenance: Improvements and Reengineering. Life Cycle and Maintenance. Selection of Maintenance Management System. Index.

Latest Print 2014 / 192 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3953-8 / ₹ 195.00 / (e-book also available)

VENKATARAMAN

Maintenance Engineering and Management

K. VENKATARAMAN is presently serving in the faculty for off-campus programmes of BITS Pilani, Chennai Centre.

This text is an accessible and comprehensive guide to the principles, practices, functions and challenges of maintenance engineering and management. With a strong emphasis on basic concepts and practical techniques throughout, the book demonstrates in detail how effective technical competencies in maintenance management can be built in engineering organizations.

The book thus provides students and practising engineers alike with the methodologies and tools needed to understand and implement the systems approach to maintenance management.

The major goals for the text include:

- To provide a good understanding of different types of maintenance management systems such as breakdown, preventive, predictive, proactive.
- To explain benefits of planned maintenance.
- To explain condition-based monitoring techniques with focus on vibration monitoring, thermography, and motor condition monitoring.
- To stress the role of reliability engineering in maintenance with tools like Failure Mode and Effect Analysis, Root Cause Analysis, and Criticality Matrix.

- To explain activities of maintenance planning with focus on shutdown planning, human resources development, and tools employed for monitoring.
- To emphasize management functions such as procurement of spares, measurement of maintenance effectiveness, etc.
- To give an overview of project management tools such as PERT etc.
- To introduce computerized maintenance management systems.
- To explain the basics of hazard analysis and fault tree analysis.

Review questions in each chapter, worked-out examples wherever applicable, case studies and an exclusive appendix on “Selected Questions and Answers” are all designed to provoke critical thinking.

This text is suitable for undergraduate and postgraduate courses in Maintenance Engineering taught in the department of mechanical engineering in almost all universities.

Contents: Preface. Introduction to Maintenance Systems. Maintainability. Condition-Based Maintenance (CBM). Reliability-Centred Maintenance (RCM). Asset and Spare Parts Management. Safety Engineering and Fault Tree Analysis. Total Productive Maintenance. Maintenance Planning and Scheduling. Computer Applications in Maintenance Management. Statistical Distribution in Preventive Maintenance. Maintenance Integration. Maintenance Effectiveness. Appendices— I: Maintenance Lubricants and Their Applications. II: Key Definitions in Lubrication. III: Suggested Questions with Answers. IV: Model Questions. Bibliography. Index.

Latest Print 2013 / 248 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3130-3 / ₹ 250.00 / (e-book also available)

Manufacturing Engineering and Technology

ANGELO & SUBRAMANIAN

Powder Metallurgy: Science, Technology and Applications

P.C. ANGELO, Professor and Head of Metals Testing and Research Centre at PSG College of Technology, Coimbatore.

R. SUBRAMANIAN, Assistant Professor in the Department of Metallurgical Engineering, PSG College of Technology, Coimbatore.

This textbook is written primarily for undergraduate and postgraduate students of metallurgical and materials engineering to provide them with an insight into the emerging technology of powder metallurgy as an alternative route to conventional metal processing.

It will also be useful to students of materials science, mechanical engineering and production engineering to understand and appreciate the importance of powder

metallurgy as an effective and profitable material processing route to produce a variety of products for engineering industries. The book will enable the students as well as practising engineers to understand and practise the science and technology of powder production and processing, as well as to choose the right method to suit the application in hand.

The various techniques used for powder production and the versatile nature of these techniques to produce a wide range of powders have been highlighted with suitable examples. Characterization of powders and subsequent compaction methods have been discussed with due reference to the final application. Novel consolidation techniques for advanced applications have been dealt with. Sintering of the compacts and the mechanisms involved in sintering have been discussed in detail.

The book covers most of the recent developments in powder metallurgy such as atomization, mechanical alloying, self-propagating high-temperature synthesis, metal injection moulding and hot isostatic pressing.

Questions and problems have been given at the end of each chapter. A glossary of relevant terms in powder metallurgy has also been included for ready reference.

Contents: Foreword. Preface. Powder Metallurgy: Basic Steps. Production of Powders. Powder Treatment and Handling. Metal Powder Characteristics. Compaction of Metal Powders. High-Temperature Compaction. Sintering. Postsintering Operations. Powder Metallurgy Products. Advanced Powder Metallurgical Processing Techniques. Appendix: Terminology. Bibliography. Index.

Latest Print 2014 / 312 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3281-2 / ₹ 350.00 / (e-book also available)

CHAKRABARTI

Casting Technology and Cast Alloys

A.K. CHAKRABARTI, *formerly Professor, Metallurgical and Materials Engineering Department, Indian Institute of Technology Kharagpur.*

This text emphasizes the underlying metallurgical principles of casting technology so that the students can develop a sound set of analytic skills, helpful in the development of improved casting processes and products. The pictorial and diagrammatic support provided throughout reinforces the clarity of the text for a thorough understanding of the metal casting concepts and technologies.

Besides comprehensive coverage of the casting processes and elaborate discussion of properties of cast irons, cast steels, and cast nonferrous alloys, the text also familiarizes the students with the most recent developments in binder systems, casting practices, solidification processing, metal filtration, metallurgy of cast alloys, alloy design, and energy and environment management.

The book is primarily designed for degree and diploma students pursuing courses in metallurgical, mechanical, and production engineering disciplines as well as for candidates studying for Associate Membership

Examinations (AMIIME, AMIE, Grad. IIF). It would also benefit M.Tech./M.E. students specializing in foundry technology and allied disciplines.

Contents: Preface. Acknowledgements. Introduction. Moulding Sand and Binders. Mould and Coremaking. Running and Feeding of Castings. Common Rules for Casting Design. Melting Furnaces and Refractories. Special Casting Processes. Cast Irons. Cast Steels. Cast Nonferrous Alloys. Casting Defects and Defect Diagnosis by NDT. Energy Conservation and Environment Control. Index.

Latest Print 2014 / 288 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2779-5 / ₹ 250.00 / (e-book also available)

DATTA

Powder Metallurgy: An Advanced Technique of Processing Engineering Materials, 2nd ed.

B.K. DATTA, *Former Senior Faculty at the Indian Institute of Technology Kharagpur.*

The textbook introduces the students to the science and technology of powder metallurgy including the treatment of ceramic powders and powders of some intermetallic compounds.

With improved organization and enriched contents, the book explores a thorough coverage of various aspects of powder metallurgy involving raw materials, various methods of production of metallic powders and non-metallic powders, their characteristics, technological aspects of compacting and sintering, various applications of powder metallurgy technology using different techniques as well as most of the recent developments in powder metallurgy.

With all the latest information incorporated and several key pedagogical attributes included, this textbook is an invaluable learning tool for the undergraduate students of metallurgical and materials engineering for a one semester course on powder metallurgy. It also caters to the students of mechanical engineering, automobile engineering, aerospace engineering, industrial and production engineering for their courses in manufacturing technology, processes and practices.

HIGHLIGHTS OF SECOND EDITION

- Sections exploring the grinding in mills, disintegration of liquid metals and alloys, some more methods for the production of iron powder by reduction of oxides, metallothermic reduction of oxides, etc. have been included.
- Sections on mechanical comminution of solid materials, structural P/M parts, etc. have been modified highlighting an up to date version.
- Several types of questions have been incorporated in the additional questions given at the end of book to guide the students from examination and practice point of view.

Contents: Preface. General Introduction. Raw Materials:

Their Production and Characteristics. Consolidation of Metal and Ceramic Powders. Applications of Powder Metallurgy. Additional Questions. Appendix—Recent Trends in Powder Metallurgy. Further Reading. Index.

Latest Print 2014 / 232 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4942-1 / ₹ 295.00 / (e-book also available)

JOHN

Metal Casting and Joining

K.C. JOHN, *Professor and Head, Department of Mechanical Engineering, Jyothi Engineering College, Cheruthuruthy, Thrissur, Kerala.*

Designed for the undergraduate students of mechanical engineering and allied branches, this book serves as a bridge between the study of the basic processes and their application in production industries.

This book covers two similar fundamental processes—foundry and welding—in a single volume. The chapters of the book are grouped in seven modules. A separate module is devoted to introduce the preliminaries of the two areas namely casting and joining processes. Miscellaneous welding and allied processes, including the modern methods and thermal cutting, conventional sand mould casting, special and modern casting methods, conventional metal joining processes and theory of solidification of metal, its metallurgy, defects in castings and casting design procedure are covered in the book. The theory of each process is explained with the help of simple line sketches which can be easily reproduced by a student at the time of examination. Enough worked out examples and problems are given for practice, especially in the design areas. At the end of each chapter, sufficient number of review questions are given as exercise.

Contents: Preface. Module A: Preliminaries of Metal Casting and Joining—Principles of Metal Casting. Principles of Metal Joining. Module B: Conventional Sand Mould Casting—Pattern Making. Mould and Core Materials. Moulding. Core Making. Gating System and Risers. Metal Melting and Pouring. Shakeout and Cleaning of Castings. Foundry Mechanization and Management. Module C: Special Casting Processes—Shell Mould Casting. Investment Casting. Pressure Die Casting. Centrifugal Casting. Continuous Casting. Miscellaneous Special Casting Processes. Module D: Conventional Metal Joining Processes—Arc Welding Processes. Resistance Welding Processes. Oxy-Fuel Gas Welding Processes. Brazing and Soldering Processes. Module E: Miscellaneous Welding and Allied Processes—Miscellaneous Old Welding Processes. Modern Welding Processes. Thermal Cutting Processes. Module F: Solidification of Metal and Casting Design—Solidification and Cooling of Castings. Casting Defects. Principles of Casting Design. Module G: Metallurgy of Welding and Design—Metallurgy of Welding. Welding Defects. Principles of Design for Welding and Drawing. Bibliography. Index.

Latest Print 2015 / 576 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-5077-9 / ₹ 495.00 / (e-book also available)

KAUSHISH

Manufacturing Processes, 2nd ed.

J.P. KAUSHISH, *former Deputy Director, Central Building Research Institute (CBRI), Roorkee, and former faculty, University of Roorkee.*

The revised and updated second edition of this book gives an in-depth presentation of the basic principles and operational procedures of general manufacturing processes. It aims at assisting the students in developing an understanding of the important and often complex interrelationship among various technical and economical factors involved in manufacturing.

The book begins with a discussion on material properties while laying emphasis on the influence of materials and processing parameters in understanding manufacturing processes and operations. This is followed by a detailed description of various manufacturing processes commonly used in the industry. With several revisions and the addition of four new chapters, the new edition also includes a detailed discussion on mechanics of metal cutting, features and working of machine tools, design of molds and gating systems for proper filling and cooling of castings. Besides, the new edition provides the basics of solid-state welding processes, weldability, heat in welding, residual stresses and testing of weldments and also of non-conventional machining methods, automation and transfer machining, machining centres, robotics, manufacturing of gears, threads and jigs and fixtures.

The book is intended for undergraduate students of mechanical engineering, production engineering and industrial engineering. The diploma students and those preparing for AMIE, Indian Engineering Services and other competitive examinations will also find the book highly useful.

New to This Edition

- Includes four new chapters *Non-conventional Machining Methods; Automation: Transfer Machining, Machining Centres and Robotics; Manufacturing Gears and Threads;* and *Jigs and Fixtures* to meet the course requirements.
- Offers a good number of worked-out examples to help the students in mastering the concepts of the various manufacturing processes.
- Provides objective-type questions drawn from various competitive examinations such as Indian Engineering Services and GATE.

Contents: Preface. Manufacturing: Principles and Processes. Materials: Structures and Properties. Ferrous Metals: Irons and Steels. Non-ferrous Metals and Other Materials. Foundry Processes: Molding and Casting. Metal Machining: Processes and Machine Tools. Electric and Gas Welding Processes. Soldering and Brazing. Metal Forming: Hot- and Cold-working and Press-working. Metal Forging: Smithing and Power Forging. Powder Metallurgy Processes. Plastics: Manufacturing and Applications. Non-conventional Machining Methods. Automation: Transfer Machining, Machining Centres and Robotics.

Manufacturing Gears and Threads. Jigs and Fixtures. Metal Joining Processes: Adhesive Bonding and Mechanical Fastening. Protective Surface Treatments: Cleaning and Coatings. Bench Working: Fitting and Traditional Sheet Metal Working. Appendix. Bibliography. Index.

Latest Print 2014 / 1040 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4082-4 / ₹ 550.00 / (e-book also available)

KHAN & HAQUE Manufacturing Science

M.I. KHAN, *Professor and Head, Department of Mechanical Engineering and Dean, Faculty of Engineering at Integral University, Lucknow.*

SERAJUL HAQUE, *Assistant Professor, Department of Mechanical Engineering at Integral University, Lucknow. He is a member of the International Association of Engineers.*

This textbook presents a comprehensive introduction to the principles and practices of manufacturing processes used in the engineering industry. The book offers a practical approach to the subject with emphasis on production processes, machinery, technology and management of manufacturing processes. The text also follows the analytical approach aimed at assisting the students in developing an indepth understanding of the technical parameters involved in manufacturing. Numerous problems have been solved and clear illustrations have been provided to help students gain useful insights into the often complex relationships among design and economical factors. The end-of-chapter questions, descriptive as well as numerical exercises, are suitably designed to enhance student learning.

The book will be valuable for students pursuing degree courses in mechanical engineering, production engineering and industrial engineering.

FEATURES

- Includes a chapter on jigs and fixtures
- Discusses important machine tools and metal cutting processes
- Emphasises industrial safety norms
- Covers advanced topics such as non-conventional machining and welding
- Highlights the significance of measurements and metrology in inspection and quality control of production processes.

Contents: Preface. Acknowledgements. Introduction. Metal Forming Processes. Sheet-metal Working. Non-conventional Metal Forming Processes. Casting of Metals (Foundry). Powder Metallurgy. Manufacturing of Plastic Components. Jigs and Fixtures. Industrial Safety Engineering. Metal Cutting and Machine Tools. Machine Tools. Grinding and Finishing. Metal Joining (Welding). Non-conventional Machining and Welding. Fundamentals of Measurement. Index.

Latest Print 2011 / 576 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4426-6 / ₹ 395.00 / (e-book also available)

KUMAR & GUPTA Manufacturing Processes

RAJEEV KUMAR, *Associate Professor, Department of Mechanical Engineering, Institute of Engineering and Technology (IET), Lucknow.*

MAHESHWAR DAYAL GUPTA, *Department of Mechanical Engineering, Centre for Engineering, Baba Saheb Bhimrao Ambedkar University (Central University), Lucknow.*

This book is an introductory textbook on manufacturing processes that is written for the first year engineering students of various universities. Manufacturing industry is the backbone of any industrialized nation and it is, therefore, essential for all the aspiring engineers, irrespective of their area of study, to be familiar with the basic concepts of manufacturing processes as it has applications in every field of engineering and technology.

The entire subject matter of the book has been organized in twelve chapters covering engineering materials and their properties, importance of manufacturing, basic processes and the tools and machines used. The book also introduces the concept of product quality and basic tools in quality enhancement. The textbook contains about 400 problems for testing the understanding of the core concepts of the subject. Keeping in mind the type of questions asked in the university examination, short answer questions and long answer type questions are provided.

KEY FEATURES

- Suitable examples with short and brief definition of terms for easy understanding.
- Simple language that is easier for the first year students who are not familiar with the difficult technical terms.
- Plenty of figures, schematics and diagrams for better understanding of the related concepts.

Contents: Preface. Acknowledgements. Properties of Materials. Ferrous Materials. Heat Treatment of Materials. Non-ferrous Materials. Metal Forming. Casting. Machining. Welding. Importance of Materials and Manufacturing. Non-metallic Materials. Miscellaneous Processes. Product Quality. Index.

Latest Print 2014 / 232 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-4987-2 / ₹ 225.00 / (e-book also available)

MUKHERJEE Metal Fabrication Technology

SYAMAL MUKHERJEE, *Senior Consultant in the Mechanical Engineering Department of the National Institute of Technical Teachers' Training and Research (NITTTR), Kolkata.*

This book is a comprehensive presentation of the fundamental concepts and applications of metal fabrication technology. Designed primarily for undergraduate and postgraduate students of mechanical engineering and production engineering, the book will also be useful for students of engineering diploma programmes in the

above fields and certificate courses in metal fabrication and erection, as well as for practising engineers and consultants involved in welding, fabrication, erection, production planning, testing and design.

The initial chapters of the book provide an overview of the metal fabrication industry, as well as an exhaustive discussion of the properties of the various engineering materials, heat treatment processes, and frame analysis. The focus then shifts to production planning and control, production line design, as well as drawing, marking and layout. The ensuing chapters explain elaborately the various metal cutting processes, metal forming methods, and manufacturing processes. Assembly and erection, joining and welding, fault analysis and inspection, and metal finishing are covered subsequently. The various systematic guidelines for erection as well as the different prohibited welding methods and welding defects are elucidated. The final chapter of the book is devoted to health and safety issues relevant to fabrication and erection.

The book contains numerous illustrations that enable the students to gain a thorough understanding of the subject matter. The review questions at the end of each chapter help to test their comprehension of the underlying concepts.

Contents: Preface. Overview of Fabrication Industry. Engineering Materials, their Properties, Heat Treatment and Fracture Analysis. Production Planning and Control (PPC) in Fabrication and Production Line Design. Communication, Drawing, Marking and Layout. Metal Cutting Processes. Metal Forming Methods. Manufacturing Processes. Assembly Operation, Erection Guidelines and Fault Analysis. Joining, Welding, Soldering, Brazing and Inspection. Metal Finishing Operations. Health and Safety in Fabrication and Erection Work. Index.

Latest Print 2010 / 464 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4090-9 / ₹ 425.00 / (e-book also available)

PARASHAR

Cellular Manufacturing Systems: An Integrated Approach

B.S. NAGENDRA PARASHAR, *Pro Vice Chancellor, KL University, Guntur.*

Cellular manufacturing, an application of group technology, is a stepping stone to achieve world class manufacturing status. It has emerged as an important technique to cope up with fast changing industrial demands for the application of newer manufacturing systems.

This comprehensive and well written text deals with all facets of cellular manufacturing right from introduction to application in a chronological order. The book first introduces cell formation techniques, followed by elimination of exceptional components, evaluation of solutions, cell characteristics, and production control issues like scheduling; line balancing and inventory control. Finally it discusses about the application of

cellular manufacturing in a large public sector. The text is supported by numerous figures, tables and examples, and also furnishes simple algorithms for complex methods.

Primarily intended for the postgraduate students of mechanical engineering and production engineering with specialization in manufacturing systems/group technology, it will also be useful for the researchers, scientists and professionals as a reference book.

Contents: Preface. Cellular Manufacturing: An Overview. Cell Formation Techniques. Processing the Exceptional Components in Cellular Manufacturing. Evaluation of Cellular Manufacturing Solutions. Cell Characteristics. Production Control Activities in Cellular Manufacturing. Implementation Issues in Cellular Manufacturing. Cellular Manufacturing—A Case Study. Appendix. Bibliography. Index.

Latest Print 2008 / 292 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-3601-8 / ₹ 250.00 / (e-book also available)

PARASHAR & MITTAL

Elements of Manufacturing Processes

B.S. NAGENDRA PARASHAR, *Pro Vice Chancellor, KL University, Guntur.*

R.K. MITTAL, *Deputy Director (Admin.), Birla Institute of Technology and Science (BITS, Pilani), Pilani.*

This comprehensive introduction to basic manufacturing processes is ideal for both degree and diploma courses in engineering. With several pedagogical features, the text makes the topics understandable and appealing for students.

The book first introduces the concepts of engineering materials and their properties, measurement and quality in manufacturing and allied activities before dwelling upon the details of different manufacturing processes such as machining, casting, metal forming, powder metallurgy and joining. To keep pace with the latest advancements in technology, use of non-conventional resources, applications of computers, and use of robots in manufacturing are also discussed in considerable detail. The text also provides a thorough treatment of topics on economy and management of production.

Contents: Preface. Acknowledgments. Manufacturing Concepts. Engineering Materials. Measurements and Quality in Manufacturing. Theory of Metal Cutting. Turning Operations. Drilling and Allied Operations. Shaping, Planing and Slotting Operations. Milling Operations. Finishing Processes. Phase Change Processes for Material Property Manipulation. Casting Processes. Metal Forming Processes. Sheet-metal Working. Powder Metallurgy. Mechanical Joining Processes. Processing of Plastics. Non-conventional Resources in Manufacturing. Computer Controlled Manufacturing Systems. Economics of Manufacturing. Production Management. Power Transmission in Machine Tools. Appendices. Objective Type Questions. Bibliography. Index.

Latest Print 2012 / 496 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-1958-5 / ₹ 250.00 / (e-book also available)

RAJAN, et al.

Heat Treatment: Principles and Techniques, 2nd ed.

T.V. RAJAN, C.P. SHARMA and ASHOK SHARMA,
*Department of Metallurgical and Materials Engineering,
Malviya National Institute of Technology, Jaipur.*

The study of heat treatment has assumed great significance because of the vital role heat treatment plays in achieving the designed characteristics in a given material. This comprehensive and well-organized text skillfully blends the theoretical and practical aspects of heat treatment. It discusses, in rich detail, about heat treatment of commercial steels, cast irons and non-ferrous metals and alloys. The book also offers an in-depth analysis of topics such as nature of metals and alloys; principles of heat treatment of steels; heat treatment processes; possible defects, causes and remedies in heat treatment; and inspection and quality control in heat treatment.

This second edition of the successful text has gone through considerable modification on the basis of responses received. Additional figures have been added for greater clarity and understanding. Multiple choice questions and other pedagogically arranged questions help students to assess their subject knowledge.

Designed primarily as a text for undergraduate and postgraduate students of Metallurgy, the book is also useful for undergraduate students of mechanical, production, and chemical engineering. Besides, it meets the requirements of students of AMIE/AMIIM, and of diploma level courses in metallurgical and mechanical engineering. Furthermore, the book can serve as an invaluable reference for practising engineers.

Contents: Foreword. Preface. Preface to the First Edition. Introduction. Nature of Metals and Alloys. Iron-Cementite Phase Diagram. Principles of Heat Treatment of Steels. Heat Treatment Processes for Steels. Hardenability. Quenchants. Chemical Heat Treatment of Steels. Surface Hardening. Thermomechanical Treatment. Heat Treatment Furnaces and Atmospheres. Temperature Measurement and Control. Possible Defects, Causes and Remedies in Heat Treatment. Heat Treatment of Commercial Steels. Cast Irons and Their Heat Treatment. Heat Treatment of Non-Ferrous Metals and Alloys. Inspection and Quality Control in Heat Treatment. Materials Testing. Energy Economy in Heat Treatment. Appendices. Bibliography. Index.

Latest Print 2014 / 408 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4095-4 / ₹ 375.00 / (e-book also available)

RAVI

Metal Casting: Computer-Aided Design and Analysis

B. RAVI, *is Associate Professor of Mechanical Engineering at the Indian Institute of Technology Bombay.*

This book presents a scientific approach to metal casting

design and analysis supported by software tools. Unlike other books in metal casting focused only on the process *know-how*, this book uncovers the *know-why* as well. Besides serving the needs of students of mechanical, production and metallurgical engineering, this book is equally meant to benefit practicing engineers involved or interested in casting development, including product designers, tool-makers, foundry engineers, supply chain managers, engineering consultants, researchers, and software developers. The theory discussed in the book is applicable to all types of castings: ferrous and non-ferrous, produced in sand and metal moulds.

By gaining a better understanding of the theory and logic involved through creating, analysing and optimizing virtual castings, the readers will learn how to:

- Design process-friendly cast products, leading to shorter development time
- Manufacture assured quality castings, leading to fewer rejections and 'surprises'
- Manage material and energy utilization, leading to higher yield and lower costs.

Contents: Preface. Metal Casting—Overview. Solid Modelling of Castings. Pattern, Mould, and Core Design. Feeder Design and Analysis. Gating Design and Analysis. Process Planning and Costing. Design for Castability. Appendices. Index.

Latest Print 2015 / 168 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2726-9 / ₹ 225.00 / (e-book also available)

SURENDER KUMAR

Technology of Metal Forming Processes

SURENDER KUMAR, *Professor and Head, Department of Production Engineering, Birla Institute of Technology, Ranchi.*

This comprehensive text presents the subject of metalworking by offering a clear account of the theory and applications of metal forming processes relevant to engineering practice. It is designed to serve as a textbook for undergraduate and postgraduate students of mechanical engineering, production engineering, industrial engineering, and metallurgical engineering.

The first seven chapters are devoted to basic concepts to equip the students with the background material on mechanics, material sciences and to provide them with a sound foundation in the theory of plasticity. In addition, the importance of friction and lubrication in metal forming processes is adequately highlighted. In the next nine chapters the reader is exposed to a richly detailed discussion of specific forming processes (including the lubricated metal forming processes) and new and powerful techniques are presented (load bounding and slip line field) for solving engineering problems in metal forming. The book then moves on to forming of polymers and also covers metal powder preforms, highlighting recent developments.

In the concluding portions of the book, the important

factors such as force, power requirements, formability and machinability in the study of individual processes, are briefly discussed. Finally, the application of computer-aided analysis in the metalworking processes has been demonstrated, being the demand in this competitive scenario.

Several chapter-end exercises are included to aid better understanding of the theory.

Contents: Preface. Nomenclature. Introduction. State of Stress. Strain and Strain Rates. Stress–Strain and Stress–Strain Rate Laws. Yield Criteria and Flow Rules. Friction in Metalworking. Lubrication Mechanism and Metalworking Lubricants. Drawing and Extrusion of Cylindrical Bodies. Drawing and Extrusion in Plane Strain. Deep Drawing. Strip Rolling. Forging. Bending and Forming. Slip Line Field Technique. Load Bounding Technique. Lubricated Metalworking Processes. Cold Processing of Polymers. Processing of Metal Powder Preforms. High Energy Rate Forming. Advances in Material Processing. Computer Application in Metalworking. Appendices—A: Comparison of Various Methods of Analysis of Forming Load. B: Derivation of Reynolds Equation for Power Law Fluids. C: Useful Tables. D: Stress–Strain Curves for Various Materials. References/Bibliography. Index.

Latest Print 2011 / 376 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3425-0 / ₹ 295.00 / (e-book also available)

Materials Management

CHITALE & GUPTA

Materials Management: Text and Cases, 3rd ed.

A.K. CHITALE, *Academic Advisor, and former Director, Shri Govindram Seksaria Institute of Management and Research, Indore.*

R.C. GUPTA, *Professor and Head, Department of Industrial and Production Engineering, SGSITS, Indore.*

This textbook, now in its third edition, continues to provide a comprehensive coverage of the different aspects of materials management in a student-friendly manner. The book gives a clear introduction to materials management, and discusses topics such as classification, codification, specifications and standardization of materials, which aid in effective purchasing. In view of their economic importance, materials planning and budgeting too have been covered in sufficient detail. Besides explaining the fundamental principles of stores management and materials handling, the text gives an in-depth analysis of inventory control with several illustrative examples. It also highlights the principles of purchasing, nature of purchasing process, value analysis and quality assurance.

In the second edition, five new chapters on capital purchasing, government purchasing, international purchasing, import substitution, and logistics, warehousing and distribution management were added

to cater to the needs of the students who are interested in having an initial exposure to the emerging area of logistics and supply chain management. Besides, chapter-end review questions have been added to probe a student's grasp of the subject matter.

Intended primarily for the undergraduate and post-graduate students of production engineering/industrial management and engineering, and MBA, this book would also be useful to the practicing managers.

Contents: Preface. Materials Management. Integrated Materials Management. Classification and Codification of Materials. Specifications in Materials Management. Standardization and Variety Reduction. Materials Planning. Budgeting and Material Planning. Stores and Store Keeping. Storage Equipment. Principles of Materials Handling. Inventory Control. Inventory Management Models. Selective Inventory Control. The Purchasing Cycle. Principles of Purchasing. The Nature of Purchasing Process and Vendor Rating. Value Analysis. Quality Control in Materials Management. Make or Buy Decisions. Buyer-seller Relationship. Negotiation. Disposal of Surplus, Obsolete and Scrap. Performance Appraisal of Materials Department. Some Legal Aspects of Purchasing. Purchasing of Capital Equipment. Public Buying. International Purchasing. Import Substitution. Logistics, Warehousing and Distribution Management. Supply Chain Management. Customer Relationship Management. Case Studies and Solved Problems. Appendices. References. Index.

Latest Print 2014 / 520 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4841-7 / ₹ 425.00 / (e-book also available)

DATTA

Materials Management: Procedures, Text and Cases, 2nd ed.

A.K. DATTA, *Secretary, Indian Society for Materials Management.*

To keep both students and managers abreast of the changes and emerging trends in the field of Materials Management, this second edition has been thoroughly revised and updated with the latest procedures and applications. It gives exhaustive coverage of the operational details of stores and purchases, standardization and quality control, value analysis and value engineering as well as the legal aspects of purchasing and the technicalities of warehousing.

A great amount of new material and some new chapters have been incorporated to suit the particular needs of students pursuing management courses. Numerous practical examples and illustrative solutions to problems are given. Mathematical concepts underlying inventory control, linear programming, etc. are explained. Case studies based on real-life situations have been included.

Contents: Preface. Preface to the First Edition. Part I: Materials Management and Purchase Organization—Introduction. Systems Approach to Materials Management. Forecasting, Objectives and the Materials

Organization. Materials Planning. Purchasing. Purchasing in Materials Management System Concept. Purchasing and Procurement Activities under Materials Management. Value Analysis and Value Engineering. Purchasing and Quality Assurance. Incoming Material Quality Control. Statistical Quality Control. Purchasing Capital Equipment, Plant and Machinery. International Buying and Import Purchasing. Governmental Purchasing Practices and Procedures. Part II: Inventory Management, Stores System and Logistics—Inventory Management and Control Systems. Stores Management and Operation. Materials Accounting, Flow of Costs and Inventory Valuation, Physical Verification, Security and Materials Audit. Materials Handling and Storage Systems; Physical Distribution Logistics. Transportation, Traffic and Claims Management. Part III: Operations Research and Related Techniques, Materials Management Information System and Computers—Operations Research and Related Techniques. Materials Management Information System and Computer. Part IV: Other Operational Areas of Materials Management—Economic Flow of Values and Materials Management. Spare Parts and Maintenance Materials Control and Obsolete Scrap or Process Waste and Surplus Materials Disposals. Materials Management and Productivity. Cost-Effectiveness and Performance Measurement. Conclusion. Part V: Case Studies Cases. Bibliography. Glossary. Case Index. Index.

Latest Print 2014 / 420 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-1251-7 / ₹ 325.00

GOPALAKRISHNAN & HALEEM Handbook of Materials Management, 2nd ed.

P. GOPALAKRISHNAN, *Ex. U.N. Advisor on Materials Management, Former Professor of Materials Management, Administrative Staff College of India Hyderabad (Consultant U.N. Materials Management).*

ABID HALEEM, *Professor of Mechanical Engineering Department, Faculty of Engineering and Technology, Jamia Millia Islamia, New Delhi. He is also Honorary Director of Internal Quality Assurance Cell (IQAC).*

This comprehensive research based, well received book, now in its Second Edition, continues to provide the most complete up-to-date coverage of the materials management discipline. It is the result of intensive and in-depth interactions of the authors with academic community, IIMM professionals as well as senior executives involved in materials, inventory, warehousing, logistics, supply chain, working capital and top management. This title reflects the wealth of experience gained by the authors in India and abroad in training, research, teaching and consultancy.

This well-organised comprehensive book clearly analyses all the concepts, processes and applications of Materials Management, Supply Chain Management, Logistics Management, and Multimodal Transport. It covers basic principles and practices concerning these areas as well as to its application in Indian conditions. This textbook

describes the concept of integrated materials management with the help of diagrams, charts, photos and solved examples, covering all the aspects of materials management. It provides a number of solved practical problems and examples for better comprehension. The suggestions of practising professionals, academicians and researchers have been appropriately incorporated in this book. An attempt has been made to strike a balance between conceptual frameworks and practical aspects of materials and its management.

Intended primarily as a textbook for graduate students pursuing materials management courses in Indian universities, this comprehensive title will also serve as a ready reckoner for the executives practising in areas such as materials, logistics, SCM, purchase, warehousing and inventory management. The students of business management, engineering, Indian Institute of Materials Management (IIMM) diploma and other related programs/courses will find this book extremely useful.

Contents: Preface. Preface to the First Edition. Acknowledgements. Section I: Materials Management Concepts. Section II: Identification of Materials. Section III: Inventory Management. Section IV: Procurement of Materials. Section V: Warehousing and Logistics Management. Section VI: Financial Issues in Materials Management. Section VII: Organisational and Ethical Issues in Material Management. Section VIII: IT Integration and Performance Reporting in Material Management. Bibliography. Questions. Index.

Latest Print 2015 / 828 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4801-1 / ₹ 795.00 / (e-book also available)

GOPALAKRISHNAN & SUNDARESAN Materials Management: An Integrated Approach

P. GOPALAKRISHNAN, *Ex. U.N. Advisor on Materials Management, Former Professor of Materials Management, Administrative Staff College of India Hyderabad (Consultant U.N. Materials Management).*

M. SUNDARESAN, *Graduate School of Business, Columbia University, New York.*

Focussed on the importance of an integrated approach to materials management within the framework of the Indian environment, this work presents comprehensive coverage of all aspects of the subject, such as the operational details of stores, purchase and inventory control as well as procedures and modern mathematical concepts. While dealing with policy aspects of materials management, including the concepts of management by objectives, it offers a lucid explanation of the application of modern scientific management techniques.

Contents: Preface. Part I: Policy Aspects—Integrated Materials Management. Corporate Policy and Materials Management. Organisation and Control. Materials Research. Materials Planning and Budgeting. ABC Analysis. Codification and Standardisation. Source Selection. Part II: Purchasing Management—Creative

Purchasing. Purchase Systems. Price Forecasting. Buying Seasonal Commodities. Purchasing Under Uncertainty. Purchasing of Capital Equipment. International Purchasing. Import Substitution: Prospects and Retrospects. Public Buying. Legal Aspects in Buying. Insurance Buying. Buyer-Seller Relationship and Ethics. Part III: Warehousing and Stores Management—Stores Management. Stores Systems and Procedures. Incoming Materials Control. Stores Accounting and Stock Verification. Obsolete, Surplus and Scrap Management. Value Analysis. Material Handling. Transportation and Traffic Management. Part IV: Inventory Management and O.R. Techniques—Inventory Management in India. Economical Ordering Quantity. Practical Inventory Systems. O.R. Techniques in MM. Role of PERT in MM. Computers in MM. Evaluation of MM. Bibliography. Index.

Latest Print 2014 / 280 pp. / 15.3 × 22.9 cm

ISBN-978-81-203-0027-9 / ₹ 225.00 / (e-book also available)

Materials Science and Engineering

BHARGAVA

Engineering Materials: Polymers, Ceramics and Composites, 2nd ed.

A.K. BHARGAVA, *Professor, Department of Metallurgical and Material Engineering, Malaviya National Institute of Technology, Jaipur.*

This text, now in its second edition, continues to provide a balanced practical treatment of polymers, ceramics, and composites, covering all their physical properties as well as applications in industry. The text puts emphasis on developing an understanding of properties, characteristics and specifications of non-metallic engineering materials and focusing on the techniques for controlling their properties during processing. It provides students with the knowledge they need to make optimal selection and use of these materials in a variety of manufacturing applications.

The book focuses on structure-properties correlation of materials as it forms the basis for predicting their behaviour during processing and service conditions. The text also discusses the recently developed advanced materials. Each chapter includes the questions of fundamental importance and industrial significance, along with their answers.

This book is especially designed for Metallurgical and Materials Science students for a course in non-metallic engineering materials. Besides it should prove useful for the students of other engineering disciplines where materials science/materials engineering is offered as a compulsory course.

NEW TO THIS EDITION

- Addition of a new chapter on *Ceramics—A Material for Biomedical Applications* (Chapter 5)

- Inclusion of a number of questions and their answers in Chapters 2, 3 and 4, modifications of existing figures and the inclusion of new ones.
- Incorporation of plenty of numerical problem related to polymers, ceramics and composites.

Contents: List of Figures. List of Tables. List of Symbols. Preface. Preface to the First Edition. Properties of Non-Metallic Materials. Polymer Materials. Ceramic Materials. Composite Materials. Role of Ceramics in Biomedical Applications. Appendices—1: Periodic Table of Elements. 2: Some Physical Properties of Metals. 3: The Electronic Configuration of Elements. 4: Atomic and Ionic Radii of Elements. 5: The SI Base Units. 6: Derived SI Units. 7: Unit Conversion. 8: Prefixes: Names of Multiples and Submultiples. 9: Values of Constants. 10: Selective Greek Alphabets and Their Pronunciations. 11: Abbreviations of Commonly Used Polymers. 11A: Other Abbreviations. 12: Physical and Thermal Properties of Polymers. 13: Mechanical Properties of Some Representative Polymer Materials. 14: Major ASTM Standards for Polymers. 15: Repeating Chemical Structural Units and Morphology of Polymers. 16: Chemical Composition of Some Ceramic Materials. 17: Some Common Ceramic Crystal Structures and Their Examples. 18: Functions and Applications of Advanced (or Technical) Ceramics. 19: Compositions of Glasses. 20: Compositions of Common Refractories. 21: Properties of Some Commonly Used Reinforcing Fibres. Bibliography. Index.

Latest Print 2012 / 440 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4621-5 / ₹ 350.00 / (e-book also available)

BHARGAVA & SHARMA Mechanical Behaviour and Testing of Materials

A.K. BHARGAVA, *Professor, Department of Metallurgical and Materials Engineering, Malaviya National Institute of Technology Jaipur.*

C.P. SHARMA, *Professor, Department of Metallurgical and Materials Engineering, Malaviya National Institute of Technology Jaipur.*

This comprehensive book provides an insight into the mechanical behaviour and testing of metals, polymers, ceramics and composites, which are widely employed for structural applications under varying loads, temperatures and environments.

Organized in 13 chapters, this book begins with explaining the fundamentals of materials, their basic building units, atomic bonding and crystal structure, further describing the role of imperfections on the behaviour of metals and alloys. The book then explains dislocation theory in a simplified yet analytical manner. The destructive and non-destructive testing methods are discussed, and the interpreted test data are then examined critically.

Specifically designed for the undergraduate and postgraduate students of Metallurgical and Materials

Engineering, the book will be equally beneficial for the undergraduate and postgraduate students of Mechanical engineering and related disciplines. Besides, the book will also be useful for the practising engineers.

KEY FEATURES

- **Practical Manual** in the form of **Appendices**
- **Question Bank** along with solutions
- **200 Objective Type Questions** (all from the GATE examination)
- **Glossary** of terms

Contents: Preface. Nature of Materials. Crystal Imperfections. Mechanical Properties. Dislocation Theory. Deformation of Metals. Strengthening Mechanisms in Materials. Fracture. Tensile Behaviour. Hardness Testing. Ductile-Brittle Transition Behaviour and Fracture Toughness Test. Fatigue Behaviour. Creep Behaviour. Non-destructive Testing. Glossary. Question Bank. Appendices. Bibliography. Index.

Latest Print 2014 / 568 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4250-7 / ₹ 425.00 / (e-book also available)

MITRA

Characterization of Materials

P.K. MITRA, *Professor, Department of Metallurgical & Materials Engineering, Jadavpur University, Kolkata.*

Designed as textbook for the students of metallurgical and materials engineering, this book is divided into two parts. The first part deals with understanding of structure and depiction of crystallographic planes and directions quantitatively, which is absolutely necessary for understanding of application of X-rays or Electron microscopes. The second part deals with basic principles and applications of X-ray and electron diffraction, small angle and grazing incidence X-ray scattering and spectroscopic analysis methods. The chapter on Electron microscopes includes almost whole range of instruments like TEM, SEM, FESEM, Microprobe Analyzer and AFM, used for characterizing micro and nanomaterials. The spectroscopic methods discussed are UV-VIS, IR & FTIR, Raman and Auger Electron spectroscopes.

CONTENTS: Preface. Crystal Structure. Stereographic Projection. Reciprocal Lattice. Principle of X-Ray Diffraction. Application of X-Rays in Structure. Principles of SAXS and GIXS. Electron Microscopy. Spectroscopy. Index.

Latest Print 2014 / 160 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4856-1 / ₹ 195.00 / (e-book also available)

RAGHAVAN

Materials Science and Engineering: A First Course, 6th ed.

V. RAGHAVAN, *formerly Professor of Materials Science at the Indian Institute of Technology Delhi.*

This well-established and widely adopted book, now in its Sixth Edition, provides a thorough analysis of the subject in an easy-to-read style. It analyzes, systematically and

logically, the basic concepts and their applications to enable the students to comprehend the subject with ease.

The book begins with a clear exposition of the background topics in chemical equilibrium, kinetics, atomic structure and chemical bonding. Then follows a detailed discussion on the structure of solids, crystal imperfections, phase diagrams, solid-state diffusion and phase transformations. This provides a deep insight into the structural control necessary for optimizing the various properties of materials. The mechanical properties covered include elastic, anelastic and viscoelastic behaviour, plastic deformation, creep and fracture phenomena. The next four chapters are devoted to a detailed description of electrical conduction, superconductivity, semiconductors, and magnetic and dielectric properties. The final chapter on 'Nanomaterials' is an important addition to the sixth edition. It describes the state-of-art developments in this new field.

This eminently readable and student-friendly text not only provides a masterly analysis of all the relevant topics, but also makes them comprehensible to the students through the skillful use of well-drawn diagrams, illustrative tables, worked-out examples, and in many other ways. The book is primarily intended for undergraduate students of all branches of engineering (B.E./B.Tech) and postgraduate students of Physics, Chemistry and Materials Science.

KEY FEATURES

- All relevant units and constants listed at the beginning of each chapter
- A note on SI units and a full table of conversion factors at the beginning
- A new chapter on 'Nanomaterials' describing the state-of-art information
- Examples with solutions and problems with answers
- About 350 multiple choice questions with answers

Contents: Preface. Preface to the First Edition. SI Units. Physical Constants. Conversion Factors. Greek Alphabets. Introduction. Equilibrium and Kinetics. Crystal Geometry and Structure Determination. Atomic Structure and Chemical Bonding. Structure of Solids. Crystal Imperfections. Phase Diagrams. Diffusion in Solids. Phase Transformations. Elastic, Anelastic and Viscoelastic Behaviour. Plastic Deformation and Creep in Crystalline Materials. Fracture. Oxidation and Corrosion. Conductors and Resistors. Semiconductors. Magnetic Materials. Dielectric Materials. Nanomaterials. Appendix I—Properties of Elements. Appendix II—Properties of Engineering Materials. Index.

Latest Print 2015 / 488 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-5092-2 / ₹ 295.00 / (e-book also available)

RAGHAVAN

Physical Metallurgy: Principles and Practice, 2nd ed.

V. RAGHAVAN, *formerly Professor of Materials Science at the Indian Institute of Technology Delhi.*

This well-established book, now in its Second Edition, presents the principles and applications of engineering metals and alloys in a highly readable form. This new edition retains all the basic topics such as phase diagrams, phase transformations, heat treatment of steels and nonferrous alloys, solidification, fatigue, fracture and corrosion covered in the First Edition. The text has been updated and rewritten for greater clarity. Also, more diagrams have been added to illustrate the concepts discussed.

This Edition gives New Sections on

- Thermoelastic martensite
- Shape memory alloys
- Rapid solidification processing
- Quaternary phase diagrams

Intended as a text for undergraduate courses in Metallurgy/Metallurgical and Materials Engineering, this book is also suitable for students preparing for associate membership examination of Indian Institute of Metals (AMIIM), as well as other professional examinations like AMIE.

Contents: Preface. Preface to the First Edition. Physical Constants. Conversion Factors. Structure of Metals and Alloys. Phase Diagrams. Phase Changes. Heat Treatment of Steels. Mechanical Properties. Corrosion and its Prevention. Engineering Alloys. Index.

Latest Print 2014 / 248 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-3012-2 / ₹ 225.00 / (e-book also available)

RAGHAVAN

Solid State Phase Transformations

V. RAGHAVAN, *formerly Professor of Materials Science at the Indian Institute of Technology Delhi.*

One of the main fields of study of metallurgists, ceramists and other materials scientists is the interrelationships between structure and properties of materials. The subject of phase transformations plays a key role here. This book presents the fundamental principles that govern the kinetics and the mechanism of solid state phase transformations and provides a good balance between the advanced concepts evolved in research and the classroom teaching. The emphasis being on principles, the presentation is generally applicable to all groups of materials.

The book is intended for advanced level undergraduate students of metallurgy and materials science, first year postgraduate students of metallurgy and materials science, and M.Sc. students of solid-state physics and solid-state chemistry.

Contents: Preface. Foreword. Introduction. Diffusion in Solids. Thermodynamics of Transformations. Nucleation Kinetics. Growth Kinetics. Overall Transformation Kinetics. Particle Coarsening. Pearlitic Transformations. Massive Transformations. Recovery, Recrystallization and Grain Growth. Martensitic Transformations. Spinodal Decomposition. List of Symbols. Index.

Latest Print 2012 / 196 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-0460-9 / ₹ 175.00

SHARMA

Engineering Materials: Properties and Applications of Metals and Alloys

C.P. SHARMA, *Professor at Department of Metallurgical Engineering, Malaviya National Institute of Technology, Jaipur.*

This compact and student-friendly book provides a thorough understanding of properties of metallic materials and explains the metallurgy of a large number of metals and alloys.

The text first exposes the reader to the structure-property correlation of materials, that form the basis for predicting their behaviour during manufacturing and other service conditions, and then discusses the factors governing the selection of a material for specific applications. It further introduces the various specifications/designations, (including AISI/SAE system) used for steels and the alloying elements. The text also gives detailed coverage on mechanical behaviour of other engineering metals including Al, Mg, Cu, Ni, Zn and Pb.

Profusely illustrated with graphs and tables, the book presents a large number of questions and answers framed on the pattern of the university examinations. It thus enables the students to format compact and to-the-point answers.

This book would be highly valued by students of metallurgical engineering and also those pursuing various other engineering as well as polytechnic courses, besides professionals who deal with selection of materials.

Contents: Preface. List of Tables. List of Figures. Introduction to Engineering Materials. Carbon Steels. Alloy Steels. Cast Irons. Light Metals and Alloys. Copper and Its Alloys. Nickel, Cobalt and Their Alloys. White Metals and Their Alloys. Refractory Metals and Alloys. Multiple Choice Questions. Appendices. Index.

Latest Print 2015 / 272 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-2448-0 / ₹ 225.00 / (e-book also available)

Mechanical Vibration/ Theory of Vibrations

AMBEKAR

Mechanical Vibrations and Noise Engineering

ASHOK G. AMBEKAR, *Technical Advisor and Former Director, Swami Vivekanand College of Engineering, Indore.*

This book, which is a result of the author's many years of teaching, exposes the readers to the fundamentals of mechanical vibrations and noise engineering. It provides them with the tools essential to tackle the problem of vibrations produced in machines and structures due to unbalanced forces and the noise produced thereof. The text lays emphasis on mechanical engineering applications of the subject and develops conceptual understanding with the help of many worked-out examples.

What distinguishes the text is that three chapters are devoted to Sound Level and Subjective Response to Sound, Noise: Effects, Ratings and Regulations and Noise: Sources, Isolation and Control. Importance of mathematical formulation in converting a distributed parameter vibration problem into an equivalent lumped parameter problem is also emphasized.

Primarily designed as a text for undergraduate and postgraduate students of mechanical engineering, this book would also be useful for undergraduate and postgraduate students of civil, aeronautical and automobile engineering as well as practising engineers.

Contents: Preface. Fundamentals and Basic Concepts. Undamped Free Vibrations. Damped Free Vibrations. Harmonically Excited Vibration (Systems with Single Degree of Freedom). Systems with Two Degrees of Freedom. Multi-Degree of Freedom Systems. Whirling Motion and Critical Speeds. Continuous Systems. Sound Level and Subjective Response to Sound. Noise: Effects, Ratings and Regulations. Noise: Sources, Isolation and Control. Bibliography. Answers to Selected Review Questions. Index.

Latest Print 2015 / 412 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2900-3 / ₹ 325.00 / (e-book also available)

DUKKIPATI & SRINIVAS

Textbook of Mechanical Vibrations, 2nd ed.

Late RAO V. DUKKIPATI, *during his illustrious academic career served as Professor of Mechanical Engineering, Fairfield University, Fairfield (Connecticut) and Adjunct Professor of Mechanical Engineering, Concordia University, Montreal.*

J. SRINIVAS, *Associate Professor of Mechanical Engineering at the National Institute of Technology Rourkela.*

This comprehensive and accessible book, now in its

second edition, covers both mathematical and physical aspects of the theory of mechanical vibrations. This edition includes a new chapter on the analysis of *nonlinear vibrations*. The text examines the models and tools used in studying mechanical vibrations and the techniques employed for the development of solutions from a practical perspective to explain linear and nonlinear vibrations. To enable practical understanding of the subject, numerous solved and unsolved problems involving a wide range of practical situations are incorporated in each chapter.

This text is designed for use by the undergraduate and postgraduate students of mechanical engineering.

Contents: Preface. Acknowledgements. Notations. Introduction. Undamped Free Vibrations. Damped Free Vibrations. Forced Vibrations. Two-degrees-of-freedom Systems. Multi-degrees-of-freedom Systems. Numerical Techniques to Find Natural Frequencies. Vibration Analysis of Continuous Systems. Transient and Random Vibration Analysis. Finite Element Method. Nonlinear Vibrations. Appendices—A.1: Laplace Transforms. A.2: Numerical Integration Methods in Vibration Analysis. A.3: Transverse Vibrations of Beams. Bibliography. Answers to Selected Exercises. Index.

Latest Print 2013 / 480 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4524-9 / ₹ 375.00 / (e-book also available)

LASITHAN

Mechanical Vibrations and Industrial Noise Control

LASITHAN L.G., *Assistant Professor, at the Department of Mechanical Engineering, College of Engineering, Adoor.*

Designed to serve as a textbook for undergraduate and postgraduate students of Mechanical Engineering, this book helps promote student understanding of complex phenomena of vibration technology. The book through clear and concise writing equips students with skills required to use vibration theory in analysis and design of engineering systems and devices. The book also discusses in an exclusive chapter the detrimental effects of industrial noise on human beings, and suggests measures to control noise.

The book explains the basic principles and the fundamental concepts of the vibration theory related to the study of conventional vibration phenomena such as free response, response to harmonic excitation, general forced response, non-linear analysis, self-excited oscillations, random time functions, and torsional vibration. Besides, it discusses the vibration measuring instruments used for testing in various engineering applications.

The book features a wealth of excellent worked-out examples of practical applications, and a host of challenging problems at the end of each chapter.

Contents: Preface. Introduction to Vibration. Undamped Free Vibrations of Single-Degree-of-Freedom Systems.

Damped Free Vibrations of Single-Degree-of-Freedom Systems. Harmonically Excited Vibration of Single-Degree-of-Freedom Systems. Vibration Measuring Instruments and Support Excitation. Two-Degree-of-Freedom Systems. Multidegree-of-Freedom Systems. Torsional Vibrations. Vibration Analysis of Continuous Systems. Multidegree-of-Freedom Systems—Approximate Numerical Methods. Nonlinear and Self-Excited Vibrations. Random Vibrations. Vibration under General Forcing Conditions. Noise. Appendix. Index.

Latest Print 2013 / 640 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4779-3 / ₹ 525.00

VENKATACHALAM Mechanical Vibrations

R. VENKATACHALAM, *Professor of Mechanical Engineering at the National Institute of Technology, Warangal.*

Aiming at undergraduate and postgraduate students of mechanical engineering, the book has been written with a long teaching experience of the author. Lucid and beyond traditional writing style makes the text different from other books. In this text, every effort has been taken to make the subject easy and interesting. The concepts have been explained in such a manner that students do not require any prerequisite knowledge.

The text amalgamated with real-world examples help students adhere to the book and learn the concepts on their own. Throughout the book, engaging and thought-provoking approach has been followed.

It discusses free and forced vibrations of undamped and damped single degree freedom systems, self-excited vibrations, vibrations of two and multi degree freedom systems, vibrations of continuous systems and Lagrangian formulation.

A chapter on 'Set up a Mechanical Vibration Laboratory' helps students and teachers to learn how to develop a basic laboratory without involving a heavy cost.

Besides undergraduate and postgraduate students, this text also serves as a launch pad for those who want to pursue research.

KEY FEATURES

- Simple practical demonstrations.
- Helps the student in developing important skills such as reasoning, interpretation and physical visualisation.
- Helps to develop software.
- Prepares for competitive examinations.
- There are nearly 50 problems illustrated and around 200 problems given in exercises for practice.

Contents: Preface. Introduction. A Start to Study of Vibrations. Some more Problems of Free Vibrations. Free Oscillations of Rigid Bodies. Outline of Study of Vibrations. Energy Methods in Vibrations. Forced Vibrations of Undamped Single Degree Freedom System. Resonance. Self Excited Oscillations. Free Vibrations of Damped Single Degree Freedom System. Forced

Vibrations of Damped Single Degree Freedom System. Transient Vibrations. Two Degree Freedom Systems. Multi Degree Freedom Systems. Numerical Methods. Lagrangian Formulation. Vibrations of Continuous Systems. Set up a Mechanical Vibration Laboratory. Closure. Appendices—A. Preliminary Ideas on Ordinary Differential Equations. B. Large Angle Oscillations of Simple Pendulum. C. Artificial Gravity. D. Finding Moments of Inertia. E. Modulus of a Complex Quantity. F. Deflection of Beams. G. For Transient Vibration Studies. H. Matrices and Eigen Value Problem. I. Development of Runge Kutta Algorithm. J. Convergence of Matrix Iteration Method. K. Oscillations of Pendulum Under Coulomb Damping. L. Oscillations Under Stick Slip Motion. M. Vibrations Under Periodic Impulses. Answers to Problems for Practice. Index.

Latest Print 2014 / 440 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-5035-9 / ₹ 425.00 / (e-book also available)

Mechatronics

SINGH & JOSHI Mechatronics

M.D. SINGH, *Formerly Principal, Sagar Institute of Technology and Research, Bhopal.*

J.G. JOSHI, *Lecturer Department of Electronics and Telecommunication, Government Polytechnic, Pune.*

Mechatronics is today fast developing as an interdisciplinary branch of engineering. This book offers a comprehensive coverage of the design and application of mechatronic systems. It discusses in detail the construction, operation, features and applications of various components of mechatronic systems. The text emphasizes the readers' multidisciplinary skills and ability to design and maintain different mechatronic systems.

KEY FEATURES

- The text is profusely illustrated with diagrams to help the readers assimilate the concepts with ease.
- Motivational assignments given at the end of each chapter and the Case Studies given at the end of the book direct the students to applications of mechatronic concepts in actual problems encountered in engineering practice.
- A separate chapter is devoted to the advanced topic of Robotics.

Primarily intended to cater to the needs of students of undergraduate and diploma courses in mechanical, electronics, industrial and mechatronics engineering disciplines, the book will also be of immense use for practising engineers.

Contents: Foreword. Preface. Acknowledgements. Introduction. Analog Devices. Oscillators. Power Supplies and Voltage Regulators. Power Electronics. Digital Electronics. Transducers. Signal Conditioning Elements. Data Acquisition System. Control System Components. Time Response Analysis. Stability. Frequency Response

Analysis. Process Control. Belts. Chains. Cams. Gears. Mechanical Systems. Microelectromechanical Systems (MEMS). Robotics. Applications of Computers in Mechatronics. Bibliography. Case Studies. Index.

Latest Print 2013 / 512 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2986-7 / ₹ 375.00 / (e-book also available)

Operations Research

PANNEERSELVAM

Operations Research, 2nd ed.

R. PANNEERSELVAM, *Professor and Head, Department of Management Studies, School of Management, Pondicherry University.*

The second edition of this well-organized and comprehensive text continues to provide an in-depth coverage of the theory and applications of operations research. It emphasizes the role of operations research not only as an effective decision-making tool, but also as an essential productivity improvement tool to deal with real-world management problems.

This edition includes new carefully designed numerical examples that help in understanding complex mathematical concepts better. The book is an easy read, explaining the basics of operations research and discussing various optimization techniques such as linear and non-linear programming, dynamic programming, goal programming, parametric programming, integer programming, transportation and assignment problems, inventory control, and network techniques. It also gives a comprehensive account of game theory, queuing theory, project management, replacement and maintenance analysis, and production scheduling.

NEW TO THIS EDITION

- Inclusion of quantity discount models for transportation problem.
- Updated inventory control model and detailed discussion on application of dynamic programming in the fields of cargo loading and single-machine scheduling.
- Numerous new examples that explain the operations research concepts better.
- New questions with complete solutions to selected problems.

This book, with its many student friendly features, would be eminently suitable as a text for students of engineering (mechanical, production and industrial engineering), management, mathematics, statistics, and postgraduate students of commerce and computer applications (MCA).

Contents: Preface. Overview of Operations Research. Linear Programming. Transportation Problem. Assignment Problem. Network Techniques. Integer Programming. Inventory Control. Dynamic Programming. Queuing Theory. Project Management. Decision Theory. Game

Theory. Replacement and Maintenance Analysis. Production Scheduling. Goal Programming. Parametric Linear Programming. Nonlinear Programming. Appendix. Suggested Further Reading. Answers to Questions. Index.

Latest Print 2015 / 620 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2928-7 / ₹ 395.00 / (e-book also available)

RAJAGOPAL

Operations Research

K. RAJAGOPAL, *Professor of Mechanical Engineering, K.S.R.M. College of Engineering, Kadapa (Andhra Pradesh).*

This comprehensive book provides the students with the basic knowledge of the processes involved in operations research and discusses the techniques of solutions to problems and their applications in daily life.

Beginning with an overview of the operations research models and decision-making, the book describes in detail the various optimization techniques such as linear and non-linear programming, integer linear programming, dynamic programming, genetic programming, and network techniques such as PERT (program evaluation review technique) and CPM (critical path method). It also explains the transportation and assignment problems, queuing theory, games theory, sequencing, replacement and capital investment decisions and inventory. Besides, the book discusses the Monte Carlo simulation techniques for solving queuing, demand forecasting, inventory and scheduling problems and elaborates on genetic algorithms.

Each mathematical technique is dealt with in two parts. The first part explains the theory underlying the methodology of solution to problems. The second part illustrates how the theory is applied to solve different kinds of problems.

This book is designed as a textbook for the undergraduate students of mechanical engineering, electrical engineering, production and industrial engineering, computer science and engineering and information technology. Besides, the book will also be useful to the postgraduate students of production and industrial engineering, computer applications, business administration, commerce, mathematics and statistics.

KEY FEATURES

- Includes a large number of solved problems to help students comprehend the concepts with ease.
- Gives step-by-step explanation of algorithms by taking problems.
- Provides chapter-end exercises to drill the students in self-study.

Contents: Preface. Introduction to Operations Research Models and Decision-Making. Linear Programming: Basic Concepts. Graphical Method. Simplex Method. Big M Method. Duality in Linear Programming. Sensitivity Analysis. Revised Simplex Method. Two-phase Simplex Method. Dual Simplex Method. Integer Linear

Programming: Branch and Bound Algorithms. Integer Linear Programming: Gomory Cutting Plane Method. Transportation Problem. Assignment Model. Non-linear Programming: Classical Optimization Techniques. Non-linear Programming with Constraints Graphical Solution. Non-linear Programming: Multivariable Optimization with Equality Constraints: Lagrange Multipliers Method. Non-linear Programming: Multivariable Optimization with Inequality Constraints: Kuhn–Tucker Conditions. Non-linear Programming: Quadratic Programming and Separable Programming. Search Methods (Non-linear Programming). Sequencing. Replacement and Capital Investment Decisions. Inventory. Theory of Games. Queueing Theory (Waiting Lines). Network Problems. Network Techniques: Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT). Dynamic Programming. Monte Carlo Simulation. Genetic Algorithms. Genetic Programming. Appendices. Index.

Latest Print 2012 / 608 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4634-5 / ₹ 495.00 / (e-book also available)

SEN

Operations Research: Algorithms and Applications

RATHINDRA P. SEN, *Professor and Head, Department of Economics in M.G. Kashi Vidyapeeth, Varanasi.*

This text provides a sound foundation for understanding the concepts, theory and applications of operations research by integrating numerous examples. It covers all the relevant topics along with the recent developments in the field.

The book begins with an overview of operations research and then discusses the simplex method of optimization and duality concept along with the deterministic models such as post-optimality analysis, transportation and assignment models. While covering hybrid models of operations research, the book elaborates PERT (Programme Evaluation and Review Technique), CPM (Critical Path Method), dynamic programming, inventory control models, simulation techniques and their applications in mathematical modelling and computer programming. It explains the decision theory, game theory, queueing theory, sequencing models, replacement and reliability problems, information theory and Markov processes which are related to stochastic models. Finally, this well-organized book describes advanced deterministic models that include goal programming, integer programming and non-linear programming.

KEY FEATURES

- Treats each topic right from its conceptual stage to the advanced stage.
- Provides abundant business life illustrations and solved examples to help amplify key concepts and give students extensive models for problem solving.
- Offers graded problems at the end of each chapter to provide students with the means to develop their understanding of the material.

The book is intended for postgraduate students of management, computer applications, mathematics, statistics, commerce, economics, as well as students of engineering (mechanical, production and industrial engineering).

Contents: Preface. Introduction. Part I: Deterministic Operations Research Models—Linear Programming I: Problem Formulation, Graphical Solution and The Simplex Method. Linear Programming II: Duality Concept and Post-Optimality Analysis. Linear Programming Extensions: Transportation and Assignment Models. Part II: Hybrid Operations Research Models—Project Management: PERT and CPM. Dynamic Programming: Recursive Optimization. Inventory Control Models. Simulation Techniques and Applications—Mathematical Modelling and Computer Programming. Part III: Stochastic Operations Research Models—Decision Theory. Game Theory: An Analysis of Strategic Interaction. Queueing Theory. Sequencing Models. Replacement, Maintenance, and Reliability Problems. Markov Processes. Information Theory. Part IV: Advanced Deterministic Operations Research Models—Goal Programming. Integer Programming. Non-linear Programming. Appendix A: Answers to Review Problems. Appendix B: Statistical Tables. Bibliography. Index.

Latest Print 2012 / 800 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3930-9 / ₹ 425.00 / (e-book also available)

SHAH, GOR & SONI Operations Research

NITA H. SHAH, *Reader, Department of Mathematics, Gujarat University, Ahmedabad.*

RAVI M. GOR, *Professor & Dean (Academics), St. Kabir Institute of Professional Studies, Ahmedabad.*

HARDIK SONI, *Lecturer, Chimanbhai Patel Institute of Computer Applications, Gujarat University, Ahmedabad.*

This comprehensive book deals with the theoretical aspects of operations research, and explains the concepts with practical examples. It begins by focusing on the need and prerequisites of operations research and moves on to discuss topics such as linear programming, integer programming, nonlinear programming, assignment problems, and inventory models in sufficient detail. Besides, this text also explains how to achieve different goals in the order of priority to optimize the objective function, various criteria of decision making under certainty, uncertainty and risk, and different techniques of analyzing the time involved in completing the project and the related cost.

KEY FEATURES

- Gives well-defined algorithms to illustrate the different techniques of operations research.
- Inventory problems are discussed with calculus.
- Provides worked-out examples in each chapter to illustrate the concepts discussed.

This text is intended for the undergraduate and post-graduate students of Mathematics, Statistics, Engineering,

and postgraduate students of Computer Applications and Business Administration. In addition, practising executives, consultants and managers will also find the book very useful.

Contents: Preface. Why Operations Research? Pre-requisite for Operations Research. Linear Programming. Integer Programming. Goal Programming. Non-linear Programming. Geometric Programming. Transportation Problem. Assignment Problem. Decision Analysis. Inventory Problems. Queuing Theory. Replacement Models. Dynamic Programming. Project Management. Sequencing. Simulation. Game Theory. Appendix: Statistical Tables. Index.

Latest Print 2013 / 576 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3128-0 / ₹ 350.00 / (e-book also available)

SRINIVASAN

Operations Research: Principles and Applications, 2nd ed.

G. SRINIVASAN, *Professor, Department of Management Studies, Indian Institute of Technology Madras. A member of the Society of Operations Management, India.*

This text, now in the **Second Edition**, continues to provide students with a clear, well-structured and comprehensive treatment of the theory and applications of operations research. The methodology used is to first expose the students to the fundamental concepts through a numerical illustration and then explain the underlying theory wherever required. The inclusion of a case study in each chapter of this second edition has made learning easier and more effective.

The book introduces the readers to various models of operations research, such as the transportation model, the assignment model, the inventory model, the queuing theory and the integer programming model. The various techniques to solve OR problems faced by managers are also discussed. Separate chapters are devoted to linear programming, dynamic programming and quadratic programming which greatly help in the decision-making process.

The text facilitates easy comprehension of topics by the students due to inclusion of:

- Examples and situations from the Indian context.
- Numerous exercise problems arranged in a graded manner.
- A large number of illustrative examples.

The text is primarily intended for the postgraduate students of management, computer applications, commerce, mathematics and statistics. Besides, the undergraduate students of mechanical engineering and industrial engineering will find this book extremely useful. In addition, this text can also be used as a reference by OR analysts and operations managers.

Contents: Preface. Acknowledgements. Linear Programming Formulations. Linear Programming—Solutions. Duality and Sensitivity Analysis. Transportation Problem.

Assignment Problem. Advanced Linear Programming. Integer Programming. Network Problems. Travelling Salesman and Distribution Problems. Dynamic Programming. Basic Queueing Models. Non-linear Programming. Deterministic Inventory Models. Bibliography. Index.

Latest Print 2014 / 532 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4208-8 / ₹ 375.00 / (e-book also available)

TIWARI & SHANDILYA Operations Research

N.K. TIWARI, *Director, SCOPE Engineering College, Bhopal (Madhya Pradesh).*

SHISHIR K. SHANDILYA, *Department of Computer Science and Engineering, TRUBA College of Engineering and Information Technology, Bhopal.*

Primarily intended for postgraduate students of management and computer applications, this book presents the theory and applications of operations research in an easy-to-read style. It introduces the readers to various models of operations research, such as transportation model, assignment model, inventory model, queuing model, replacement model, sequencing model, and integer programming model. The various methods to solve real-life problems faced by managers are also fully analyzed. Separate chapters are devoted to Linear Programming, Decision Theory, Game Theory, Dynamic Programming, and Project Management, which greatly help the decision-making process.

The text features numerous fully worked-out examples, a fairly large number of exercises, and end-of-chapter theoretical questions which enhance the value of the text.

Besides postgraduate students of management (MBA), computer applications (MCA), commerce, mathematics, and statistics, students of engineering will also find this text extremely useful.

Contents: Preface. Acknowledgements. An Introduction to Operations Research. Linear Programming. Transportation Model. Assignment Model. Decision Theory. Game Theory. Inventory Model. Queuing Model. Replacement Model. Dynamic Programming. Sequence Model. Project Management. Integer Programming. Bibliography. Index.

Latest Print 2013 / 304 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2966-9 / ₹ 295.00

Power Plant Engineering

GUPTA

Power Plant Engineering

MANOJ KUMAR GUPTA, *Associate Professor in the Department of Mechanical Engineering, Ujjain Engineering College, Ujjain.*

This textbook has been designed for a one-semester course on Power Plant Engineering studied by both

degree and diploma students of mechanical and electrical engineering. It effectively exposes the students to the basics of power generation involved in several energy conversion systems so that they gain comprehensive knowledge of the operation of various types of power plants in use today.

After a brief introduction to energy fundamentals including the environmental impacts of power generation, the book acquaints the students with the working principles, design and operation of five conventional power plant systems, namely thermal, nuclear, hydroelectric, diesel and gas turbine. The economic factors of power generation with regard to estimation and prediction of load, plant design, plant operation, tariffs and so on, are discussed and illustrated with the help of several solved numerical problems.

The generation of electric power using renewable energy sources such as solar, wind, biomass, geothermal, tidal, fuel cells, magneto hydrodynamic, thermoelectric and thermionic systems, is discussed elaborately.

The book is interspersed with solved problems for a sound understanding of the various aspects of power plant engineering. The chapter-end questions are intended to provide the students with a thorough reinforcement of the concepts discussed.

Contents: Preface. Introduction. Thermal Power Plant. Nuclear Power Plant. Hydroelectric Power Plant. Diesel Engine Power Plant. Gas Turbine Power Plant. Power Station Economics. Non-conventional Power Generation. Appendix. Bibliography. Index.

Latest Print 2014 / 356 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4612-3 / ₹ 350.00 / (e-book also available)

Product Design

CHITALE & GUPTA

Product Design and Manufacturing, 6th ed.

A.K. CHITALE, *former Director and Academic Advisor, Govindram Seksaria Institute of Management and Research, Indore.*

R.C. GUPTA, *Professor and Head, Department of Industrial and Production Engineering, SGSITS.*

This well-established and widely adopted text, now in its Sixth Edition, continues to provide a comprehensive coverage of the morphology of the design process. It gives a holistic view of product design, which has inputs from diverse fields such as aesthetics, strength analysis, production design, ergonomics, reliability and quality, Taguchi methods and quality with six sigma, and computer applications. The text discusses the importance and objectives of design for environment and describes the various approaches by which a modern, environment-conscious designer goes about the task of design for environment. Many examples have been provided to illustrate the concepts discussed.

In this **sixth edition**, three appendices have been added. Appendix A deals with limits, fits and tolerance along with their applications. Appendix B discusses the use of G and M codes for part programming with illustrative examples. Appendix C explains the advanced concepts of aesthetics.

The book is primarily intended as a text for courses in mechanical engineering, production engineering, and industrial design and management. It will also prove handy for practising engineers.

KEY FEATURES

- Provides concepts from material science, which include inputs on ceramics, rubber, polymers and other materials to make the design idea physically realizable.
- Uses the modern Concurrent Design concept to satisfy diverse groups/areas such as marketing, vendors, production and quality assurance.
- Considers the use of computers while analyzing modern techniques of prototyping, simulation of product and its use. Introduces AI, robots, AGV, PLC and AS/RS in manufacturing automation.

Contents: Preface. Preface to the First Edition. Introduction to Product Design: Asimow's Model. Product Design Practice and Industry. Strength Consideration in Product Design. Design for Stiffness and Rigidity. Production Processes. Design for Production—Metal Parts. Material Processing of Plastics, Rubber, Glass and Ceramics. Designing with Plastics, Rubber, Ceramics and Wood. Optimization in Design. Economic Factors Influencing Design. Human Engineering Considerations in Product Design. Value Engineering and Product Design. Role of Computer in Product Design, Manufacturing and Management. Modern Approaches to Product Design. Quality Assurance in Product Design and Manufacturing. New Product Development and Product Management. Product Design for Environment. Appendices—A: Limits, Fits and Tolerances. B: Introduction to Part Programming in G and M Codes. C: Aesthetics in Industrial Design. Index.

Latest Print 2014 / 596 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4873-8 / ₹ 375.00 / (e-book also available)

KUMAR

Product Design: Creativity, Concepts and Usability

PRASHANT KUMAR, *Professor Emeritus, Department of Mechanical Engineering, College of Engineering, Pune.*

This book presents a well-organized structure for learning the process of designing a product. Creativity and Concepts are the two major elements of product design emphasized in the book. Usability is also stressed as an important aspect of product design because it is advantageous to know the requirements of the users and their expectations.

The book extensively describes the concept of problem formulation through user centred design (UCD) survey,

need statements and major requirements, and specifications and constraints. It also addresses the concept of idea generation of a formulated problem with the help of an idea-rack and optimization through configuration exploration. The text explains several other concepts of product design, such as product life cycle, design phases, simplicity, richness and complexity, uncoupled and decoupled designs, risk management, synthesis and analysis, interdisciplinary approach, and flexibility.

The book is eminently suitable for the students of mechanical engineering, besides being useful to students of all engineering disciplines. Academics will find this text useful for the introduction of an interdisciplinary course on product design either at the senior undergraduate degree level or at the postgraduate level.

KEY FEATURES

- Many examples of products from day-to-day life.
- Concept explanation using case studies and anecdotes.
- Discussions on philosophical, creative, and conceptual aspects of design process.

Contents: Preface. Acknowledgements. Design as a Discipline. Product Life Cycle. Design Phases. Formulation: Part 1 User Centred Design Survey. Formulation: Part 2 Need Statement and Major Requirements. Formulation: Part 3 Specifications and Constraints. Idea-rack. Optimization Through Configuration Exploration. Usability Considerations. Simplicity, Complexity and Richness. Decision Making. Uncoupled, Decoupled and Coupled Designs. Products of Static and Dynamic Societies. Suitable Life Style. References and Suggested Reading. Index.

Latest Print 2012 / 332 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4427-3 / ₹ 325.00 / (e-book also available)

Production and Operations Management

ADAM & EBERT

Production and Operations Management: Concepts, Models and Behavior, 5th ed.

EVERETT E. ADAM Jr. and RONALD J. EBERT, *both of University of Missouri, Columbia.*

This comprehensive text retains the core concepts, models and managerial orientation of previous editions and reflects the current production and operations management practices and research results. It emphasizes practice through new chapter highlights. The text continues to offer problems which can be solved by the computer.

KEY FEATURES

- Gives increased coverage of international and service operations management.

- Includes a new chapter “Japanese Contribution to World Class Manufacturing”.
- Each chapter opens with a specially prepared executive comments on the topic of the chapter from a COO (Chief Operating Officer) of a major service or manufacturing operation.
- Provides end-of-chapter material designed to reinforce the essentials of each chapter, such as solved problems, revised review questions and cases, and *computer-assisted learning*.

Contents: Preface. Managing Operations—Operations Management. Operations Strategies for Competitive Advantage. Planning (Designing) The Conversion System—Forecasting. Designing Products. Services, and Processes. Operations Capacity. Locating Production and Service Facilities. Layout Planning. Organizing The Conversion System—Job Design, Production and Operations Standards, and Work Measurement. Project Management. Scheduling Production and Service Systems—Scheduling Systems and Aggregate Planning for Production and Services. Operations Scheduling, Controlling The Conversion System—Inventory Control Fundamentals. Inventory Control Applications. Material Requirements Planning. Managing for World Class Competition—Japanese Contributions to World Class Manufacturing. Managing Operations Management—The Conversion Process in Change. Appendix. Glossary. Name Index. Subject Index.

Latest Print 2015 / 748 pp. / 21.6 × 27.8 cm

ISBN-978-81-203-0838-1 / ₹ 550.00

CHANDRA BOSE

Inventory Management

D. CHANDRA BOSE, *Reader in the Research and Postgraduate Department of Commerce, Sree Narayana College, Kollam, Kerala.*

Inventory control is vitally important to almost any type of industry, whether product or service-oriented. Investments in raw materials, spare parts, work-in-progress and finished products are all critical costs of operations which if not controlled can lead to high capital costs, high operating costs, and decreased production efficiency.

This book focuses on the problems of materials control in small-scale manufacturing industries. It explains how to optimize the available resources with a view to reducing material costs and achieving improved capital turnover. It also analyzes a few selected industries and critically reviews their performance in the area of inventory control.

The book is designed as a text on inventory management for postgraduate students pursuing courses in **commerce**, **management**, and **business studies**. It is also suitable for all those studying for professional qualifications such as CA, ICWA, and CS.

Contents: Preface. Introduction. Organizational Set-up for Materials. Working Capital and Inventory. Some Concepts about Inventories. Tools and Techniques of Inventory

Management. Inventory Ratio. Supply of Maintenance Materials and Spare Parts. Disposal of Obsolete Materials, Surplus and Scrap. Case Study. Further Reading. Index.

Latest Print 2014 / 164 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-2853-2 / ₹ 175.00

KHANNA

Production and Operations Management, 2nd ed.

R.B. KHANNA, *Professor of the Indian Institute of Planning and Management (IIPM) Jaipur. He has also been Professor at the Institute of Certified Management Accountants of India (ICMAI), Jaipur; Visiting Faculty in the Department of Management Studies, IIT Roorkee; and Professor and Dean (Academics) at the Institute of Management Studies, Roorkee.*

This well-balanced text with its fine blend of theory and applications, gives an in-depth understanding of production and operations management in an easy-to-understand style. Employing an innovative approach, the author, shows how the use of modern advanced technology gives a boost to production processes and significantly helps production and operations management. The book clearly demonstrates the use of special software packages to solve actual problems.

Retaining the original contents, the book, divided into six parts, explains following in its **second edition**

WHY	Necessity of production and operations management
WHAT	Product/service design, product quality and other issues
HOW	Process design and related issues
WHERE	Plant location, layout and capacity
WHEN	Planning and control of production operations
WHO	Human relations issues that affect production and operations

KEY FEATURES

- Learning objectives at the beginning of each chapter enable readers to focus on important points of a chapter.
- A concept quiz at the end of each chapter helps the reader to evaluate his understanding of the concepts explained in a chapter.
- Numerous solved examples, and answers to all chapter-end numerical problems have been provided.
- Covers Service Operations in almost every chapter in addition to the traditional manufacturing operations.
- A section with 10 progressive short case studies gives real-world experience.
- Chapter-end summary helps readers to review and recapitulate the key concepts.

The students of management and engineering (mechanical, production and industrial engineering) will be benefited with the book.

An instructor manual containing PowerPoint slides and solutions to chapter-end problems is available.

Contents: Preface. Preface to the First Edition. Part I: The 'Why' of Production and Operations Management—Operations Management: An Introduction. Operations Strategy and Competitiveness. Part II: The 'What' of Production and Operations Management—Product and Service Design. Reliability, Maintainability, Availability and Value Analysis. SUPPLEMENT 1: Dynamic Programming. SUPPLEMENT 2: Replacement Models. Product Quality. Part III: The 'How' of Production and Operations Management—Process Design and Selection. Work Study. Process Quality: Statistical Quality Control. Part IV: The 'Where' of Production and Operations Management—Facility Location. Facility Layout. Capacity and Equipment Selection. SUPPLEMENT 3: Simulation. Part V: The 'When' of Production and Operations Management—Forecasting. Aggregate Production Planning. Material Management and Inventory Control. Material Requirements Planning. Operations Scheduling. Supply Chain Management. Enterprise Resource Management. Just-in-Time Production System. Queuing Theory. Project Planning and Control I: Network Models. Project Planning and Control II: Line of Balance. Part VI: The 'Who' of Production and Operations Management—Human Resources in Operations Management. Appendixes—A: The Standard Normal Probability Distribution. B: Values of e for Computing Poisson Probabilities. C: Table of Random Numbers. Answers to Selected Questions. Bibliography. Index.

Latest Print 2015 / 632 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-5121-9 / ₹ 550.00 / (e-book also available)

KRISHNASWAMY & MATHIRAJAN Cases in Operations Management

K.N. KRISHNASWAMY, *Consultant who formerly served as Professor in the Department of Management Studies, Indian Institute of Science, Bangalore.*

M. MATHIRAJAN, *is with Anna University Tiruchirappalli as Professor of Planning and Development and he is on lien for two years from May 2008 from Indian Institute of Science (IISc) Bangalore. He is a Principal Research Scientist in the Department of Management Studies, IISc, Bangalore.*

This book is intended to enhance the knowledge of MBA students in Operations Management acquired in a basic level course. The case-study material covered relates to a wide spectrum of management activities, and deals with the application of statistical, operations research and system analysis methods to problems categorized under several headings. The book can therefore be used in conjunction with a course in Operations Management or as an independent second course.

Thirty real-world cases in the book are the result of the over three decades of research work by the authors, including consultancy assignments, doctoral dissertations, and project assignments of graduate management

students. The cases are research oriented and encourage students to think rigorously in an environment of uncertainty in a real-world situation. The cases are comprehensive enough so as to drill the students in devising alternative methods of solutions, thus, providing them with a deep understanding of the decision-making problems instead of merely a general overall appreciation. These real-world studies aid students in learning applications of quantitative and analytical techniques of management, thus, bringing home to the student the uses, problems, difficulties and limitations of such applications.

Contents: Preface. Part I: Facilities and Capacity—Case 1: HIMAT Tool Room. Case 2: Machine Utilization at Krishnan & Co. Case 3: Evaluation of Production Programme in Bhal Tools. Case 4: Development of INDUS Plant Layout. Case 5: Capacity Planning for Manufacturing in WPSDL. Part II: Materials Management—Case 6: Magi Corporation. Case 7: Material Control at HYPO. Case 8: Integrated Materials Management in Moti Engineering Works. Case 9: Spare Parts Inventory Management at BMO. Case 10: Purchase Control at Kalpavruksha Silk Company. Part III: Manpower Management—Case 11: Manpower Planning at Mylin. Case 12: Beamtronics-Assembly Manpower. Case 13: Mangalore Fibres Limited. Case 14: Tool Room Standards at Abhyagat. Case 15: Planning Tours of a Marketing Executive at BLPB. Part IV: Production Planning and Scheduling—Case 16: Scheduling at Bellop. Case 17: Planning and Scheduling of Multi-products at Beamtronics. Case 18: Dazzle Lamp-Aggregate Production Planning. Case 19: Utilization of Resources at Mecast Foundry. Case 20: Scheduling of Heat-treatment Furnace of Sagar Foundry. Part V: Production/Operations Control—Case 21: Oskar Manufacturing Corporation. Case 22: KIRA-Production Control System Design. Case 23: Quality Control in BECO. Case 24: Control of Yenka Runway Project. Case 25: Operating Decisions in Iravatha Silk Manufacturing. Case 26: Strategic Issues of Production Control at MMTL. Part VI: Logistics/Distribution Planning—Case 27: Efficient Milk Collection for Vandana Dairy. Case 28: Collection of Solid Waste at Purangam. Case 29: Compus Mail Service. Case 30: Inventory and Distribution Planning for Jala Raksha Ltd. Case 31: Solid Waste Handling at MIC. Index.

Latest Print 2010 / 400 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3590-5 / ₹ 295.00 / (e-book also available)

MAHAPATRA

Operations Management: A Quantitative Approach

P.B. MAHAPATRA, *Professor and Head of the Department of Mechanical Engineering, at the Punjab Engineering College, Chandigarh.*

This text is an extensively revised and a thoroughly expanded version of the author's earlier book entitled *Computer-Aided Production Management*. It is specially designed to suit the latest syllabi of courses on

Production/Operations Management offered by various universities to the undergraduate students of Mechanical Engineering, Production Engineering and Industrial Engineering as well as students of Master of Business Administration (MBA) specializing in Production and Operations Management stream.

The book offers a balanced coverage of the fundamental principles of *managing operations* and the quantitative techniques used to support the functions of operations management. There are many worked-out examples in each chapter to enable students to comprehend the quantitative material of the book.

The text is divided into two parts. Techniques of operations research such as linear programming, transportation assignment models, dynamic optimization and waiting line models are discussed in Part I. These topics serve as prerequisites for solving problems in Operations Management discussed in Part II. Some generic classes with functions for array and matrix manipulation, analysis of queuing models and evaluation of probability for some standard distributions have been defined and used throughout for writing programs for diverse managerial applications.

Part II is devoted to a detailed discussion of management functions such as Product Design and Development, Forecasting, Capacity Analysis, Plant Layout, Assembly Line Balancing, Inventory Control, Materials Requirement Planning, Production Scheduling, Quality Control, Total Quality Management, Just in Time (JIT), Supply Chain Management, Maintenance Management and Six Sigma. Small computer programs have been given wherever required for solving practical problems. The functions developed in generic base classes have been used to take advantage of source code reusability offered by Object Oriented Programming (C++).

The book provides a solid and comprehensive introduction to the core tasks of operations management with practical guidance on how to solve problems through computer programming.

Contents: Preface. Management of Production Systems. PART I—Linear Programming. Transportation and Assignment Models. Dynamic Optimization Models. Waiting Lines Models. PART II—Product Design and Development. Forecasting. Capacity Analysis. Facility Location and Layout. Balancing of Assembly Lines. Project Management. Inventory Control. Dynamic Inventory Models. Materials Requirement Planning. Just In Time (JIT). Supply Chain Management. Production Scheduling and Sequencing. Maintenance Management. Control of Quality. Total Quality Management. Six Sigma. System Simulator. Appendices. Index.

Latest Print 2010 / 640 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3926-2 / ₹ 395.00 / (e-book also available)

MUKHERJEE & KACHWALA Operations Management and Productivity Techniques

P.N. MUKHERJEE, *Head of the Department of Operations Management at the Narsee Monjee Institute of Management Studies (Deemed University), Mumbai.*

T.T. KACHWALA, *Head of the Department of Decision Science at Narsee Monjee Institute of Management Studies (Deemed University), Mumbai.*

The concept of Operations Management is universally applicable to all functions including Production, Materials, Human Resources, Marketing, Logistics and Supply Chain Management. Operations Management is an effective and efficient way of carrying out a business process (manufacturing or service sector) aimed at maximization of Customer Satisfaction and Return On Investment. The concept of productivity implies effectiveness and efficiency in individual and organizational performance, reflected in the creation of surplus through productive operations.

This book provides readers with an easy-to-understand treatment of all aspects of Operations Management and explains the expanded coverage of the role of Operations Management in the organization. Manufacturing and service operations are given equal treatment.

While focusing on the basic principles and core operations in a straightforward and well structured style, the book provides students with an understanding of managing operations, effectively and efficiently, in the following areas:

- Total Quality Management
- Statistical Process Control
- Total Productive Management
- Service Quality Management
- Supply Chain Management
- Inventory Management

Written for MBA students as well as for B.Tech. students in Mechanical/Production/Industrial engineering, this book covers the curriculum of different universities for a course in Operations Management.

Contents: Preface. Operations Management. Facilities Planning: Plant Location, Plant Layout and Material Handling. Holistic Management Practice for World-Class Performance and Leadership. Quality and Its Definitions, Concepts and Features. Statistical Process Control. Production Planning, Control and Scheduling. Productivity Improvement Techniques. Work Study. World-Class Manufacturing Technique. Supply Chain Management. Service Quality. Service Quality Research and Subject Development. Theory of Constraints (TOC). Basic Inventory Concepts. Managing Material Flow. Forecasting Methods. Introduction to Operations Research. Appendix. References. Index.

Latest Print 2014 / 432 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3602-5 / ₹ 375.00 / (e-book also available)

Production Planning and Control

MUKHOPADHYAY

Production Planning and Control: Text and Cases, 3rd ed.

S.K. MUKHOPADHYAY, *formerly Professor, National Institute of Industrial Engineering, Mumbai*

This comprehensive and up-to-date text, now in its Third Edition, describes how the latest techniques in production planning and control are applied to contemporary industrial setups so as to meet the ever-increasing demands in industrial organizations for better quality of services, for faster delivery of products and for adapting to the rapid changes taking place in the industrial scenario. With the demands in the industrial arena increasingly tending to be lumpy, the most effective strategy for planning and controlling production processes cannot be a static, preconceived one. Instead, it is one that is flexible and is capable of adapting to the erratic changes in demand patterns. Evolving such a strategy requires more of practical skill than mere theoretical knowledge of the subject.

This book explores the demands of the present-day industrial environment and the techniques for addressing these demands through a number of case studies drawn from Indian industries. The efficacy of various planning strategies, the methods for implementing them, and their suitability for different industries have been clearly explained in relation to these cases. While the essentials of theory have been covered in a simple and straightforward style, the stress is on developing the practical skills required to tackle the unpredictable problems and the unforeseen demands that pose a formidable challenge to modern industries. The book places emphasis as much on the principles of heuristic techniques as on the systematic approach to production planning.

This book would serve as a useful textbook to postgraduate students of management as well as undergraduate students of industrial engineering. It will be equally useful to the teaching community and the practicing professionals.

NEW TO THE THIRD EDITION

- Includes a new chapter on 'Leagile Manufacturing: A Contemporary Manufacturing Syndrome' (Chapter 11)
- Provides several references to explore more in the field

KEY FEATURES

- Gives solved problems that serve as numerical illustrations of the theoretical concepts.
- The Case Studies given focus on the Indian scenario; these will be of great practical value to students and professionals alike.
- Offers substantial coverage of the modern heuristic methods, the Kanban system and the ERP techniques.

Contents: Preface. Preface to the First Edition. Acknowledgements. Facilities Location and Layout.

Forecasting. Aggregate Planning. Disaggregation. Capacity Management. Lot Sizing Rules. Scheduling Decision Rules. Cases and Examples. Quality. ERP with SAP R/3. Leagile Manufacturing: A Contemporary Manufacturing Syndrome. References. Suggested Further Reading. Index.

Latest Print 2015 / 424 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-5084-7 / ₹ 350.00 / (e-book also available)

NATARAJAN, GOVINDARAJAN & KUMAR Fundamentals of Packaging Technology, 2nd ed.

S. NATARAJAN, *former Professor and Head, Department of Mechanical Engineering, Anna University, Chennai.*

M. GOVINDARAJAN, *former Assistant Professor, Department of Mechanical Engineering, Anna University, Chennai.*

B. KUMAR, *Professor, Department of Printing Technology, Anna University, Chennai.*

In the current market scenario, packaging provides the most important first point of contact by which a company presents its products to consumers. Though packaging has to perform functions such as product protection and preservation, it is now being accepted as a value addition method.

This compact textbook is designed primarily for the undergraduate students of printing technology and mechanical engineering. The text introduces the concepts and techniques relevant to packaging of industrial, pharmaceutical and food products. It covers the package design concepts with emphasis on graphics and colours, as innovation in packaging is taking place at a rapid pace due to the competition among brands for shelf appeal and space. Besides, it also discusses importance of glass as a packaging material, label types and their design, bulk packaging and test procedures on package to evaluate its worthiness in distribution and storage.

In its second edition the book has been updated wherever necessary. Chapter 7 on "Plastics and Speciality Packaging" has been completely overhauled and split into two. The later part of the chapter has been introduced as "Package Finishing and Security (Chapter 8)". Thus, in contrast to eight chapters of the previous edition, the book now comprises total nine chapters.

Besides undergraduate students, this book will also be useful for diploma students of packaging, researchers and professionals in printing and packaging field.

KEY FEATURES

- A **Case Study** lends a practical orientation towards the subject of study.
- Review questions, arranged in a graded manner, sharpen the analytical skills of the students.
- Solved problems reinforce the understanding of the subject.

Contents: Preface. Overview of Packaging. Package Design. Paper and Paper Boards. Metal Packaging. Glass Packaging. Wooden Containers. Plastics and Speciality

Packaging. Package Testing. Package Finishing and Security. Case Study. Standard for Packaging Material and Package Testing. Packaging Timeline. Glossary. Bibliography. Index.

Latest Print 2014 / 160 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-5054-0 / ₹ 250.00 / (e-book also available)

RADHAKRISHNAN & BALASUBRAMANIAN Business Process Reengineering: Text and Cases

R. RADHAKRISHNAN, *Vice-Chancellor, Anna University, Coimbatore.*

S. BALASUBRAMANIAN, *Director, Centre for Intellectual Property Rights, Anna University, Coimbatore.*

This textbook explores the fundamental principles of Business Process Reengineering (BPR). The express aim of the book is to address the needs of MBA students opting for courses in 'Information Technology Management' or 'Operations Management', MCA students who opt for Business Processes as an elective, and students of BE/B.Tech. Mechanical Engineering and Production Engineering for courses in Process Engineering/Automation/Management System Design. The book provides them with the concepts, methodologies, models and tools needed to understand and implement BPR.

In a nutshell, the book offers a step-by-step presentation of the practical framework and management techniques needed to achieve engineering solutions for implementation of BPR in an organization. The initial chapters introduce the reader to the need for BPR and its utility in relation to IT and manufacturing. The middle chapters cover the methodology, success factors, barriers, and the technologies that are relevant for BPR implementation. The latter chapters present solutions like lean and virtual manufacturing, enterprise resource planning, and functional information systems. An exclusive chapter is devoted to concepts and tasks of software reengineering.

Aided by extensive illustrations, end-of-chapter review questions, as well as a chapter consisting entirely of case studies, this book will help students develop a rich, multifaceted perspective, to enable them to handle complex management and engineering problems.

The book will be useful to students in practically all branches of engineering, not just mechanical/production/industrial engineering.

Contents: Preface. Introduction to Business Processes. Introduction to BPR. BPR in Manufacturing Industry. BPR and Information Technology. BPR Implementation Methodology. Success Factors of BPR. Managing Barriers to Business Process Reengineering Success. BPR and Relevant Technologies. Lean Manufacturing and the Environment. Enterprise Resource Planning. Functional Information System. Software Reengineering. Virtual Manufacturing. Case Studies. References. Index.

Latest Print 2014 / 288 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-3567-7 / ₹ 295.00 / (e-book also available)

Production/Industrial Engineering

JAIN & CHITALE

Textbook of Production Engineering, 2nd ed.

K.C. JAIN, *Senior Professor, Department of Mechanical Engineering, Prestige Institute of Engineering and Science (PIES), Indore.*

A.K. CHITALE, *former Director and Academic Advisor, GSIMR, Indore.*

This thoroughly revised book, now in its second edition, gives a complete coverage of the fundamental concepts and applications of Production Engineering.

Divided into six parts, the text covers the various theoretical, design, and process aspects of metal cutting, the design and mechanism of various machine tools, and various aspects of precision measurement and manufacturing. The concepts and processes of metal working and the design of press tools, various modern methods of manufacturing, such as ultrasonic machining (USM), electrochemical deburring (ECD), and hot machining are also covered. A variety of worked-out examples and end-of-chapter review questions are provided to strengthen the grasp as well as to test the comprehension of the underlying concepts and principles. The text is extensively illustrated to aid the students in gaining a thorough understanding of various production processes and the principles behind them.

The text is intended to serve the needs of the undergraduate students of Mechanical Engineering and Production Engineering. The postgraduate students of Mechanical Engineering and Production Engineering will also find the book highly useful.

Contents: Preface. Part I: Metal Cutting—Introduction to Materials and Processes. Metal Cutting Tools: Basic Concepts. Cutting Tool Materials. Design of Metal Cutting Tools. Theory of Metal Cutting. Theory of Multipoint Machining. Heat in Metal Cutting and Temperature Measurement. Dynamometry. Tool Failures and Tool Life. Machinability. Economics of Metal Machining. Metal Cutting and Metal Working Fluids. Part II: Machine Tools—Introduction to Machine Tools. Design of Machine Tool Beds. Design of Machine Tool Guides and Ways. Design of Feed Power Mechanism and Screw. Design of Machine Tool Gear Box. Stepless Regulation of Speeds. Machine Tool Vibrations. Mechanization and Automation. Numerical and Computer Numerical Controlled Machines. Gear Cutting and Broaching. Part III: Precision Measurement and Manufacturing—Metrology and Precision Measurement. Jigs and Fixtures. Part IV: Metal Working—Metal Working Processes. Theory of Metal Working Processes. Press Tools and Their Design. Part V: Modern Methods of Manufacturing—Unconventional Methods of Machining. Part VI: Grinding Process—

Grinding and Other Abrasive Metal Removal Processes. References. Index.

Latest Print 2014 / 920 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4749-6 / ₹ 695.00 / (e-book also available)

RAVI

Industrial Engineering and Management

V. RAVI, *Associate Professor, Department of Humanities, Indian Institute of Space Science and Technology, Thiruvananthapuram.*

The book is primarily intended as a text for all branches of B.Tech, M.Tech and MBA courses.

Beginning with an introduction to industrial engineering, it discusses contributions and thoughts of classical (Taylor, Fayol, and Weber's), neo-classical (Hawthorne) and modern thinkers. The book explains different functions of management, and differentiate between management and administration.

Various types of business organisations with their structures and personnel management also find place in the book. Topics related to facilities location, material handling, work study, job evaluation and merit rating, wages and incentives that are of prime importance in any business are discussed. The book is aimed at providing a better understanding of industrial operations with practical approach.

Financial aspects related to business operations such as financial management, management accounting, breakeven analysis, depreciation and replacement policies for equipment assume prime importance. Numerical examples have been solved at appropriate places to create interest in readers. Marketing aspects of business as marketing management, new product development and sales forecasting methods are discussed, besides management and control of operations.

For maintaining industrial peace, good relationship between employers and employees is essential. Chapters on industrial relations, industrial safety and industrial legislations are introduced with the objective of providing readers with information on these important aspects.

Good decision-making is what differentiates a good manager from a bad one. Thus, a chapter on decision-making is added to examine its skill. Network constructions, CPM, PERT have been covered under project management. Quantitative techniques for decision making as linear programming, transportation problems, assignment problems, game theory, queuing theory, etc., are also discussed in this textbook.

KEY FEATURES

- Lucid presentation of the concepts.
- Illustrative figures and tables make the reading more fruitful and enriching.
- Numerical problems with solutions form an integral part of the book, making it application-oriented.

- Chapter-end review questions test the students' knowledge of the fundamental concepts.

Contents: Preface. Introduction to Industrial Engineering. Development of Management Thought. Functions of Management. Organisation Structure. Types of Business Organisations. Personnel Management. Financial Management. Management Accounting. Breakeven Analysis. Depreciation. Equipment Replacement Policy. Facilities Location and Plant Layout. Material Handling. Work Study. Job Evaluation and Merit Rating. Wages and Incentives. Industrial Relations. Industrial Safety. Industrial Legislations. Production Planning and Control. Marketing Management and Product Development. Sales Forecasting. Materials Management, Purchasing and Storekeeping. Inventory Control. Quality Management. Reliability and Maintenance Management. Productivity and Value Analysis. Ergonomics. Decision-Making. Project Management. Operations Research. Bibliography. Appendix. Index.

400 pp. (approx.) / 17.8 × 23.5 cm
ISBN-978-81-203-5110-3 / FORTHCOMING

Project Management

KANDA

Project Management: A Life Cycle Approach

ARUN KANDA, *Professor of Industrial Engineering, Mechanical Engineering Department, IIT Delhi.*

Project management is a judiciously planned and organized effort to accomplish a specific project within a time frame. This book is designed for undergraduate and postgraduate students of mechanical engineering, industrial engineering, production engineering, management studies as well as working professionals who wish to have an insight into the entire life cycle decisions related to a project.

This book on project management looks at the decisions to be made during the various phases of the project process, examines systematic methodologies and models that help in the decision making, and provides interpretation of results obtained from various models so that they may be intelligently adopted by a practical project manager in the successful implementation of any project. This book offers something for each of the following categories of readers:

For the student: It provides a treatment of the fundamentals of project management, stressing the underlying theory and assumptions for the various decisions to be made in the entire life cycle. There are examples and practice problems to illustrate the concepts.

For the practical project manager: It is a systematic collection of major decisions and solution methodologies available for tackling the problems of project management. The role of human and behavioural factors

in managing teams and conflict resolution is emphasized along with technical expertise.

For the researcher: Throughout the text where results are derived, the reference to original sources is included so that the serious reader may pursue those ideas in greater depth. Also hints on the state of the art and directions for research are included wherever appropriate.

KEY FEATURES

- Examines the decisions in the complete life cycle of a project.
- Analyzes multi-criteria techniques for project appraisal and selection.
- Gives detailed techniques of planning and developing project networks and their usage for scheduling, with cost and resource constraints.
- Stresses both the Earned Value and Critical Chain Methodology for project monitoring.
- Identifies the human and behavioural aspects for the success of a project.

Contents: Preface. Project Management: An Overview. Project Identification and Screening. Project Appraisal. Project Selection with Multiple Criteria. Project Representation and Preliminary Manipulations. Basic Scheduling Concepts. Resource Considerations in Project Management. Project Monitoring and Control. Computers, e-Markets and Their Role in Project Management. Behavioural and Contractual Issues. Project Organization, Implementation and Closure. Bibliography. Index.

Latest Print 2011 / 248 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-4173-9 / ₹ 225.00 / (e-book also available)

Refrigeration and Airconditioning

AMEEN

Refrigeration and Air Conditioning

AHMADUL AMEEN is *Professor of Mechanical Engineering at the Universiti Sains Malaysia.*

This textbook provides a concise, systematic treatment of essential theories and practical aspects of refrigeration and air-conditioning systems. It is designed for students pursuing courses in mechanical engineering both at diploma and degree level with a view to equipping them with a fundamental background necessary to understand the latest methodologies used for the design of refrigeration and air-conditioning systems.

After reviewing the physical principles, the text focuses on the refrigeration cycles commonly used in air-conditioning applications in tropical climates. The subject of psychrometry for analysing the various thermodynamic processes in air conditioning is particularly dealt with in considerable detail.

The practical design problems require comprehensive use of tables and charts prepared by the American Society of

Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). This text incorporates such tables and charts so that the students are exposed to solving real-life design problems with the help of ASHRAE Tables.

Finally, the book highlights the features, characteristics and selection criteria of hardware including the control equipment. It also provides the readers with the big picture in respect of the latest developments such as thermal storage air conditioning, desiccant cooling, chilled ceiling cooling, Indoor Air Quality (IAQ) and thermal comfort.

Besides the students, the book would be immensely useful to practising engineers as a ready reference.

KEY FEATURES

- SI units have been used throughout the text.
- A real-life design problem has been solved using the ASHRAE's Cooling Load Temperature Differential (CLTD) method.
- Comprehensive graphical illustrations and schematic diagrams help in conceptualizing the concepts, the systems, and the processes.
- Worked examples aided by graphics and charts provide a better understanding of the subject.
- Extensive review exercises help students absorb the text material.

Contents: Preface. Part 1: General—Introduction. Review of Basic Principles. Part 2: Refrigeration Cycles and Refrigerants—Vapour Compression Cycle and Heat Pump. Section A: Vapour Compression Cycles. Section B: Multi-pressure Vapour Compression Cycles. Section C: Heat Pumps. Refrigerants. Vapour Absorption Cycle. Other Refrigeration Cycles. Applications: Industrial, Transport and Food Refrigeration. Section A: Industrial Refrigeration. Section B: Transport Refrigeration. Section C: Food Refrigeration. Ultra-low Temperature Refrigeration: Cryogenics. Part 3: Air Conditioning—Thermal Comfort. Indoor Air Quality, Ventilation and Filtration. Section A: Indoor Air Quality. Section B: Ventilation. Section C: Air Filtration. Air-Conditioning Systems and Applications. The Psychrometry of Air-Conditioning Processes. Cooling Load. Section A: Cooling Load Analysis. Section B: Cooling Load Calculation Procedure. Section C: A Case Study. Air-Distribution Systems. Air-Duct Design. Part 4: Equipment, Accessories and Control—Refrigeration Hardware. Air-Conditioning Plant. Air-Conditioning Control. Central Plant Pumping and Distribution Systems. An Overview of Other Cooling Methods and Strategies. Appendix A: Cooling Load Calculation Tables. Appendix B: Refrigerant Properties. Index.

Latest Print 2014 / 512 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2671-2 / ₹ 425.00 / (e-book also available)

ARORA

Refrigeration and Air Conditioning

RAMESH CHANDRA ARORA, served as Professor of Mechanical Engineering at Indian Institute of Technology Kharagpur from 1987 to 2005.

This textbook offers a comprehensive and wide-ranging

introduction to theoretical principles and practical aspects of refrigeration and air conditioning systems. Written by an outstanding teacher with 30 years of distinguished career at the Indian Institute of Technology Kharagpur, this work created by late Dr. R.C. Arora (1945–2005) is intended to lead students to a deeper understanding and a firm grasp of the basic principles of this fast-growing and exciting subject area. This text is ideally suited for **undergraduate education in mechanical engineering programmes and specialized postgraduate education in thermosciences**. The book is designed to typically appeal to those who like a more rigorous presentation.

The text begins by reviewing, in a simple and precise manner, the physical principles of *three* pillars of Refrigeration and Air Conditioning, namely thermodynamics, heat transfer, and fluid mechanics. Following an overview of the history of refrigeration, subsequent chapters provide exhaustive coverage of the principles, applications and design of several types of refrigeration systems and their associated components such as compressors, condensers, evaporators, and expansion devices. Refrigerants too, are studied elaboratively in an exclusive chapter.

The second part of the book, beginning with the historical background of air conditioning in Chapter 15, discusses the subject of psychrometrics being at the heart of understanding the design and implementation of air conditioning processes and systems, which are subsequently dealt with in Chapters 16 to 23. It also explains the design practices followed for cooling and heating load calculations.

Each chapter contains several worked-out examples that clarify the material discussed and illustrate the use of basic principles in engineering applications. Each chapter also ends with a set of few review questions to serve as revision of the material learned.

Contents: Preface. Acknowledgements. History of Refrigeration. Thermal Principles—A Review of Fundamentals. Mechanical Vapour Compression Cycles. Compressors. Performance of Single Stage Saturation Cycle with Reciprocating Compressor. Multistage Refrigeration Systems. Absorption Refrigeration Systems. Refrigerants. Expansion Valves. Condensers. Evaporators. Complete Vapour Compression System. Gas Cycle Refrigeration. Water—Steam Ejector—Refrigeration System and Thermoelectric Refrigeration System. Air Conditioning. Thermodynamic Properties of Moist Air. Elementary Psychrometric Processes. Wetted Surface Heat Transfer—Psychrometer, Straight Line Law and Psychrometry of Air Conditioning Processes. Comfort—physiological Principles, iaq and Design Conditions. Solar Radiation. Load Calculations. Room Airflow and Duct Design. Fans. Appendix. Index.

Latest Print 2015 / 1096 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3915-6 / ₹ 550.00 / (e-book also available)

SAPALI Refrigeration and Air Conditioning, 2nd ed.

S.N. SAPALI, *Professor, Department of Mechanical Engineering, College of Engineering, Pune.*

This book is designed for a first course in Refrigeration and Air Conditioning. The subject matter has been developed in a logical and coherent manner with neat illustrations and a fairly large number of solved examples and unsolved problems. The text, developed from the author's teaching experience of many years, is suitable for the senior-level undergraduate and first-year post-graduate students of mechanical engineering, automobile engineering as well as chemical engineering.

The text commences with an introduction to the fundamentals of thermo-dynamics and a brief treatment of the various methods of refrigeration. Then follows the detailed discussion and analysis of air refrigeration systems, vapour compression and vapour absorption refrigeration systems with special emphasis on developing sound physical concepts and gaining problem solving skills. Refrigerants are exhaustively dealt with in a separate chapter.

The remainder chapters of the book deal with psychrometry and various processes required for the analysis of air conditioning systems. Technical descriptions of compressors, evaporators, condensers, expansion devices and ducts are provided along with design practices for cooling and heating load calculations. The basic principles of cryogenic systems and applications of cryogenic gases and air liquefaction systems have also been dealt with.

The Second Edition incorporates:

- New sections on vortex tube, solar refrigeration and magnetic refrigeration, in Chapter 2.
- Additional solved examples on vapour compression refrigeration system using the R134a refrigerant, in Chapter 4.
- New sections on duct arrangement systems and air distribution systems, in Chapter 15.
- A new Chapter 17 on Food Preservation.

Contents: Preface. Introduction. Methods of Refrigeration. Air Refrigeration Systems. Simple Vapour Compression Refrigeration Systems. Refrigerants. Multipressure Systems. Vapour Absorption Refrigeration Systems. Psychrometry. Cooling Load Estimation and Psychrometric Analysis. Air Conditioning Systems and Equipment. Compressors. Evaporators and Condensers. Expansion Devices. Refrigerant Piping, Accessories and System Practices. Air Distribution System and Duct Design. Cryogenics. Food Preservation. Appendices. Index.

Latest Print 2014 / 592 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4872-1 / ₹ 425.00 / (e-book also available)

Reliability Engineering

MURALIDHARAN & SYAMSUNDAR Statistical Methods for Quality, Reliability and Maintainability

K. MURALIDHARAN, *Professor and Head, Department of Statistics, The Maharaja Sayajirao University of Baroda, Vadodara. He is also the Director of Populations Research Centre at the same university.*

A. SYAMSUNDAR, *Deputy General Manager (Research and Development) at Visakhapatnam Steel Plant, Visakhapatnam.*

A fine blend of the three disciplines, viz. quality, reliability and maintainability, this book provides a clear understanding of the concepts and discusses their applications using statistical tools and techniques. The concepts are critically assessed and explained to enable their use for management decision-making.

The book describes many current topics such as six sigma, capability maturity model integration (CMMI), process data management, reliability system models, repairable system models, maintainability assessment and design and testing concepts.

It is intended as a textbook for the undergraduate students of Mechanical Engineering and Production and Industrial Engineering. The book will also be useful to the postgraduate students of Applied Statistics, Quality and Reliability, and Quality and Productivity Management as well as to the management and engineering professionals.

KEY FEATURES

- Provides charts and plots to explain the concepts discussed.
- Gives an account of most recent developments.
- Gives illustrations of practical situations where tools can be applied immediately.
- Interspersed with plenty of worked-out examples to reinforce the concepts.
- Includes chapter-end exercises to drill the students in self-study.

Contents: Preface. Part 1: Quality—Understanding Quality. Quality and Process. Process Capability and Quality. Process Improvement and Quality. Process Data Management. Part 2: Reliability—Understanding Reliability. Reliability Tools. Reliability Models and Inferences. Reliability Assessment. Reliability Improvement. Repairable System Reliability. Part 3: Maintainability—Maintainability. Maintainability Measures and Prediction. Maintainability Assessment. Maintainability Design and Testing. Appendices. Index.

Latest Print 2012 / 360 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4543-0 / ₹ 350.00 / (e-book also available)

NAIKAN

Reliability Engineering and Life Testing

V.N.A. NAIKAN, *Associate Professor, Reliability Engineering Centre, Indian Institute of Technology Kharagpur.*

This compact and easy-to-understand text presents the underlying principles and practice of reliability engineering and life testing. It describes the various techniques available for reliability analysis and prediction and explains the statistical methods necessary for reliability modelling, analysis and estimation. The text also discusses in detail the concepts of life testing, its classification and methodologies as well as accelerated life tests, the methodologies and models of stress related failure rates evaluation, and data analysis. Besides, it elaborates on the principles, methods and equipment of highly accelerated life testing and highly accelerated stress screening. Finally, the book concludes with a discussion on the parametric as well as non-parametric methods generally used for reliability estimation, and the recent developments in life testing of engineering components.

KEY FEATURES

- The book is up-to-date and very much relevant to the present industrial, research, design, and development scenarios.
- Provides adequate tools to predict the system reliability at the design stage, to plan and conduct life testing on the products at various stages of development, and to use the life test and field data to estimate the product reliability.
- Gives sufficiently large number of worked-out examples.

Primarily intended as a textbook for the postgraduate students of engineering (M.Tech., Reliability Engineering), the book would also be quite useful for reliability practitioners, professional engineers, and researchers.

Contents: Preface. Reliability Engineering. Statistical Methods in Reliability. Reliability Testing. Accelerated Life Testing. Highly Accelerated Life Testing. Data Analysis and Reliability Estimation. Parametric and Non-Parametric Methods. Recent Developments. Appendices. Bibliography. Index.

Latest Print 2014 / 384 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-3593-6 / ₹ 350.00 / (e-book also available)

Renewable Energy Technologies

ABBASI & ABBASI

Renewable Energy Sources: Their Impact on Global Warming and Pollution

TASNEEM ABBASI, *Assistant Professor at the Centre for Pollution Control and Environmental Engineering, Pondicherry University, Pondicherry.*

S.A. ABBASI, *Senior Professor and Head at the Centre for Pollution Control and Environmental Engineering, Pondicherry University, Pondicherry.*

Today, the tide has turned so strongly in favour of

renewables that for the first time since the dawn of the fossil fuel era over two hundred years ago renewable energy technologies have started attracting more investment globally than that in the fossil fuel-based technologies.

This text provides a comprehensive and wide ranging introduction to various renewable energy technologies and their applications, such as solar, wind, biomass, biogas, wave, geothermal, tidal and small hydel. It provides a thorough understanding of the basic energy conversion processes taking place in various renewable energy-based equipment like heat engines, photovoltaics, wind turbines, windmills, wave machines, and so on. The text also deals with the impact of renewable energy sources on global warming and pollution.

The book is intended for courses in Environmental Sciences, Environmental / Electrical / Mechanical Engineering and Energy Studies at the undergraduate and postgraduate levels. It will also serve as a useful reference for scientists, technocrats and environmentalists.

India is generously endowed with renewable energy sources. I hope the present book by Prof. Tasneem Abbasi and Prof. S.A. Abbasi will help students, renewable energy professionals and even the general masses to understand various aspects of renewable energy technologies and their applications.

Contents: Foreword. Preface. From Renewables to Renewables: The Human Quest for Energy Comes Full Circle. Pollution and Global Warming Due to the Use of Fossil Fuels: The Extent of the Problem. Direct Solar. Biomass Energy. Biogas Energy. Wind Energy. Wave Energy. Tidal Energy. Geothermal Energy. Small Hydro. Hydrogen as a Renewable Energy Source. Storage of Intermittently-generated Renewable Energy. Decarbonization of Fossil Fuel Use by CO₂ Capture. Is the Use of Renewable Energy Sources an Answer to the Problems of Global Warming and Pollution? References. Index.

Latest Print 2011 / 332 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3994-1 / ₹ 325.00 / (e-book also available)

AHMED

Wind Energy: Theory and Practice, 2nd ed.

SIRAJ AHMED, *Professor, Department of Mechanical Engineering, Maulana Azad National Institute of Technology (MANIT), Bhopal.*

In the contemporary world, wind energy is emerging as one of the most viable alternatives to meet the challenge of increasing energy demand, particularly for electrical energy generation. It is clean, fuel-free and available almost in every country in the world and in abundance in off-shore. This book, now in its Second Edition, covers most of the essential engineering principles, theories and best practices for wind energy development for electricity generation with clear emphasis on state-of-the-art. In this edition, substantial addition has been made in the

chapters on Aerodynamics, Siting, Wind Farm Design, and Wind Energy Economics.

This comprehensive book on wind energy is intended as a text for the undergraduate and postgraduate students of Mechanical/Electrical Engineering and students pursuing Energy Studies. It will also serve as a handbook and ready reference for practicing engineers and professionals in the field of wind energy.

KEY FEATURES

- Describes technological advances in wind energy.
- Deals with wind resource assessment methodology, instrumentation and advanced techniques.
- Discusses the concepts of aerodynamics for wind turbine blade and rotor.
- Provides in detail the design concepts for modern horizontal axis wind turbine.
- Covers layout design, micro-siting and modelling of wind farms.
- Analyzes the economics of wind energy projects for electricity generation.
- Focuses on the impact of wind energy on the environment.

Contents: Preface. Acknowledgements. List of Symbols. List of Abbreviations. Background. Wind Resource Assessment. Aerodynamics. Wind Turbine. Wind Turbine Design. Siting, Wind Farm Design. Wind Energy Economics. Environmental Impact. Electrical and Control Systems. Appendices. Glossary. Bibliography. Index.

Latest Print 2011 / 352 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4490-7 / ₹ 395.00 / (e-book also available)

EARNEST Wind Power Technology

JOSHUA EARNEST, *Professor in the Department of Electrical and Electronics Engineering, National Institute of Technical Teachers' Training and Research (NITTTR), Bhopal.*

This comprehensive textbook provides engineering students the underlying principles of different types of grid connected renewable energy sources and in particular, the detailed underpinning knowledge required to understand the different types of grid connected wind power plants. A unique feature of this book is that along with every figure title, a brief explanation follows that helps the reader to understand the concepts without going back to the paragraphs again.

The saying that a picture is more than a thousand words is evident from the 260 illustrations. The relevant pictures, tables, graphs and ample worked-out examples accelerate the learning. The software based computer simulation examples of grid connected wind electric generators is another special characteristic of this book. Still, another unique feature is the inclusion of a chapter on the much sought after small wind turbine technologies.

Designed as a textbook for Renewable Energy courses offered in the undergraduate and diploma engineering

programmes in most of the universities of India, the book can not only serve for the one-semester stream specific course on Renewable Energy or Wind Energy for senior level undergraduate students of electrical, mechanical, electronics and instrumentation engineering but also for the postgraduate engineering students.

Contents: Preface. Renewable Energy Technologies. The Wind Resource. The Wind Power Plant. Wind Energy Conversion. Wind Turbine Aerodynamics. Wind Power Control Strategies. Constant Speed Wind Power Plants. Variable Speed Wind Power Plants. Quality Issues of Wind Power. Grid Integration of Wind Power. Wind Resource Assessment Technologies. Wind Power Plant Design Considerations. Small Wind Turbines. Wind Project Life Cycle. Index.

Latest Print 2014 / 492 pp. / 21.6 × 27.8 cm

ISBN-978-81-203-4778-6 / ₹ 475.00 / (e-book also available)

EARNEST & WIZELIUS Wind Power Plants and Project Development, 2nd ed.

JOSHUA EARNEST, *Professor in the Department of Electrical and Electronics Engineering, National Institute of Technical Teachers' Training and Research (NITTTR), Bhopal.*

TORE WIZELIUS, *Wind Power Consultant, who has authored nine books on wind power (in Swedish and English). While working as a lecturer at Gotland University from 1998–2008 Tore Wizelius developed a number of online distance education university courses and also courses on wind power for technical university teachers in India, in cooperation with Prof. Joshua Earnest.*

Won best publication award of 2011 jointly given by Global Wind Energy Council (GWEC), Belgium & WISE Pune

This book, now in its Second Edition, continues to give a wide and deep introduction to most aspects of this renewable energy source. Based on the feedback from different quarters, most of the chapters of this second edition has been enriched and modified. On popular demand from the mechanical engineers, an additional chapter on 'Gear Systems in Wind Turbines' has also been added. As the previous edition, this revised version will continue to enlighten electrical, mechanical, instrumentation, electronics and civil engineers as well. Needless to say, this book will prove to be an asset even to those who already have the first edition of this book.

What do Reviewers' say?

"This massive work is a welcome addition to any wind energy library—well illustrated with splendid photographs and drawings that I haven't seen in any other book. An ardent learner can lucidly understand the basic wind turbine theory, design, and project development. I wish I'd written it!"

—Paul Gipe, USA, Author, Advocate and Renewable Industry Analyst, California

“Dr Joshua Earnest, author of numerous books on wind power, strikes a chord with everyone willing to think deeply about renewable energy and wind power in particular, as he tackles the most profound issues of wind power design and implementation. It is a true pleasure to read this extraordinary and inspiring ‘bible of wind power’”.

—**Lars Hallén**, Sweden, Founder and Chairman of LIFE Academy, Karlstad

“First-ever reference book from India with a highly practical spread of inter-disciplinary ‘KnowHow’, ‘KnowWhy’ and ‘Deeper Knowledge’ for anyone who wants to Win with Wind Power Generation”.

—**Dr. S. Gomathinayagam**, India, Director General, National Institute of Wind Energy (NIWE) (formerly C-WET)

“This book is one of the most comprehensive books on wind energy, especially regarding the electrical systems of large wind power plants. I’m very pleased to see this new edition”.

—**Sven Ruin**, Sweden, Consultant for TERO and Chairman of the Swedish Wind Power Association’s section on small-scale wind power

Contents: Preface. Acknowledgements. Part I: Wind Energy—Wind Power Yesterday, Today and Tomorrow. Wind Power in India. Wind Characteristics. Power in the Wind. Size, Performance and Efficiency of Wind Power Plants. Part II: Wind Power Plant Technology Overview—Types of Wind Power Plants. Components of Wind Power Plants. Working of Wind Power Plants. Aerodynamic Power Regulation of Wind Power Plants. Specifications of Wind Power Plants. Part III: Electrical and Electronics of Wind Power Plants—Constant and Variable Speed Wind Power Plants. Power Electronics in Wind Power Plants. Type-A WPP with Squirrel Cage Induction Generator. Type-B WPP with Wound Rotor Induction Generator. Type-C WPP with Doubly Fed Induction Generator. Type-D Direct-drive and Geared WPP with WRSG. Type-D Direct-drive and Geared WPP with PMSG. Part IV: Grid Connection of Wind Power Plants—Wind Power Quality and Electrical Generators. Grid Integration of Wind Power Plants. Part V: Wind Power Project Development—Wind Resource Assessment. Siting and Micro-siting of Wind Power Plants. Economics of Wind Power Projects. Choice of Wind Power Plants. Project Development. Part VI: Wind Power Policy and Environment—Wind Power Policy. Wind Power and Environment. Wind Power Planning. Public Perception and Acceptance. Part VII: Maintenance of Wind Power Plants—Operation and Maintenance of Wind Power Plants. Maintenance of Wind Power Plant Components. Bibliography. Glossary. Appendices. Index.

548 pp. (approx.) (Hardbound in Colour)

21.6 × 27.8 cm / ISBN-978-81-203-5127-1 / FORTHCOMING

KOTHARI, et al.

Renewable Energy Sources and Emerging Technologies, 2nd ed.

D.P. KOTHARI, *Former, Vice Chancellor, VIT University, Vellore, and Director-in-Charge, IIT Delhi.*

K.C. SINGAL, *after graduation in Electrical Engineering in the year 1957 from Roorkee University (now IIT Roorkee), served in various capacities with Haryana State Electricity Board (HSEB) and retired as Chief Engineer Operation in the year 1992.*

RAKESH RANJAN, *Principal of International Institute of Technology and Business, Sonapat, Haryana.*

This book, now in its Second Edition, is an introductory text on renewable energy sources, technologies and their applications—a subject which is becoming increasingly important worldwide. This edition includes two new chapters that introduce contemporary practices in renewable technologies. It also discusses issues on environmental degradation and its reasons and remedies.

Besides this, a large number of numerical problems to correlate theory with typical values and chapter-end review questions are also given to reinforce the understanding of the subject matter.

Written in an accessible style, this text is designed to serve the needs of undergraduate students in electrical, mechanical and civil engineering disciplines. It will also be useful for all higher-level courses in energy programmes and multi-disciplinary postgraduate courses in science and engineering.

NEW TO THIS EDITION

- Inclusion of two new chapters—‘Hybrid Systems’ and ‘Environment, Energy and Global Climate Change’.
- A new section on Distributed Energy System and Dispersed Generation.
- Appendices on
 - Smart grid and grid system in India
 - Remote village electrification with renewable energy sources
 - Indian Electricity Act 2003, which supports exploration of Renewable Energy.

SALIENT FEATURES

- Provides balanced introduction to all aspects of solar energy conversion including PV technology.
- Gives comprehensive coverage of all facets of wind power development.
- Explains small hydropower projects with illustrative figures.
- Emphasises the importance of availability of biofuel from *Jatropha* plant.
- Special attention is given to ‘gas hydrates’ and ‘hydrogen energy’ sources.
- Fuel cells are explained as per the latest technology available.
- Harnessing of ocean energy is dealt with in detail.

- Utilisation of biomass and solid waste for energy recovery is emphasised.

Contents: Preface. Preface to the First Edition. Energy Resources and Their Utilisation. Environmental Aspects of Electric Energy Generation. Solar Radiation and Its Measurement. Solar Thermal Energy Collectors. Solar Thermal Energy Conversion Systems. Solar Photovoltaic System. Wind Energy. Wind Energy Farms. Small Hydro-power. Geothermal Energy. Electric Power Generation by Ocean Energy. Biomass Energy. Fuel Cells. Hydrogen Energy System. Hybrid Systems. Environment, Energy and Global Climate Change. Appendices. Bibliography. Index.

Latest Print 2014 / 456 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4470-9 / ₹ 325.00 / (e-book also available)

MUKERJEE & THAKUR

Photovoltaic Systems: Analysis & Design

A.K. MUKERJEE, *was Chief Scientific Officer in the Centre for Energy Studies, IIT Delhi.*

NIVEDITA THAKUR, *Associate Fellow in The Energy and Resources Institute (TERI), New Delhi.*

This book offers a comprehensive treatment of the fundamentals of solar cells and their use in the photovoltaic (PV) technology, a major constituent of renewable sources of energy. It discusses the nature and measurement of solar radiation, methods for characterization of solar cells and determination of their parameters. The book describes the principle of operation of different types of inverters used in PV systems and also illustrates the design, construction and performance of photovoltaic operated systems such as the solar lantern, solar water pump, solar inverter and a general solar power system. Besides, it explains the process of uploading of power generated by solar arrays to the power grid for onwards transmission to distant locations. The economic aspects of the PV systems and their conventionally operated counterparts are also dealt with. The design procedure given in the book enables the reader to configure the desired PV system without the help of high priced patented software.

The text is intended for a course on PV technologies undertaken by the undergraduate and postgraduate students of Electrical Engineering, Energy Studies, and Mechanical Engineering. In addition, the book would also be useful for teachers, scientists, engineers and professionals to quickly understand the fundamentals of photovoltaic technology.

KEY FEATURES

- About one hundred figures, fifty circuit diagrams and several design examples are given.
- A large number of problems are given at the end of some chapters.
- References are provided for further study and research.

Contents: Preface. Acknowledgements. Introduction. The Sun. Solar Cell Characteristics. The PV System. Balance of

System (BOS) Batteries. BOS: Inverters for AC Loads. BOS: Maximum Power Point Trackers. BOS: Other MPP Tracking Techniques. Design Examples. A Grid Interactive PV System. Design of Transformers, Inductors and Line Filters. Index.

Latest Print 2014 / 376 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4417-4 / ₹ 450.00 / (e-book also available)

SAWHNEY

Non-Conventional Energy Resources

G.S. SAWHNEY, *Professor and Head of the Department of Mechanical Engineering at Accurate Institute of Management and Technology, Greater Noida.*

There has been an enormous increase in the demand for energy as a result of industrial development and population growth. Due to the depletion of fossil fuels at a rapid pace, harnessing the power of clean, alternative energy resources has become a necessity. Thus, the book aims to increase awareness among readers about the renewable energy resources and the technologies used to harness them. Written in a lucid and precise manner, the text matter is structured in the question–answer format supported with numerous examples and illustrations. Besides discussing various renewable energy sources such as solar, wind, biogas, hydrogen, thermoelectric, tidal, geothermal, wave and thermal, the book also discusses energy management and environment and outlines Kyoto Protocol.

The book caters to the needs of undergraduate engineering students of all branches.

Contents: Preface. Energy Resources and Their Utilisation. Solar Radiation. Solar Energy. Solar Photovoltaic System. Biogas. Wind Energy. Electrochemical Effects and Fuel Cells. Hydrogen Energy. Thermoelectric Systems for Direct Energy Conversion. Tidal Power. Geothermal Energy. Wave Energy. Ocean Thermal Energy. Environment And Kyoto Protocol. Small Hydro Resource. Energy Management. Index.

Latest Print 2014 / 284 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4609-3 / ₹ 325.00 / (e-book also available)

SOLANKI

Renewable Energy Technologies: A Practical Guide for Beginners

CHETAN SINGH SOLANKI, *Associate Professor, Department of Energy Science and Engineering, Indian Institute of Technology Bombay.*

This book presents a highly accessible introduction to the multi-disciplinary field of renewable energy sources—an area which is becoming increasingly important. It is intended to serve as a textbook for undergraduate electrical and mechanical engineering students and will also be useful for courses in environmental science.

The book helps beginners to understand the basic energy conversion processes involved in various renewable

energy based equipment such as solar photovoltaics, solar water heaters, wind turbines, and biomass plants. Under each technology, several possible system configurations and their usages are considered. Step-by-step procedures are given to design and cost estimate several renewable energy based systems, designed for the given requirements. Numerous chapter-end problems are given to reinforce concepts, and for getting used to system design and system costing procedures.

Besides students, this book will be immensely useful for individuals interested in learning and practising renewable energy technologies.

Contents: Preface. List of Abbreviations. Basics of Energy. Solar Radiation. Solar Photovoltaic Technologies. Solar Thermal Technologies. Wind Energy. Biomass Energy. Appendices—A: Monthly Averaged Daily Solar Radiation. B: Global Annual Solar Radiation Map of India. C: Wind Energy Distribution Map of India. D: Typical Power Ratings of Energy Appliances. E: Physical Constants and Conversion Factors. F: Subsidies and Manufacturers. Index.

Latest Print 2015 / 168 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-3434-2 / ₹ 225.00 / (e-book also available)

SOLANKI

Solar Photovoltaic Technology and Systems: A Manual for Technicians, Trainees, and Engineers

CHETAN SINGH SOLANKI, *Associate Professor, Department of Energy Science and Engineering, Indian Institute of Technology Bombay.*

This comprehensive training manual discusses the various aspects of solar PV technologies and systems in a student-friendly manner.

The text deals with the topics such as solar radiation, various types of batteries, their measurements and applications in SPV systems emphasizing the importance of solar PV technology in renewable energy scenario. It also discusses the method of estimating energy requirement; SPV modules, their formations and connection to arrays, grid-connected SPV captive power systems, tips over troubleshooting of components used in solar PV system, and system designs with plenty of illustrations on all topics covered in the book.

The text is supported by a large number of solved and unsolved examples, practical information using numerous diagrams and worksheet that help students understand the topics in a clear way.

The text is intended for technicians, trainers and engineers who are working on solar PV systems for design, installation and maintenance of solar PV systems.

Contents: Preface. Acknowledgements. Basics of Electricity. Introduction to Energy and Solar Photovoltaic Energy. Solar Cells. Solar PV Modules. Solar PV Module Arrays. Basics of Batteries. Applications of Batteries in

Solar PV Systems. Charge Controller, MPPT and Inverters. Wires. Solar PV System Design and Integration. Grid-connected Solar PV Power Systems. Installation, Troubleshooting and Safety. Index.

Latest Print 2014 / 320 pp. / 21.6 × 27.8 cm

ISBN-978-81-203-4711-3 / ₹ 525.00 / (e-book also available)

SOLANKI

Solar Photovoltaics: Fundamentals, Technologies and Applications, 3rd ed.

CHETAN SINGH SOLANKI, *Associate Professor in the Department of Energy Science and Engineering at the Indian Institute of Technology Bombay (IITB).* More about the author: www.es.e.iitb.ac.in/~chetan/index.htm

This thoroughly revised text, now in its third edition, continues to provide a detailed discussion on all the aspects of solar photovoltaic (PV) technologies from physics of solar cells to manufacturing technologies, solar PV system design and their applications. The Third Edition includes a new chapter on “Advances in c-Si Cell Processes Suitable for Near Future Commercialization” (Chapter 8) to introduce the technological advancement in the commercial production to keep the readers up to date.

Organized in three parts, Part I introduces the fundamental principles of solar cell operation and design, Part II explains various technologies to fabricate solar cells and PV modules and Part III focuses on the use of solar photovoltaics as part of the system for providing electrical energy. In addition to this, numerous chapter-end exercises are given to reinforce the understanding of the subject.

The text is intended for the undergraduate and postgraduate students of engineering for their courses on solar photovoltaic technologies and renewable energy technologies. The book is of immense use for teachers, researchers and professionals working in the photovoltaic field. In a nutshell, this book is an absolute must-read for all those who want to understand and apply the basics behind photovoltaic devices and systems.

Contents: Foreword. Preface. Preface to the First Edition. Acknowledgements. List of Symbols. Abbreviations. International System of Units. Part I: Solar Cell Fundamentals—Place of PV in World Energy Scenario. Fundamentals of Semiconductors. Charge Carriers and Their Motion in Semiconductor. P-N Junction Diode: An Introduction to Solar Cells. Design of Solar Cells. Part II: Solar Cell Technologies—Production of Si. Si Wafer-based Solar Cell Technology. Advances in c-Si Cell Processes Suitable for Near Future Commercialization. Thin Film Solar Cell Technologies. Concentrator PV Cells and Systems. Emerging Solar Cell Technologies and Concepts. Part III: Solar Photovoltaic Applications—Solar Radiation. Solar Photovoltaic Modules. Balance of Solar PV Systems. Photovoltaic System Design and Applications.

Appendices—A: Best Solar Cell Efficiency Table. B: Estimation of Solar Radiation. C: Monthly Global Solar Radiation Data around the World. D: Worksheet for Designing Stand-alone Solar PV Systems. E: Look up Table for Present Worth Factor of Future Investments. Bibliography. Index.

Latest Print 2015 / 540 pp. / 17.8 × 23.5 cm (Hard Cover)
ISBN-978-81-203-5111-0 / ₹ 550.00 / (e-book also available)

विकिरण का मासिक औसत। परिशिष्ट ख: भूमण्डलीय सौर विकिरण (भारत का मानचित्र)। परिशिष्ट ग: पवन ऊर्जा वितरण (भारत का मानचित्र)। परिशिष्ट घ: ऊर्जा उपकरणों का अंकित शक्ति निर्धारण। परिशिष्ट ङ: भौतिक स्थिरांक और परिवर्तक कारक। परिशिष्ट च: सब्सिडी एवं निर्माता अनुक्रमणिका।

Latest Print 2009 / 176 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-3808-1 / ₹ 150.00 / (e-book also available)

सोलंकी

अक्षय ऊर्जा प्रौद्योगिकी: एक व्यावहारिक ज्ञान

चेतन सिंह सोलंकी, इण्डियन इन्स्टीट्यूट ऑफ टैक्नोलॉजी बम्बई के एनर्जी सिस्टम्स इंजीनियरिंग विभाग में एसोसिएट प्रोफेसर हैं।

आदिकाल से ही मानव जीवन में ऊर्जा का महत्वपूर्ण स्थान रहा है। हमारे दैनिक जीवन का कोई भी क्रिया-कलाप ऊर्जा के बिना सम्भव नहीं है। आज तक वैश्विक उद्योगों का क्रमिक विकास मुख्यतः जीवाश्म ईंधन से प्राप्त ऊर्जा पर ही निर्भर रहा है। लेकिन दीर्घकाल तक इसका उपयोग करने के कारण आज इसके दुष्परिणाम उच्च भू-ताप (global warming) तथा प्रदूषित वातावरण के रूप में हमारे सामने खड़े हैं। जिसके परिणामस्वरूप पृथ्वी का अस्तित्व ही संकट में पड़ता जा रहा है। इस संकट से उबरने के लिए हमारे पास एक ही विकल्प है, और वह है—**अक्षय ऊर्जा प्रौद्योगिकी**।

यह पुस्तक इन्हीं विकट समस्याओं के समाधान हेतु लिखी गई है। पुस्तक में अक्षय ऊर्जा प्रौद्योगिकी के मूलभूत तत्त्वों का सरल तथा सुबोध भाषा में विस्तार से वर्णन किया गया है। विषय सामग्री को रोचक बनाने के लिए यथास्थान संयंत्रों के डिजाइन एवं उपकरणों के चित्र तथा तालिकाएँ भी दी गयी हैं। प्रत्येक अध्याय के अन्त में अभ्यास के लिए प्रश्न भी दिए गए हैं। अतः यह पुस्तक विद्यार्थियों एवं सुधी पाठकों के लिए अतीव उपयोगी सिद्ध होगी।

पुस्तक की विशेषताएँ

- पारम्परिक ऊर्जा स्रोतों का उपयोग।
- जीवाश्म ईंधन के प्रयोग से बढ़ता भू-ताप (global warming) एवं वातावरण पर पड़ने वाले कुप्रभाव।
- सौर फोटोवोल्टाइक (PV) संयंत्र प्रौद्योगिकी—मॉड्यूलों का निर्धारण, ट्रैकिंग शक्ति, संयंत्र डिजाइन और कीमत का आँकलन।
- विद्युत ऊर्जा द्वारा वातानुकूलन, प्रशीतन तथा जल उष्णन आदि।
- विद्युत ऊर्जा के अनेक आयाम तथा संयंत्रों में इस ऊर्जा का हानि रहित उपयोग।
- सौर संयंत्र पम्पिंग सिस्टम का डिजाइन एवं केस स्टडी।
- बाँयोगैस तकनीकी का सफल उपयोग।
- भूमण्डलीय—सीधे एवं छितरित सौर विकिरणों के प्रभाव।
- पवन ऊर्जा—निहित शक्ति, पवन टरबाइन के प्रकार, डिजाइनिंग एवं टरबाइन रेटिंग का आँकलन।

विषय सूची: प्रस्तावना। आधार। संक्षिप्तियाँ। ऊर्जा के मूल तत्त्व। सौर विकिरण। सौर फोटोवोल्टाइक प्रौद्योगिकी। सौर तापीय प्रौद्योगिकी। पवन ऊर्जा। जैव ईंधन ऊर्जा। परिशिष्ट क: दैनिक सौर

Robotics and Robotic Engineering

MURPHY

Introduction to AI Robotics

ROBIN R. MURPHY, Associate Professor of Computer Science and Engineering, University of South Florida, Tampa.

This book attempts to cover all that is needed to program an artificially intelligent robot for applications involving sensing, navigation, planning, and uncertainty.

In the overview at the beginning of each chapter, the author touches upon anthropomorphic robots from classic films and science fiction stories before delving into the nuts and bolts of organizing intelligence in robots.

The book is divided into two parts—Part I: Robotic Paradigms and Part II: Navigation—Part I defines intelligent robots and introduces why artificial intelligence is needed. It covers the 'theory' of AI robotics, taking the reader through a historical journey from the Hierarchical to the Hybrid Deliberative/Reactive Paradigm for organizing intelligence, besides focusing on Reactive Paradigm and behaviours, techniques for reactive behaviours, and coordination and control of teams of multi-agents. Part II devotes three chapters to qualitative and metric navigation with path planning techniques, and work in uncertainty management.

Pedagogical features such as chapter-end summaries, exercises, photographs and diagrams, and the extensive Bibliography at the end of the book would considerably enhance the value of this well-researched text. Intended as a text for students of mechanical engineering, the book should also be useful to students of computer science and professionals interested in programming artificially intelligent robots for various applications.

Contents: Preface. Part I: ROBOTIC PARADIGMS—From Teleoperation to Autonomy. The Hierarchical Paradigm. Biological Foundations of the Reactive Paradigm. The Reactive Paradigm. Designing a Reactive Implementation. Common Sensing Techniques for Reactive Robots. The Hybrid Deliberative/Reactive Paradigm. Multi-agents. Part II: NAVIGATION—Topological Path Planning. Metric Path Planning. Localization and Map Making. On the Horizon. Bibliography. Index.

Latest Print 2012 / 488 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2458-9 / ₹ 395.00

SIEGWART, et al.
Introduction to Autonomous Mobile Robots, 2nd ed.

ROLAND SIEGWART, *Professor of Autonomous Systems and Director of the Center for Product Design at the Institute of Robotics and Intelligent Systems, ETH Zürich.*

IIIAH R. NOURBAKSH, *Professor of Robotics and Director of the CREATE Lab in the Robotics Institute, School of Computer Science, at Carnegie Mellon University.*

DAVIDE SCARAMUZZA, *Senior Researcher at the Autonomous Systems Lab at ETH Zürich, where he is also a lecturer and leader of the European project sFly.*

This book offers students and other interested readers an introduction to the fundamentals of mobile robotics, spanning the mechanical, motor, sensory, perceptual, and cognitive layers.

The text focuses on mobility itself, offering an overview of the mechanisms that allow a mobile robot to move through a real world environment to perform tasks, including locomotion, sensing, localization, and motion planning. The book presents techniques and technology that enable mobility in a series of interacting modules. It covers all aspects of mobile robotics, including software and hardware design considerations, related technologies, and algorithmic techniques.

NEW TO THIS EDITION

- New material has been added on topics such as locomotion, perception, localization, and planning and navigation.
- Problem sets have been added at the end of each chapter.

As the book covers all aspects of robotics into one volume, it can serve as textbook or working tool for beginning practitioners.

“This text provides a clear and systematic development of the essentials of mobile robotics. The second edition adds up-to-date material to a book that has already been adopted in robotic classes worldwide. With this guide in hand, students and readers will swiftly navigate the field toward more advanced systems.”

—RAJA CHATILA, LAAS-CNRS, France

Contents: Acknowledgments. Preface. Introduction. Locomotion. Mobile Robot Kinematics. Perception. Mobile Robot Localization. Planning and Navigation. Bibliography. Index.

Latest Print 2011 / 472 pp. / 17.8 × 23.5 cm
 ISBN-978-81-203-4322-1 / ₹ 450.00

SI Units

SOMAN

**International System of Units:
 A Handbook on SI Units for Scientists
 and Engineers**

K. SOMAN, *a retired scientist from Indian Space Research Organisation (ISRO).*

This book contains comprehensive reference material on the use of the International System of Units (SI system). It is now the world's most widely used system of measurement, developed in 1960 from the metric system. As some countries, notably the United States and the United Kingdom, still continue to use customary units in addition to SI, this book also provides information on CGS, FPS and MKS systems of units.

The book is organized into 12 chapters. The first nine chapters acquaint the readers with the definitions of the base units in the SI system, application of prefixes, realization of derived and supplementary units, conversion factors, general physical data, and several examples to illustrate the use of conversion factors between the units used in different systems.

The book also contains engineering related data, in SI units, on properties of some metals, alloys and polymers for use by design engineers. Data on threaded fasteners is also presented in SI units. Besides, there is miscellaneous other information, such as properties of gases, paper sizes, solar system, and earthquake severity measurement scale, presented in the context of the use of the SI system.

The book will be useful as a handy guide to students of science and engineering, technicians, scientists and engineers, as well as authors and editors of technical books.

Contents: Preface. Scope. Magnitude and Exponents of SI System of Units. Derived Units in SI System for Scientists and Engineers. Conversion Constants. General Physical Data. Worked-out Examples of Conversion Factors. Conversion Constants for SI Units. Rules for Practising SI Units. Organization of the International System of Units. Engineering Material Part. Threaded Fastener: ISO (Metric). Miscellaneous Section. Bibliography. Index.

Latest Print 2012 / 120 pp. / 16.0 × 24.1 cm
 ISBN-978-81-203-3653-7 / ₹ 125.00

**Strength of Materials/Mechanics
 of Solids/Mechanics of Materials**

CHANDRAMOULI

Fundamentals of Strength of Materials

P.N. CHANDRAMOULI, *Professor of Civil Engineering at the National Institute of Engineering, Mysore.*

This book provides comprehensive coverage of the

fundamental concepts and all the key topics of interest in Strength of Materials with an emphasis on solving practical problems, from the first principles, related to the design of structural members, mechanical devices and systems in several fields of engineering.

The book is organized to present a thorough treatment of stress analysis first. This treatment of basic principles is followed by appropriate application of analysis techniques and design approaches to trusses and cables, torsion in circular shaft, deflection of beams, buckling of straight columns and struts, and analysis of thick- and thin-walled cylinders under internal and external pressure.

The book features clear explanations, a wealth of excellent worked-out examples of practical applications, and challenging problems.

The book is intended for the undergraduate students of civil, mechanical, electrical, chemical, aeronautical, and production and industrial engineering.

KEY FEATURES

- Provides a large number of worked-out examples to help students comprehend the concepts with ease.
- Gives chapter-end review questions to test students' understanding of the subject.
- Includes chapter-end numerical problems to enhance the problem-solving ability of students. Many of the problems depict realistic situations encountered in engineering practice.
- Incorporates objective type questions to help students assess their overall mastery of the subject.

Contents: Preface. Stresses and Strains. Compound Stresses. Shear Force and Bending Moment. Trusses and Cables. Centroid and Centre of Gravity. Moment of Inertia. Bending and Shear Stresses in a Beam. Torsion in Circular Shaft. Deflection of Beams. Columns and Struts. Thin and Thick Cylinders. Testing of Materials. Bibliography. Index.

Latest Print 2013 / 864 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4672-7 / ₹ 525.00 / (e-book also available)

DAS, et al.

Basic Engineering Mechanics and Strength of Materials

MADAN MOHAN DAS, *formerly Professor, Civil Engineering Department, Assam Engineering College, Guwahati. An Emeritus Fellow of AICTE, Director of Technical Education, Government of Assam.*

MIMI DAS SAIKIA, *Professor, Civil Engineering Department, Assam Down Town University, Guwahati.*

BHARGAB MOHAN DAS, *Chief Business Development Officer, Ritta Co. Ltd., Thailand and President and COO, Thai Global Energy Co. Ltd., Thailand.*

This textbook focuses on imparting the basic knowledge of engineering mechanics and strength of materials to the first-year undergraduate students of all branches of engineering.

The book elaborates on the introductory topics of Basic Engineering Mechanics and Strength of Materials in two parts. **Part I** of the book deals with various aspects of basic engineering mechanics (Chapters 1–11). The scope of engineering mechanics includes system of forces, laws of mechanics, moments of forces, parallel forces, couples and equilibrium of forces. This part also discusses analysis of forces in space and perfect frames, centre of gravity, friction and kinetics of rigid bodies. **Part II** of the book focuses on elementary knowledge of Strength of Materials (Chapters 12–17). The coverage of strength of materials included simple and generalized stress and strain, bending moment and shear force in beams, stress in thin cylinders and shells, as well as analysis of torsion and Euler's theory applicable to columns.

KEY FEATURES

- Illustrates theory with a large number of solved problems.
- Gives chapter-end exercises to sharpen students' problem-solving skills.
- Presents more than 200 diagrams to clarify the concepts.

Contents: Preface. Part I: Basic Engineering Mechanics—Introduction and System of Forces. Laws of Mechanics and Resultant Forces. Moments of Forces. Parallel Forces and Couples. Equilibrium of Forces. Forces in Space: Introduction to Vector Algebra. Analysis of Forces in Perfect Frames. Centre of Gravity. Moment of Inertia. Friction. Kinetics of Rigid Bodies. Part II: Strength of Materials—Simple Stress and Strain. Generalized Stress and Strain. Beams: Introduction to Bending Moment and Shear Force. Hoop Stress: Thin Cylinders and Thin Shells. Torsion. Columns and Stress. Index.

Latest Print 2014 / 268 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4181-4 / ₹ 250.00 / (e-book also available)

GAMBHIR

Fundamentals of Solid Mechanics (A Treatise on Strength of Materials)

M.L. GAMBHIR, *former Professor and Head, Department of Civil Engineering, and also Dean, Planning and Resource Generation, at the Thapar University, Patiala.*

This book is primarily designed for courses in Solid Mechanics/Mechanics of Materials/Mechanics of Solids/Strength of Materials prescribed for the undergraduate students of engineering in civil, mechanical, aeronautical and applied mechanics disciplines. It covers all the basic topics of mechanics of deformable bodies generally taught in these courses.

The text presents the topics in a clear, simple, practical, logical and cogent fashion that provides the students with insights into theory as well as applications to practical problems. It uses an abundance of worked examples to impart a high level of comprehension of concepts and helps master the process of calculations, manipulations and that of making appropriate inferences. Well-labelled

diagrams have been used throughout the text for a sound comprehension of the fundamentals of the subject. Most of the examples and chapter-end problems have been formulated in parametric form making them independent of units and suitable for practical applications. An extensive set of problems along with **hints** and **answers** is provided at the end of each chapter for practice.

Since the book aims at covering the topics generally taught in engineering curriculum of several disciplines, an interdisciplinary approach has been followed. Some advanced topics such as *thick pressure vessels, skew bending, curved members, beam-columns*, etc. have also been included for the benefit of postgraduate students.

KEY FEATURES

- Emphasizes clarity of concepts and development of structural sense to enable the student to appropriately visualize the details of structures.
- Develops the students' proficiency in solving a variety of problems encountered in engineering practice.
- Chapter-end questions (with hints and answers) prepare the student to handle practical mechanical, structural and fabrication problems.
- Examples and practice problems are formulated in parametric form making them independent of units and suitable for practical applications.

Contents: Preface. Introductory Concepts. Analysis for Axial Forces: The Cable and the Plane Truss. Analysis for Deformation of Bars: Statically Determinate Systems (Simple Stresses and Strains—Elastic Constants). Analysis for Axial Deformation of Bars: Statically Indeterminate Systems (Composite Systems and Thermal Stresses). Biaxial and Triaxial Stresses and Strains: Pressure Vessels. Torsion. Shearing Force and Bending Moment Diagrams. Bending of Simple Beams. Shearing Stresses. Springs. Combined Stresses: Elastic Bending of Members with Axial Loads. Rivetted and Bolted Connections. Welded Connections. Deflections (Direct Integration and Geometrical Methods). Deflections (Energy Methods). Members Subjected to Compression: Columns and Struts. Unsymmetrical (Skew) Bending. Curved Members Subjected to Bending. Plastic Bending. Principal and Complex Stresses. Special Topics. Appendix A: Geometrical Characteristics of Cross-Sections. Appendix B: Shear Force, Bending Moment Diagrams and Deflection Formulae for Beams. References. Index.

Latest Print 2014 / 936 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3870-8 / ₹ 550.00 / (e-book also available)

PAUL, ROY & MUKHERJEE Mechanical Sciences: Engineering Mechanics and Strength of Materials

AKSHOY RANJAN PAUL, *Department of Mechanical Engineering, Kalyani Government Engineering College, Kalyani, West Bengal.*

PIJUSH ROY, *Department of Mechanical Engineering, College of Textile Technology, Serampore, West Bengal.*

SANCHAYAN MUKHERJEE, *Department of Mechanical Engineering, Kalyani Government Engineering College, Kalyani, West Bengal.*

Primarily intended for undergraduate students of all engineering disciplines, this comprehensive and up-to-date text strives to meet the long-felt need for a single book that covers **Engineering Mechanics** as well as **Strength of Materials**.

The text is organized in three parts. Parts I and II provide an easily understandable presentation of the theory along with systematic application of the principles of **statics** and **dynamics** to engineering problems. Part III covers the basic topics in **strength of materials** in a clear, simple, direct fashion that uses an abundance of examples to clarify principles.

KEY FEATURES

- Clear and simple diagrams to explain concepts
- More than 200 graded solved examples to foster understanding of theory
- More than 125 exercises with solution hints and answers to develop students' problem solving skills
- Multiple-choice questions to help students assess their learning.

Contents: Foreword. Preface. Notation. Part I: Statics—Introduction to Engineering Mechanics. Scalar and Vector Analysis. Statics of Particles. Equivalent Systems of Forces of Rigid Bodies. Equilibrium of Rigid Bodies. Analysis of Simple Structures. Centroid and Moment of Inertia. Friction. Virtual Work. Simple Lifting Machines. Part II: Dynamics—Kinematics of Particles and Rigid Bodies. Kinetics of Particles and Rigid Bodies. Mechanical Vibrations. Part III: Strength of Materials—Simple Stresses and Strains. Relations between Elastic Constants. Composite Bars and Temperature Stresses. Strain Energy—Impact Loading. Shear Force and Bending Moment Diagram. Deflection of Beams. Principal Stresses. Stresses in Thin Walled Pressure Vessels. Torsion of Shafts. Multiple-choice Questions. Index.

Latest Print 2009 / 596 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2611-8 / ₹ 395.00 / (e-book also available)

SHESHA PRAKASH & SURESH Textbook of Mechanics of Materials (with CD-ROM)

M.N. SHESHA PRAKASH, *Professor, Department of Civil Engineering and Vice Principal, Vidya Vikas Institute of Engineering and Technology, Mysore.*

G.S. SURESH, *Professor and Head, Department of Civil Engineering, National Institute of Engineering (NIE), Mysore.*

Primarily designed as a textbook for the undergraduate students of civil engineering and mechanical engineering, this compact and accessible book covers the fundamental principles and applications of Strength of Materials/Mechanics of Materials. The text discusses in detail the topics such as simple and compound stresses, bending

moments, shear forces, stresses in beams, deflection in beams, torsion of shafts, thick and thin cylinders, and columns and struts. A large number of worked-out problems are provided to illustrate the concepts discussed. Besides, a large number of chapter-end problems are given to help students test their understanding of the subject.

This book comes with a companion CD containing software, developed using MS Excel, to work out the problems. It would help the faculty to develop new kinds of problems with reliable solutions for use in tests and examinations. The use of this software will enable the students to understand the concepts in a thorough manner.

Contents: Preface. Acknowledgements. Simple Stresses. Compound Stresses. Bending Moment and Shear. Stresses in Beams. Deflection of Beams. Torsion of Shafts. Thick and Thin Cylinders. Columns and Struts. Index.

Latest Print 2011 / 304 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4185-2 / ₹ 275.00 / (e-book also available)

SINGH

Mechanics of Solids

ARBIND KUMAR SINGH, *Department of Civil Engineering, Indian Institute of Technology Guwahati.*

Designed as a text for both the undergraduate and postgraduate students of civil, mechanical, aerospace, and marine engineering, this book provides an in-depth analysis of the fundamental principles of mechanics of deformable solids based on the phenomenological approach.

The book starts with linear and angular momentum principles for a body. It introduces the concepts of stress, strain and the constitutive relations using tensors. Then it goes on to give a description of the laws of thermodynamics as a restriction on constitutive relations and formulates the boundary value problem in elasticity. Besides, the text treats bar under axial, bending and torsional deformation as well as plane stress and plane strain idealizations. The book concludes with a discussion on variational mechanics and the theory of plasticity.

DISTINGUISHING FEATURES

- Elaborate treatment of constitutive relations for linear elasticity.
- Consistent formulation of strength of materials approach and three-dimensional elasticity for bar under axial, bending and torsional deformation.
- Presentation of failure criteria and plasticity theory taking the modern developments into account.
- Large number of worked-out examples throughout the text and exercises at the end of each chapter.

Contents: Preface. Force and Deformation. Stress at a Point. Strain at a Point. Constitutive Modelling. Energy of Deformation. Boundary Value Problem in Linear Elasticity. Equations of Equilibrium of Rod. Extension of Bar. Bending of Beam. Torsion of Circular Shaft. Torsion of Noncircular Bar. Plane Stress and Plane Strain. Variational

Mechanics. Failure Criteria. Plasticity: General Concept. Index.

Latest Print 2014 / 496 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3190-7 / ₹ 395.00 / (e-book also available)

SRIVASTAVA & GOPE

Strength of Materials, 2nd ed.

A.K. SRIVASTAVA, *Manager (Design) in Aircraft Upgrade Research and Design Centre, Hindustan Aeronautics Limited (Ministry of Defence), Nasik.*

P.C. GOPE, *Professor in Mechanical Engineering at the College of Technology, G.B. Pant University of Agriculture and Technology, Pantnagar.*

The book, now in the Second Edition, presents the fundamental principles of strength of materials and focuses on 3D analysis of stress and strain, double integration method, Macaulay's method, moment area method and method for determining stresses using Winkler-Bach theory. It also covers the analyses of helical springs and leaf spring, and buckling analysis of columns and struts using Euler's and Rankine's theory.

This edition includes four new chapters, namely *Simple and Compound Stress, Theory of Failure, Energy Methods and Finite Element Method and its Applications Using ANSYS Software*. The chapter on *Analysis of Stress and Strain* has been thoroughly revised.

The text is primarily designed for the undergraduate students of mechanical engineering, production engineering, and industrial engineering. Besides students, practising engineers would also find the book useful.

KEY FEATURES

- A large number of numerical problems
- Open-ended or synthesis-type examples wherever required
- Chapter-end exercises

Contents: Foreword. Preface. Preface to the First Edition. Simple and Compound Stress. Analysis of Stress and Strain. Theory of Failure. Energy Methods. Deflection of Beams. Curved Beam. Thin Cylinder and Sphere. Thick and Compound Cylinder. Unsymmetrical Bending and Shear Centre. Columns and Struts. Spring. Rotating Discs and Cylinders. Finite Element Method and its Application Using ANSYS Software. Index.

Latest Print 2014 / 408 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4522-5 / ₹ 350.00 / (e-book also available)

Thermal Engineering

SAWHNEY

Thermal and Hydraulic Machines, 2nd ed.

G.S. SAWHNEY, *Professor and Head of the Department of Mechanical Engineering at Accurate Institute of Management and Technology, Greater Noida.*

The second edition of this well-received book, continues

to present the operating principles and working aspects of thermal and hydraulic machines. First, it covers the laws and the essential principles of thermodynamics that form the basis on which thermal machines operate. It subsequently presents the principles, construction details and the methods of control of hydraulic and thermal machines.

The coverage of thermal machines includes steam turbines, gas turbines, IC engines, and reciprocating and centrifugal compressors. The coverage of hydraulic machines includes hydraulic turbines, reciprocating pumps and centrifugal pumps. The classification, construction and efficiency of these machines have been discussed with plenty of diagrams and worked problems. This will help the readers understand easily the underlying principles. This new edition includes substantially updated chapters and also introduces additional text as per the syllabus requirement.

The book is intended for the undergraduate engineering students pursuing courses in mechanical, electrical and civil branches.

KEY FEATURES

- Provides succinct coverage of all operating aspects of thermal and hydraulic machines.
- Includes a large number of worked problems at the end of each chapter to help students achieve a sound understanding of the subject matter.
- Gives objective type questions with explanatory answers to assist students in preparing for competitive examinations.

Contents: Preface. Preface to the First Edition. Basic Concepts and Zeroth Law of Thermodynamics. First Law of Thermodynamics. Second Law of Thermodynamics. Properties of Steam and Thermodynamics. Vapour Cycles. Thermodynamic Cycles. Steam Turbine. Gas Turbine. Compressor. Impact of Jet. Hydraulic Turbines. Centrifugal Pumps. Reciprocating Pumps. Bibliography. Index.

Latest Print 2014 / 588 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4473-0 / ₹ 495.00 / (e-book also available)

SOMAN

Thermal Engineering

K. SOMAN, a retired scientist from Indian Space Research Organisation (ISRO).

Primarily intended as a text for undergraduate students of mechanical engineering, this book presents a clear and concise exposition on the principles and applications of thermal engineering.

Divided into 10 chapters, the book provides a comprehensive coverage on the fundamentals of thermodynamics and heat transfer; laboratory testing procedures for internal combustion engines (IC engines), working of gas turbines, refrigerators, and air-conditioning systems. Each topic is treated in detail giving necessary empirical formulas to solve the practical engineering problems. The derivations such as efficiencies

of energy conversion, testing of IC engines and air compressors, estimating combustion parameters, and enthalpy and entropy calculations are provided to add an analytical approach to the subject.

KEY FEATURES

- Saturated with self-explanatory diagrams
- Provides unsolved problems to check students' comprehension of the subject
- Incorporated with Appendices comprising Steam Tables, Gas Tables and Standard pressure charts.

Contents: Foreword. Preface. Nomenclature. Principles of Steam Engineering. Steam Nozzles. Vapour Power Cycles. Steam Turbines. Fuels and Combustion. Internal Combustion Engines. Gas Power Cycles. Gas Turbines. Air Compressors. Refrigeration and Air-conditioning. Appendices. Bibliography. Index.

Latest Print 2011 / 720 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4048-0 / ₹ 450.00 / (e-book also available)

Thermodynamics

ACHUTHAN

Engineering Thermodynamics, 2nd ed.

M. ACHUTHAN, Director, MES College of Engineering, Kuttipuram (Kerala).

This revised and fully updated text, now in its **Second Edition**, continues to provide a thorough understanding of the fundamental principles of classical thermodynamics starting with the most elementary ideas of heat and temperature. The book also focuses on practical applications of thermodynamic processes and equips students with simple techniques of solving engineering problems.

The book begins with the basic concepts of properties of matter, work, mechanical energy, potential energy and temperature, and then moves on to explain the laws of thermodynamics. It continues to discuss in detail the auxiliary functions, properties of substances, thermodynamics of combustion, ideal cycles and internal combustion engine cycles. The book concludes with a chapter on Brayton Cycle.

KEY FEATURES

- Systematic problem-solving methodology
- A large number of solved examples
- A number of review questions
- Several unsolved exercises with hints
- A set of 107 new problems in Appendix A based on different examination patterns.

The book is suitable as a textbook for undergraduate students of mechanical/mechatronics/aeronautical/automobile engineering disciplines.

Contents: Preface. What is Thermodynamics? Concepts of Thermodynamics. Work and Mechanical Energy. Temperature and Its Empirical Scales. The First Law of Thermodynamics. Energy (First Law) Equation for Flow

Systems. The Second Law of Thermodynamics. Auxiliary Functions. Properties of Substances. Thermodynamics of Combustion. Ideal Cycles. Internal Combustion (I.C.) Engine Cycles. Brayton Cycle and Its Other Names. Appendices—A: Additional Problems. B: Explanatory Notes. C: Problem Solving. D: Some Mathematical Principles. E: Other Formulations of Thermodynamics. F: Steam and R-12 Tables. Bibliography. Index.

Latest Print 2011 / 512 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3845-6 / ₹ 325.00 / (e-book also available)

MUKHERJEE & PAUL

Fundamentals of Mechanical Sciences: Engineering Thermodynamics and Fluid Mechanics

SANCHAYAN MUKHERJEE, *Department of Mechanical Engineering, Kalyani Government College, Kalyani, West Bengal.*

AKSHOY RANJAN PAUL, *Department of Applied Mechanics, Motilal Nehru National Institute of Technology, Allahabad.*

The book is primarily intended for the first-year undergraduate students of all branches of engineering as per the course curriculum of the West Bengal University of Technology (WBUT). It is a comprehensive textbook on fundamental concepts of thermodynamics and fluid mechanics. It gives a detailed description of the theory along with the systematic applications of laws of thermodynamics and fluid mechanics to engineering problems. The text is amply illustrated with worked-out examples, tables and diagrams to enable the students to comprehend the subject with ease. It is designed to take students from an elementary level to a level of sound understanding required for the analysis of practical problems.

KEY FEATURES

- Deals with basic principles in a clear and easy-to-understand style.
- Provides plenty of solved problems in each chapter.
- Unsolved problems with hints and answers are included at the end of each chapter, to develop students' problem-solving skills.
- Multiple choice questions with answers are provided to help students assess their comprehension of the subject.
- To make the students familiar with the examination pattern, previous years' WBUT Examination Question Papers are given along with the solutions.

Contents: Preface. Part I: Engineering Thermodynamics—Introductory Concepts and Definitions. First Law of Thermodynamics. The Second Law of Thermodynamics—Entropy. Properties of a Pure Substance. Air Standard Cycles. Vapour and Combined Power Cycles. Part II: Engineering Fluid Mechanics—Introduction to Fluid Mechanics. Fluid Statics. Kinematics of Fluid. Dynamics of Fluid Flow. Supplementary Reading: Basic Refrigeration

Cycles. Multiple Choice Questions. Solved Test Papers of WBUT Examinations (2005 to 2008). Appendix. Bibliography. Index.

Latest Print 2009 / 304 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3756-5 / ₹ 225.00 / (e-book also available)

PAUL, MUKHERJEE & ROY

Mechanical Sciences: Engineering Thermodynamics and Fluid Mechanics

AKSHOY RANJAN PAUL, *is with the Department of Mechanical Engineering, Kalyani Government Engineering College, Kalyani, West Bengal.*

SANCHAYAN MUKHERJEE, *is with the Department of Mechanical Engineering, Kalyani Government Engineering College, Kalyani, West Bengal.*

PIJUSH ROY, *is with the Department of Mechanical Engineering, College of Textile Technology, Serampore, West Bengal.*

Primarily intended for the first-year undergraduate students of various engineering disciplines, this comprehensive and up-to-date text also serves the needs of second-year undergraduate students (Mechanical, Civil, Aeronautical, Chemical, Production and Marine Engineering) studying Engineering Thermodynamics and Fluid Mechanics.

The whole text is divided into two parts and gives a detailed description of the theory along with the systematic applications of laws of Thermodynamics and Fluid Mechanics to engineering problems. Part I (Chapters 1–6) deals with the energy interaction between system and surroundings, while Part II (Chapters 7–15) covers the fluid flow phenomena. This accessible and comprehensive text is designed to take the student from an elementary level to a level of sophistication required for the analysis of practical problems.

KEY FEATURES

- More than 150 graded solved examples to foster understanding of theory.
- Multiple-choice questions to help students assess their comprehension of the topics.
- Unsolved problems with hints and answers to develop students' problem solving skills.

Contents: Foreword. Preface. Part I: Engineering Thermodynamics—Introductory Concepts and Definitions. First Law of Thermodynamics. The Second Law of Thermodynamics—Entropy and Availability. Properties of a Pure Substance. Gas Power Cycles. Vapour and Combined Power Cycles. Part II: Engineering Fluid Mechanics—Introduction to Fluid Mechanics. Fluid Statics. Kinematics of Fluid. Dynamics of Fluid Flow. Viscous Incompressible Flow. Viscous Flow Through Pipes. Dimensional Analysis and Similitude. Open Channel Flow. Compressible Flow. Multiple-choice Questions. Supplementary Reading. Appendix. Bibliography. Index.

Latest Print 2010 / 604 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2727-6 / ₹ 450.00 / (e-book also available)

RATHAKRISHNAN Fundamentals of Engineering Thermodynamics, 2nd ed.

E. RATHAKRISHNAN, *Professor, Department of Aerospace Engineering, Indian Institute of Technology Kanpur.*

Updated and enhanced with numerous worked-out examples and exercises, this Second Edition continues to present a thorough, concise and accurate discussion of fundamentals and principles of thermodynamics. It focuses on practical applications of theory and equips students with sound techniques for solving engineering problems.

The treatment of the subject matter emphasizes the phenomena which are associated with the various thermodynamic processes. The topics covered are supported by an extensive set of example problems to enhance the student's understanding of the concepts introduced. The end-of-chapter problems serve to aid the learning process, and extend the material covered in the text by including problems characteristic of engineering design.

The book is designed to serve as a text for undergraduate engineering students for a course in thermodynamics.

KEY FEATURES

- Devotes separate chapters to treatment of statistical thermodynamics and kinetic theory of ideal gases
- Includes a revised chapter on heat transfer theory
- Provides systematic problem-solving methodology to fortify material throughout
- End-of-chapter summaries help students identify key concepts
- Includes a set of thermodynamic property tables for ready reference by students

Contents: Preface. Basic Concepts and Definitions. Energy and the First Law of Thermodynamics. Thermodynamic Analysis of Control Volume. The Second Law of Thermodynamics. Entropy. Availability, Irreversibility and Availability Analysis of Engineering Processes. Properties of Pure Substances. Nonreacting Gas Mixtures. Vapour Power Cycles. Gas Power Cycles. Refrigeration Cycles. Psychrometrics. General Thermodynamic Property Relations. Reactive Systems. Chemical and Phase Equilibrium. Thermodynamics of Compressible Flow. Kinetic Theory of an Ideal Gas. Elements of Statistical Thermodynamics. Elements of Heat Transfer. Appendix. Selected References. Index.

Latest Print 2015 / 716 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2790-0 / ₹ 450.00 / (e-book also available)

VENKANNA & SWATI Applied Thermodynamics

B.K. VENKANNA, *Professor of Mechanical Engineering at Sri Basaveshwar Engineering College, Bagalkot, Karnataka.*

SWATI B.V., *Assistant Professor in the Department of Mechanical Engineering, Sri Basaveshwar Engineering College, Bagalkot, Karnataka.*

This text covers the application of thermodynamics by way of a simple, elegant and practical presentation that ties theory logically and rigorously with the design and application aspects of I.C. engines, combustion thermodynamics, gas power cycles, vapour power cycles, reciprocating compressors, refrigeration and psychometrics.

The text discusses the performance and working of thermodynamic cycles such as gas power cycles and vapour power cycles. The applications of these cycles to the study and analysis of I.C. engines, steam engines, gas turbines and power plants are highlighted. The book also presents a thorough analysis of the working principles of I.C. engines, reciprocating compressors, refrigeration, and air conditioning systems. The book helps students to develop an intuitive understanding of the application of thermodynamics by guiding them through a systematic problem-solving methodology. The contents of the book have been designed to meet the requirements of diploma, AMIE, undergraduate and postgraduate students of mechanical engineering, biotechnology, chemical engineering, automobile engineering, industrial and production engineering.

KEY FEATURES

- Focuses on problem-solving techniques.
- Provides an excellent selection of more than 300 graded and solved examples to foster understanding of the theory.
- Gives over 100 chapter-end problems with answers.
- Summarizes important equations at the end of each chapter.

Contents: Preface. Acknowledgements. I.C. Engines. Combustion Thermodynamics. Gas Power Cycles. Vapour Power Cycles. Reciprocating Compressors. Refrigeration. Psychrometrics. Appendix: Property Tables and Constants in S.I. Units. References.

Latest Print 2015 / 544 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4113-5 / ₹ 350.00 / (e-book also available)

VENKANNA & SWATI Basic Thermodynamics

B.K. VENKANNA, *Professor of Mechanical Engineering at Sri Basaveshwar Engineering College, Bagalkot, Karnataka.*

SWATI B.V., *Assistant Professor in the Department of Mechanical Engineering, Sri Basaveshwar Engineering College, Bagalkot, Karnataka.*

This book provides an in-depth discussion of the principles of thermodynamics. It focuses on engineering applications of theory and sound techniques for solving thermodynamic problems. The book presents the fundamental concepts of thermodynamics and describes the theory of work and heat. The text covers in detail the first law and the second law of thermodynamics with their applications. It also explains the concepts of entropy

and availability and irreversibility. In addition, the book presents thermodynamic properties of pure substances, ideal gases and mixtures of ideal gases, as well as real gases.

This book is designed for undergraduate students of mechanical engineering, industrial and production engineering, automobile engineering and aeronautical engineering for their courses in thermodynamics.

KEY FEATURES

- Presents the text in a simple and elegant manner to enable the students to grasp the essentials of the subject easily and quickly.
- Covers all types of problems of various difficulty levels.
- Includes more than 300 worked-out examples and a large number of end-of-chapter exercises.
- Provides solutions to several model question papers at the end of the book.

Contents: Preface. Acknowledgments. Fundamental Concepts and Definitions. Work and Heat. First Law of Thermodynamics. Second Law of Thermodynamics. Entropy. Availability and Irreversibility. Pure Substances. Ideal Gases and Mixtures of Ideal Gases. Real Gases. Index.

Latest Print 2014 / 528 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4112-8 / ₹ 375.00 / (e-book also available)

Total Quality Management

GOPALAKRISHNAN

Simplified Six Sigma: Methodology, Tools and Implementation

N. GOPALAKRISHNAN, *President of Projects India, Bangalore, a company specialising in training and implementation of lean manufacture and Six Sigma.*

This compact and concise text, based on the rich and vast experience of the author gained while training thousands of individuals, explains in detail what Six Sigma is and why it is necessary to adapt the process. It explains the methodology, tools to be used, and the Six Sigma implementation process.

The book describes how to define a problem, how to measure the key inputs and outputs, and how to collect and analyse the data. It discusses the method of identifying the problems, solutions and, with this, to improve the problem process to get Six Sigma output on a continuous basis. The book gives details of how to impart training on the Six Sigma concepts, tools and implementation methodology to master black belts, black belts and green belts. It contains a detailed syllabus for the training, and the method of selecting the trainers.

This book should prove extremely useful to students of engineering, especially Production/Mechanical Engineering and Industrial Engineering and Management, and postgraduate students of business management. It will be of immense value to all the organisations which wish to achieve highest quality outputs.

KEY FEATURES

- Illustrates all the tools to be used in each of the phases with ready to use templates using the MS Excel work sheets.
- Explains step-by-step the implementation process and how to record the results.
- Describes the data collection process and forms to be used for different types of data.
- Discusses how to control all the processes to ensure stability in the process.
- Contains a number of case studies to help both students and professionals.

Contents: Preface. Abbreviations. What is Six Sigma? Symptoms which Indicate the Need for Six Sigma. What are the Elements of Six Sigma? Six Sigma Process—Define Phase. Six Sigma Tools—Define Phase. Six Sigma Process—Measure Phase. Six Sigma Tools—Measure Phase. Six Sigma Process—Analyze Phase. Six Sigma Tools—Analyze Phase. Six Sigma Special Tools—Analyze Phase. Six Sigma Process—Improve Phase. Six Sigma Tools—Improve Phase. Six Sigma Process—Control Phase. Six Sigma Tools—Control Phase. Implementing Six Sigma. Index.

Latest Print 2013 / 352 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4528-7 / ₹ 425.00 / (e-book also available)

JANAKIRAMAN & GOPAL

Total Quality Management: Text and Cases

B. JANAKIRAMAN, *Professor, Department of Management Studies, NITTE Meenakshi Institute of Technology, Bangalore.*

R.K. GOPAL, *Professor and Program Chair, Department of Management Studies, PES University, Bangalore.*

Providing accessible coverage of the basics and practical aspects of total quality management, this book is intended for students of management and engineering.

The text adopts a realistic approach to the teaching of the subject with the principal focus on the philosophy of total quality management and its role in today's world of fierce business competition.

COVERAGE

- Discusses the mechanism of quality control, quality assurance and different types of quality control tools and their usage.
- Features the Japanese management philosophy, quality awards and standards.
- Presents the differences between total quality management and business process re-engineering and approaches to integrate them.
- Describes the various aspects of benchmarking, capability maturity model and customer relationship management.

KEY FEATURES

- Case studies illustrate application of the principles.

- A good number of figures supplement theory.
- End-of-chapter questions help students reinforce their conceptual understanding of the subject.

Contents: Preface. Introduction to Quality Concepts. Managing for Quality Products and Services. Seven QC Tools. The Philosophy of TQM. Quality Gurus. Quality Circles. Reactive Improvement. Proactive Improvement. Six Sigma Concepts. Just in Time. Taguchi and Hoshin. Quality Awards. Quality Standards. Business Process Re-Engineering. Benchmarking. Capability Maturity Model for Software Industry. Customer Relationship Management. Appendix A: IS/ISO 9001–2000. Appendix B: ISO 14000—Guidance on the Use of the Specification. Bibliography. Index.

Latest Print 2015 / 260 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-2995-9 / ₹ 225.00 / (e-book also available)

KRISHNAIAH

Applied Statistical Quality Control and Improvement

K. KRISHNAIAH, *Professor of Eminence, Department of Industrial Engineering, Anna University, Chennai.*

Primarily intended for the undergraduate students of industrial, production, mechanical and manufacturing engineering, and postgraduate students of industrial, quality engineering and management and industrial engineering and management, this book fills the gap between theory and practice of tools and techniques of quality control and quality improvement. In this book, the principles and concepts are presented clearly and logically with necessary numerical illustrations to reinforce the understanding of the subject matter.

The book is organized in two parts. Part I deals with statistical quality control. It starts with the fundamentals of statistics and quality followed by elaborate discussion on statistical process control, process and gauge capability studies with emphasis on their practical application. It also covers detailed discussion on the various types of control charts used to monitor and control quality of processes and products. It includes acceptance sampling inspection procedures and standard sampling systems. Part II deals with quality improvement techniques/methods. It is a data driven approach that discusses the application of Design of Experiments and Taguchi Methods for improving quality of processes and products. A comprehensive discussion on total quality management is also presented.

KEY FEATURES

- Provides a well structured procedure for the application of all the tools and techniques.
- Includes Shainin DOE tools widely used in Six sigma projects.
- Demonstrates the application of quality improvement techniques through real life case studies.

Contents: Preface. Acknowledgements. Statistical Concepts for Quality Control. Fundamentals of Quality. Statistical Process Control. Process and Measurement

System Capability. Control Charts for Attributes. Control Charts for Individual Measurements. Acceptance Sampling by Attributes. Standard Acceptance Sampling Systems. Concepts of Reliability. Quality Improvement Through Design of Experiments. Process Parameters Optimisation Using Taguchi Method. Shainin System for Quality Improvement. Shainin DOE Tools. Six-sigma Approach to Quality. Total Quality Management. Case Studies on Quality Improvement. Appendices. References. Index.

Latest Print 2014 / 488 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4975-9 / ₹ 425.00 / (e-book also available)

KRISHNAIAH & SHAHABUDEEN

Applied Design of Experiments and Taguchi Methods

K. KRISHNAIAH, *Professor of Eminence, Department of Industrial Engineering, Anna University, Chennai.*

P. SHAHABUDEEN, *Professor and Head, Department of Industrial Engineering, Anna University, Chennai.*

Design of experiments (DOE) is an off-line quality assurance technique used to achieve best performance of products and processes. This book covers the basic ideas, terminology, and the application of techniques necessary to conduct a study using DOE.

The text is divided into two parts—Part I (Design of Experiments) and Part II (Taguchi Methods). Part I (Chapters 1–8) begins with a discussion on basics of statistics and fundamentals of experimental designs, and then, it moves on to describe randomized design, Latin square design, Graeco-Latin square design. In addition, it also deals with statistical model for a two-factor and three-factor experiments and analyses 2^k factorial, 2^{k-m} fractional factorial design and methodology of surface design. Part II (Chapters 9–16) discusses Taguchi quality loss function, orthogonal design, objective functions in robust design. Besides, the book explains the application of orthogonal arrays, data analysis using response graph method/analysis of variance, methods for multi-level factor designs, factor analysis and genetic algorithm.

This book is intended as a text for the undergraduate students of Industrial Engineering and postgraduate students of Mechtronics Engineering, Mechanical Engineering, and Statistics. In addition, the book would also be extremely useful for both academicians and practitioners

KEY FEATURES

- Includes six case studies of DOE in the context of different industry sector.
- Provides essential DOE techniques for process improvement.
- Introduces simple graphical methods for reducing time taken to design and develop products.

Contents: Preface. Part I: Design of Experiments—Review of Statistics. Fundamentals of Experimental Designs. Single Factor Experiments. Multi-Factor Factorial Experiments. The 2^k Factorial Experiments. Blocking and Confounding in 2^k Factorial Designs. Two-Level Fractional

Factorial Designs. Response Surface Methods. Part II: Taguchi Methods—Quality Loss Function. Taguchi Methods. Design of Experiments using Orthogonal Arrays. Data Analysis from Taguchi Experiments. Robust Design. Multi-Level Factor Design. Multi-Response Optimization Problems. Case Studies. Appendices. References. Index.

Latest Print 2012 / 368 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4527-0 / ₹ 395.00 / (e-book also available)

SINGHAL & SINGHAL Implementing ISO 9001:2008 Quality Management System: A Reference Guide, 2nd ed.

DIVYA SINGHAL, *Assistant Professor at the Goa Institute of Management, Goa.*

K.R. SINGHAL, *Ajmer Centre Coordinator and Fellow Member of National Centre for Quality Management (NCQM).*

ISO 9000 series standards have changed the whole concept of quality management methods. ISO 9001:2008 QMS standard has been implemented and ISO 9000 series standards have been adopted as national standards or endorsed for use in 178 countries and economies.

ISO 9001:2008 Quality Management System (QMS) is based on eight quality management principles and there are various internal and external benefits of implementing this standard, whether or not an organization goes for certification.

This book provides the readers with an accessible and up-to-date introduction to the essentials of a quality management system, discusses what is in the ISO 9001:2008 QMS and shows how the organizations can implement this system. With the authors' extensive experience in QMS audit, training and advisory services, the book incorporates basic information on understanding and implementing ISO 9001:2008 QMS and highlights its importance towards making quality the fundamental business principle.

The text contains plenty of practical tips and guidance on how to implement ISO 9001:2008 QMS in the real world. It discusses sample QMS procedures, emphasizes the importance of maintaining a value added internal audit system and highlights the necessity of developing the QMS documentation procedures.

Apart from the regular BBA, MBA, and diploma courses in Total Quality Management, this book is also suitable for Management Development Programmes in Quality Management and ISO 9001 offered to professionals by many of the B-schools.

Contents: Foreword. Preface. Quality and Quality Management Systems. Quality Management Principles. Step-By-Step Process for Developing and Implementing—ISO 9001:2008 QMS. Certification/Registration Process ISO 9001:2009 QMS. Quality Management System Standards—ISO 9000 Family. Scope and Normative

Reference—ISO 9001:2008 QMS. General and Documentation Requirements—ISO 9001:2008 QMS. Management Responsibility—ISO 9001:2008 QMS. Resource Management—ISO 9001:2008 QMS. Product Realization—ISO 9001:2008 QMS. Measurement, Analysis and Improvement—ISO 9001:2008 QMS. Increasing the Power of Your QMS—Achieve Performance Excellence Through Continual Improvement. Adding Value to Internal QMS Audit. Developing QMS Documentation—ISO 9001:2008 QMS. *Appendices*—A: Sample QMS Procedures. B: Certification Bodies in India. C: Frequently Asked Questions. D: Some Useful Websites/Blogs. E: Checklist for ISO 9001:2008 QMS (Useful for Implementation, Initial Survey and Audit Purpose Including Internal Audit). Bibliography,

Latest Print 2015 / 192 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4574-4 / ₹ 195.00 / (e-book also available)

SUGANTHI & SAMUEL Total Quality Management

L. SUGANTHI, *Professor of Planning and Development, Anna University, Chennai.*

ANAND A. SAMUEL, *Principal, Vellore Institute of Technology, Vellore.*

This comprehensive, student friendly book is intended as a tool to achieve quality in organizations. Completing a course based on topics covered in this book will make one confident enough to implement quality management principles in a given situation. A holistic approach, practical relevance, effective learning and a compendium of A to Z of TQM distinguish this well-written text. Inclusion of the findings of research carried out by the authors in industries and educational institutions add flavour to the book.

Various examples are drawn from institutional experience, which make the understanding of the concepts easy. The special feature of this book is that every chapter has a case study, in addition to a host of short questions and summary type questions. The questions for group discussion, practical exercises and net based exercises given at the end of every chapter are unique.

Intended primarily as a textbook for engineering and management students, this book would also be useful for the in-house training of engineers and managers of various industries and organizations on TQM. The book may be effectively used as a resource material for quality professionals and consultants.

Contents: Preface. Introduction. Principles of Quality Management. Total Quality Management Philosophy. Quality Planning. Customer Orientation. Problem Solving Tools. Continuous Improvement Strategies. Preventive Techniques. Quality Ambience. Human Dimensions of TQM. Team Development. Quality Certification. Reliability. Cost of Quality. TQM Road Map. Model Question Paper. Bibliography. Index.

Latest Print 2014 / 408 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-2655-2 / ₹ 275.00 / (e-book also available)

Tribology

BASU, SENGUPTA & AHUJA Fundamentals of Tribology

S.K. BASU, *Professor Emeritus, Production Engineering, Pune Institute of Engineering and Technology, Pune (Formerly Govt. College of Engineering).*

S.N. SENGUPTA, *Professor and Head, Mechanical Engineering, Dr. B.C. Roy Engineering College, Durgapur.*

B.B. AHUJA, *Professor and Head, Department of Production Engineering, Dean Resource Mobilisation, Pune Institute of Engineering and Technology.*

This comprehensive and student friendly text gives a clear analysis of the fundamental aspects of the subject, starting from surface behaviour and contact phenomenon of interfacing surface. The book elaborates the types, specification and standardization and measurement of surface irregularities in evaluating triboproperties in relation to friction, lubrication and wear. Besides, it also discusses various lubricants and their selection.

The text reflects the rich and varied experience of the authors in teaching, research and industry and provides real life cases encountered by them.

This practice-oriented book, which contains a large number of worked-out examples, exercises and other pedagogic features, is intended as a text for undergraduate and postgraduate students of production, mechanical and design engineering. It can also be profitably used as a reference by practising engineers.

Contents: Preface. Introduction. Viscosity of Lubricants and Equation of Hydrodynamics. Surface Roughness and Its Standardization of Measurement Technique. Hydrodynamic Slider Bearings. Hydrodynamic Journal Bearing. Tribological Behaviour of Asperities Contact. Hydrostatic Aerostatic bearings. Elasto Hydrodynamic Cases. Friction and Wear. Antifriction Bearings. Selection of Lubricants. Index.

Latest Print 2012 / 272 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2723-8 / ₹ 250.00

SAHOO Engineering Tribology

PRASANTA SAHOO, *Department of Mechanical Engineering at Jadavpur University, Kolkata.*

This introductory yet comprehensive book presents the fundamental concepts on the analysis and design of tribological systems. It is a unique blend of scientific principles, mathematical formulations and engineering practice. The text discusses properties and measurements of engineering surfaces, surface contact geometry and contact stresses. Besides, it deals with adhesion, friction, wear, lubrication and related interfacial phenomena. It also highlights recent developments like nanotribology and fractal analysis with great clarity.

The book is intended as a text for senior undergraduate

and postgraduate students of mechanical engineering, production/industrial engineering, metallurgy and material science. It can also serve as a reference for practising engineers and designers.

KEY FEATURES

- Discusses dry contact tribology and lubrication of bearings.
- Describes surface engineering and boundary lubrication.
- Provides large number of illustrations.
- Gives many problems at the end of the book, with answers to some of them.

Contents: Preface. Introduction. Engineering Surfaces—Properties and Measurement. Surface Contact. Adhesion. Friction. Wear. Thermal Considerations in Sliding Contact. Surface Engineering. Boundary Lubrication. Liquid Lubricants—Properties and Measurement. Basic Equations for Fluid Film Lubrication. Hydrodynamic Thrust Bearings. Hydrodynamic Journal Bearings. Hydrodynamic Squeeze Film Bearings. Hydrostatic Bearings. Gas-Lubricated Bearings. Elasto-hydrodynamic Lubrication. Rolling Element Bearings. Nanotribology. Fractal Analysis in Tribology. Appendix. References. Index.

Latest Print 2014 / 336 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2724-5 / ₹ 275.00 / (e-book also available)

Turbomachinery

VENKANNA Fundamentals of Turbomachinery

B.K. VENKANNA, *Professor of Mechanical Engineering at Sri Basaveshwar Engineering College, Baglkot, Karnataka.*

This text covers the basic principles of turbomachinery in a clear, practical presentation that ties theory logically and rigorously with the design and application part of turbomachines such as centrifugal compressors, centrifugal pumps, axial flow compressors, steam and gas turbines, and hydraulic turbines.

The contents of the book have been designed to meet the requirements of undergraduate and postgraduate students of mechanical engineering. The book helps students develop an intuitive understanding of fluid machines by honing them through a systematic problem-solving methodology.

KEY FEATURES

- Simple and elegant presentation to enable students to grasp the essentials of the subject easily and quickly
- Focuses on problem-solving techniques
- Provides an excellent selection of more than 300 graded solved examples to foster understanding of the theory
- Gives over 100 chapter-end problems
- Provides a succinct summary of equations at the end of each chapter
- Provides solutions to several question papers at the end of the book.

Contents: Preface. Introduction to Turbomachines. Energy Transfer in Turbomachines. Thermodynamics of Fluid Flow and Thermodynamic Analysis of Compression and Expansion Processes. Centrifugal Compressors and Pumps. Centrifugal Compressors. Centrifugal Pumps. Axial Flow Compressors. Steam and Gas Turbines. Hydraulic Turbines. Bibliography. Solved Question Papers. Index.

Latest Print 2014 / 664 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3775-6 / ₹ 425.00 / (e-book also available)

METALLURGY & MATERIALS ENGINEERING

Basic Materials Science

RAGHAVAN

Materials Science and Engineering: A First Course, 6th ed.

V. RAGHAVAN, *formerly Professor of Materials Science at the Indian Institute of Technology Delhi.*

This well-established and widely adopted book, now in its Sixth Edition, provides a thorough analysis of the subject in an easy-to-read style. It analyzes, systematically and logically, the basic concepts and their applications to enable the students to comprehend the subject with ease.

The book begins with a clear exposition of the background topics in chemical equilibrium, kinetics, atomic structure and chemical bonding. Then follows a detailed discussion on the structure of solids, crystal imperfections, phase diagrams, solid-state diffusion and phase transformations. This provides a deep insight into the structural control necessary for optimizing the various properties of materials. The mechanical properties covered include elastic, anelastic and viscoelastic behaviour, plastic deformation, creep and fracture phenomena. The next four chapters are devoted to a detailed description of electrical conduction, superconductivity, semiconductors, and magnetic and dielectric properties. The final chapter on 'Nanomaterials' is an important addition to the sixth edition. It describes the state-of-art developments in this new field.

This eminently readable and student-friendly text not only provides a masterly analysis of all the relevant topics, but also makes them comprehensible to the students through the skillful use of well-drawn diagrams, illustrative tables, worked-out examples, and in many other ways. The book is primarily intended for undergraduate students of all branches of engineering (B.E./B.Tech) and postgraduate students of Physics, Chemistry and Materials Science.

KEY FEATURES

- All relevant units and constants listed at the beginning of each chapter
- A note on SI units and a full table of conversion factors at the beginning

- A new chapter on 'Nanomaterials' describing the state-of-art information
- Examples with solutions and problems with answers
- About 350 multiple choice questions with answers

Contents: Preface. Preface to the First Edition. SI Units. Physical Constants. Conversion Factors. Greek Alphabets. Introduction. Equilibrium and Kinetics. Crystal Geometry and Structure Determination. Atomic Structure and Chemical Bonding. Structure of Solids. Crystal Imperfections. Phase Diagrams. Diffusion in Solids. Phase Transformations. Elastic, Anelastic and Viscoelastic Behaviour. Plastic Deformation and Creep in Crystalline Materials. Fracture. Oxidation and Corrosion. Conductors and Resistors. Semiconductors. Magnetic Materials. Dielectric Materials. Nanomaterials. Appendix I—Properties of Elements. Appendix II—Properties of Engineering Materials. Index.

Latest Print 2015 / 488 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-5092-2 / ₹ 295.00 / (e-book also available)

Energy and Environmental Management

GUPTA

Energy and Environmental Management in Metallurgical Industries

R.C. GUPTA, *former Professor in Metallurgy and Head, Department of Metallurgical Engineering, IT-BHU.*

This comprehensive book deals with the environmental aspects of metallurgical industries, including ferrous (iron and steel, DRI units, EAF units, ferroalloys and foundries) and non-ferrous (aluminium, copper, lead and zinc) plants.

The text, comprising of eight chapters, discusses fundamental aspects of environment management, various energy sources available on the earth and environment awareness required for sustained economic growth. The book provides a thorough understanding of pollution sources in metallurgical industries and their abatement techniques. It also provides details of energy management in metal industry and enumerates factors for metallurgical plant location and layout. Furthermore, it presents health and safety guidelines for metallurgical professionals. The text concludes with discussion on basic legislations related to environment and labour.

This book is primarily designed for undergraduate students of metallurgical engineering. Besides, it will also be useful as a ready reference source to professionals associated with metallurgical industries.

KEY FEATURES

- Coverage of various types of environmental issues such as air emission, toxic effluents, solid waste, thermal discharge, noise and radiation.

- Analysis of renewable and non-renewable energy sources on the earth with current energy usage pattern and future consumption pattern.
- Description of various activities in the metallurgical units along with discussion of sources of pollution and abatement techniques.
- Guidelines for the plant location and layout.
- Basic information about labour health and safety, environmental legislations, labour laws, ISO 14000, carbon credit, etc.

Contents: Preface. Acknowledgements. Fundamentals of Environmental Management. Energy and Its Sources. Environmental Awareness. Metallurgical Industries and Environment. Energy Management in Metallurgical Industries. Environmental Aspects of Plant Location and Layout. Occupational Health and Safety. Environmental Legislations and Related Issues. **Appendices—A:** List of Some Common Tree and Shrub Species. **B:** List of Some Common Animals. **C:** National Parks of India. **D:** Wildlife Sanctuaries in India. **E:** Agenda 21. **F:** Valdez Principle. **G:** International Chamber of Commerce Charter. **H:** Unit Conversion Tables. **I:** Common Mathematical Formulae. **J:** Properties of Elements. Bibliography. Index.

Latest Print 2012 / 348 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4600-0 / ₹ 325.00 / (e-book also available)

Extractive Metallurgy

CHAKRABARTI Steel Making

A.K. CHAKRABARTI, *formerly Professor, Metallurgical and Materials Engineering Department, Indian Institute of Technology Kharagpur.*

Steel Making is designed to give students a strong grounding in the theory and state-of-the-art practice of production of steels. The book is primarily focused to meet the needs of undergraduate metallurgical students and candidates for associate membership examinations of professional bodies (AMIIM, AMIE). Besides, for all engineering professionals working in steel plants who need to understand the basic principles of steel making, the text provides a sound introduction to the subject.

Beginning with a brief introduction to the historical perspective and current status of steel making together with the reasons for obsolescence of Bessemer converter and open hearth processes, the book moves on to:

- elaborate the physicochemical principles involved in steel making
- explain the operational principles and practices of the modern processes of primary steel making (LD converter, Q-BOP process, and electric furnace process)
- provide a summary of the developments in secondary refining of steels
- discuss principles and practices of ingot casting and continuous casting of steels

- emphasize an increasing need to protect our environment and utilize waste energy
- explain transport processes, simulation, and modelling relevant to the developments in steel technology.

The book provides considerable information in an easily assimilable form and makes an ideal introduction to the complex subject of steel technology.

Contents: Preface. Acknowledgements. Historical Perspective and Current Status of Steel Making. Physicochemical Principles. Review of the Older Steel Making Processes: A—Bessemer Converter Process. B—Open Hearth Furnace Steel Making Process. Top-Blown Basic Oxygen Converter Processes. Bottom-Blown Basic Oxygen Converter Process (Q-BOP/OBM/LWS). Electric Furnace Steel Making. Secondary Steel Making. Ingot Casting Practice. Continuous Casting of Steel. Transport Processes, Dimensional Analysis and Physical Simulation in Steel Making: A—Transport Phenomena. B—Dimensional Analysis and Physical Simulation in Steel Making. Ferroalloy Technology. Waste Management and Energy Conservation. Index.

Latest Print 2014 / 240 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-3050-4 / ₹ 295.00 / (e-book also available)

CHATTERJEE Hot Metal Production by Smelting Reduction of Iron Oxide, 2nd ed.

AMIT CHATTERJEE *is formerly associated with Tata Steel Limited, Jamshedpur. Currently, he is consultant in Process Metallurgy of Iron and Steel.*

This book, in its second edition, continues to offer a comprehensive treatise on smelting reduction of iron oxide—an emerging alternative method of producing hot metal without using coke. This technique is being increasingly used for hot metal production, which has till date, been dominated by the traditional blast furnace method. Shortage of coking coal, high cost of coke and the recent enforcement of stricter environmental regulations have resulted in the advent of smelting reduction as a supplementary method of hot metal production.

The book covers the details of this rapidly emerging method that holds particular relevance for countries like India, endowed with relatively large reserves of high grade iron ore but unfortunately, not matched by the availability of coking coal. The book offers an in-depth analysis of the theoretical as well as the practical aspects of smelting reduction. It begins by acquainting the readers with the current worldwide status of ironmaking, followed by the classification of the various smelting reduction processes. It then focuses on explaining the fundamentals of smelting reduction before proceeding with a critical appraisal of the various smelting reduction processes that are currently available. The future of this methodology in India and in the rest of the world is discussed in the concluding chapter. The book contains numerous illustrations to provide a clear understanding of the different processes, equipment and quality

parameters relevant to smelting reduction-based ironmaking.

The book is intended mainly for undergraduate and postgraduate engineering (particularly metallurgical engineering) students seeking an insight into this emerging ironmaking technology. It would also be of immense interest to researchers and technologists engaged in the subject of smelting reduction of iron oxide. A variety of chapter-end references would enable teachers and students to get acquainted with the extensive knowledge already available in this field.

HIGHLIGHTS OF SECOND EDITION

- Two new sections on *Hisarna process* and *Circosmelt process* have been incorporated.
- New figures and tables have been used in some sections to illustrate the concepts with better clarity and give the up-to-date information.
- Some references have also been added, making the text suitable for further study.

Contents: Preface. Common Terms Used in this Book. Current Ironmaking Scenario. Classification of Smelting Reduction Processes. Fundamentals of Smelting Reduction. Appraisal of Individual Smelting Reduction Processes. Comparison of Smelting Reduction Processes. Future of Smelting Reduction—India and the Rest of the World. Index.

Latest Print 2014 / 280 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4947-6 / ₹ 350.00 / (e-book also available)

CHATTERJEE

Sponge Iron Production by Direct Reduction of Iron Oxide, 2nd ed.

AMIT CHATTERJEE is formerly associated with Tata Steel Limited, Jamshedpur. Currently, he is consultant in Process Metallurgy of Iron and Steel.

This book provides a fascinating study of the very important emerging field of direct reduction in which iron ore is 'directly reduced' in the solid-state, using either natural gas or non-coking coal, to produce a highly metallised material, referred to as sponge iron (or direct reduced iron). This intermediate product is subsequently melted in electric arc furnaces or induction furnaces (sometimes even in basic oxygen furnaces) to produce liquid steel. Such a process combination enables steel to be produced without using coking coal, which is an expensive input in the normal blast furnace—basic oxygen furnace route of steelmaking adopted in integrated steel plants.

The book offers comprehensive coverage and critical assessment of various coal-based and gas-based direct reduction processes. Besides dealing with the application of the theoretical principles involved in the thermodynamics and kinetics of direct reduction, the book also contains some worked-out examples on sponge iron production. The concluding part of this seminal book summarises the present and future scenario of direct

reduction, including the use of gas generated from coal in direct reduction processes.

The book is primarily intended for the undergraduate and postgraduate students of metallurgical engineering. It is also a *must-read* for researchers, technologists and process metallurgists engaged in the rapidly developing field of direct reduction of iron oxides, which is of critical importance for India and other developing nations that are beginning to play a major role in global steelmaking.

Contents: Preface. Common Terminologies Used in This Book. The Need for Alternative Iron Units. Scrap: Type, Availability and Demand. Fundamentals of Direct Reduction. Coal-based DR Processes Using Rotary Kilns. Coal-based Processes Using Reactors Other Than Rotary Kiln. Gas-based Direct Reduction. Gas-based Direct Reduction Using Alternatives to Natural Gas. Use of DRI in Ironmaking and Steelmaking. Present and Future of Direct Reduction. Index.

Latest Print 2014 / 376 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4659-8 / ₹ 375.00 / (e-book also available)

GHOSH & CHATTERJEE

Ironmaking and Steelmaking: Theory and Practice

AHINDRA GHOSH, Formerly Professor, Materials and Metallurgical Engineering, Indian Institute of Technology Kanpur.

AMIT CHATTERJEE is formerly associated with Tata Steel Limited, Jamshedpur. Currently, he is consultant in Process Metallurgy of Iron and Steel.

This authoritative account covers the entire spectrum from iron ore to finished steel. It begins by tracing the history of iron and steel production, right from the earlier days to today's world of oxygen steelmaking, electric steelmaking, secondary steelmaking and continuous casting.

The physicochemical fundamental concepts of chemical equilibrium, activity-composition relationships, and structure-properties of molten metals are introduced before going into details of transport phenomena, i.e. kinetics, mixing and mass transfer in ironmaking and steelmaking processes. Particular emphasis is laid on the understanding of the fundamental principles of the processes and their application to the optimisation of actual processes.

Modern developments in blast furnaces, including modelling and process control are discussed along with an introduction to the alternative methods of ironmaking. In the area of steelmaking, BOF plant practice including pre-treatment of hot metal, metallurgical features of oxygen steelmaking processes, and their control form part of the book. It also covers basic open hearth, electric arc furnace and stainless steelmaking, before discussing the area of casting of liquid steel—ingot casting, continuous casting and near net shape casting. The book

concludes with a chapter on the status of the ironmaking and steelmaking in India.

In line with the application of theoretical principles, several worked-out examples dealing with fundamental principles as applied to actual plant situations are presented.

The book is primarily intended for undergraduate and postgraduate students of metallurgical engineering. It would also be immensely useful to researchers in the area of iron and steel.

Contents: Preface. Part A: General—Introduction. Overview of Blast Furnace Ironmaking. Overview of Modern Steelmaking. General Physicochemical Fundamentals. Part B: Blast Furnace Ironmaking—Physical Chemistry of Blast Furnace Reactions. Thermal and Chemical Features of the Blast Furnace. Internal Zones and Gas Flow in Blast Furnaces. Raw Materials I: Coke. Raw Materials II: Iron Ore and Agglomerates. Blast Furnace Productivity, Fuel Efficiency and Modern Developments. Blast Furnace Products and Their Utilisation. Blast Furnace Modelling and Control. Part C: Alternative Ironmaking—Sponge Ironmaking. Smelting Reduction. Part D: Steelmaking—Physical Chemistry of Primary Steelmaking. BOF Plant Practice. Metallurgical Features of Oxygen Steelmaking. Process Control for Basic Oxygen Steelmaking. Basic Open Hearth and Electric Arc Furnace Steelmaking. Secondary Steelmaking. Stainless Steelmaking. Part E: Casting Of Liquid Steel—Ingot Casting of Steel. Continuous Casting of Steel. Part F: Miscellaneous—Ironmaking and Steelmaking in India. Appendices I and II. Bibliography. Index.

Latest Print 2014 / 492 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3289-8 / ₹ 425.00 / (e-book also available)

SARANGI & SARANGI Alternatives Routes to Iron Making, 2nd ed.

BIDYAPATI SARANGI, *Professor, Department of Metallurgical and Materials Engineering, Indira Gandhi Institute of Technology (IGIT), Sarang, Dhenkanal. Having worked as a former Research Associate and Scientist.*

ARABINDA SARANGI, *Director (Academics), Synergy Institute of Engineering and Technology, Banamali Prasad, Dhenkanal.*

With a boom in the steel industry all over the world today, the demand of sponge iron has considerably increased as a feed (raw) material. The increase in the demand of sponge iron is also due to the fact that it is used as a substitute for coking coal which is available in scarcity in the world. The primary objective of this book is to provide the basis principles, fundamentals and theory of sponge iron production.

This book, earlier titled as *Sponge Iron Production in Rotary Kiln*, is revised as per the feedback from students, faculty members and professionals. It, now, covers broad spectrum of alternative routes of iron making, therefore, the book is renamed as **Alternative Routes to Iron**

Making. In this revised edition of the book, three new chapters have been added to fulfil the requirement of a textbook for various universities.

NEW TO THIS EDITION

- New chapters on:
 - Environmental pollution and control in sponge iron industries
 - Smelting reduction processes
- Inclusion of principle of fluidisation in fluidised bed processes.
- Description of Hyl III process with recent development of the process.

Primarily intended for undergraduate and postgraduate students of metallurgical engineering, this book is equally beneficial for researchers, and professionals engaged in DR processes and steel industries.

KEY FEATURES

- Common terminologies of Direct Reduction process are explained in a simple language.
- Appendices on physical constants and unit conversions used in the DR processes, and measurement of kiln filling degrees are incorporated in detail.
- Several illustrative figures, and tables are interspersed in the book.

Contents: Preface. Acknowledgements. Sponge Iron Production: An Overview. Commercially Used Direct Reduction Processes. Physic—Chemical Principle of Sponge Iron Production. Raw Materials for Direct Reduction Iron Production. Testing of Raw Materials for Direct Reduction of Iron Ore. Refractories. Flow of Materials in Rotary Kiln. Kinetics of Iron Ore Reduction. Kinetics of Coal Gasification. Rotary Kiln Plant. Rotary Kiln Burden. Commissioning and Operation of Rotary Kiln. Operational Problems in Rotary Kiln. Accretion Formation. Storage and Handling of Sponge Iron. Heat and Mass Balance. Commercially Used Gas Based Process. Utilization of Sponge Iron. Appendix. Index.

288 pp. (approx.) / 17.8 × 23.5 cm

ISBN-978-81-203-5119-6 / FORTHCOMING

Ferrous Metallurgy

GUPTA

Theory and Laboratory Experiments in Ferrous Metallurgy

R.C. GUPTA, *Former Professor of Metallurgy and Head, Department of Metallurgical Engineering, Institute of Technology, Banaras Hindu University, Varanasi.*

This book is a unique combination of theory and laboratory practice in the area of ferrous metallurgy. It covers subjects like properties of raw materials, coal and coke, liquid and gaseous fuels, iron ore agglomeration, iron ore reduction, steelmaking, and ingot casting.

Divided into eleven chapters, the material is organized in a logical progression, beginning with providing

information on identification of materials by using simple means. The other chapters provide an easily understandable presentation of various topics related to ferrous metallurgy, for example, density and porosity, angle of repose, raw material strength, coal and coke for ironmaking units, liquid and gaseous fuels, pelletisation of iron ore fines, iron ore sintering, iron ore reduction and swelling, steelmaking and ingot casting. All the chapters give the relevant theory and test procedures followed by experiments.

This book is designed primarily for the undergraduate students in metallurgical engineering to help them perform laboratory experiments. The candidates preparing for AMIIM and AMIE examinations conducted by The Indian Institute of Metals and The Institution of Engineers (India) will also find this book useful.

KEY FEATURES

- Describes each experiment complete with aim, materials needed, equipment/tools required, procedure, typical observation data, calculations, discussion and conclusions.
- Provides a unique compilation of nearly 100 materials relevant to iron and steel industry.
- Provides a combination of all the related subjects covering the field of metallurgy, such as metallurgical design, fuels, refractories, agglomeration, ironmaking, steelmaking, and ingot casting.

Contents: Preface. Acknowledgments. Identification of Common Materials. Density and Porosity. Angle of Repose. Raw Materials Strength. Coal and Coke for Ironmaking Units. Liquid and Gaseous Fuels. Pelletisation of Iron Ore Fines. Iron Ore Sintering. Iron Ore Reduction and Swelling. Steelmaking. Ingot Casting. Appendices— I: Safety Guide. II: Unit Conversion Tables. III: Mathematical Formulae. IV: Useful Data. V: Fabrication of Tools and Equipment. Bibliography. Subject Index.

Latest Print 2014 / 344 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3924-8 / ₹ 350.00 / (e-book also available)

Foundry

CHAKRABARTI

Casting Technology and Cast Alloys

A.K. CHAKRABARTI, *formerly Professor, Metallurgical and Materials Engineering Department, Indian Institute of Technology Kharagpur.*

This text emphasizes the underlying metallurgical principles of casting technology so that the students can develop a sound set of analytic skills, helpful in the development of improved casting processes and products. The pictorial and diagrammatic support provided throughout reinforces the clarity of the text for a thorough understanding of the metal casting concepts and technologies.

Besides comprehensive coverage of the casting processes

and elaborate discussion of properties of cast irons, cast steels, and cast nonferrous alloys, the text also familiarizes the students with the most recent developments in binder systems, casting practices, solidification processing, metal filtration, metallurgy of cast alloys, alloy design, and energy and environment management.

The book is primarily designed for degree and diploma students pursuing courses in metallurgical, mechanical, and production engineering disciplines as well as for candidates studying for Associate Membership Examinations (AMIIME, AMIE, Grad. IIF). It would also benefit M.Tech./M.E. students specializing in foundry technology and allied disciplines.

Contents: Preface. Acknowledgements. Introduction. Moulding Sand and Binders. Mould and Coremaking. Running and Feeding of Castings. Common Rules for Casting Design. Melting Furnaces and Refractories. Special Casting Processes. Cast Irons. Cast Steels. Cast Nonferrous Alloys. Casting Defects and Defect Diagnosis by NDT. Energy Conservation and Environment Control. Index.

Latest Print 2014 / 288 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-2779-5 / ₹ 250.00 / (e-book also available)

JOHN

Metal Casting and Joining

K.C. JOHN, *Professor and Head, Department of Mechanical Engineering, Jyothi Engineering College, Cheruthuruthy, Thrissur, Kerala.*

Designed for the undergraduate students of mechanical engineering and allied branches, this book serves as a bridge between the study of the basic processes and their application in production industries.

This book covers two similar fundamental processes—foundry and welding—in a single volume. The chapters of the book are grouped in seven modules. A separate module is devoted to introduce the preliminaries of the two areas namely casting and joining processes. Miscellaneous welding and allied processes, including the modern methods and thermal cutting, conventional sand mould casting, special and modern casting methods, conventional metal joining processes and theory of solidification of metal, its metallurgy, defects in castings and casting design procedure are covered in the book. The theory of each process is explained with the help of simple line sketches which can be easily reproduced by a student at the time of examination. Enough worked out examples and problems are given for practice, especially in the design areas. At the end of each chapter, sufficient number of review questions are given as exercise.

Contents: Preface. Module A: Preliminaries of Metal Casting and Joining—Principles of Metal Casting. Principles of Metal Joining. Module B: Conventional Sand Mould Casting—Pattern Making. Mould and Core Materials. Moulding. Core Making. Gating System and Risers. Metal Melting and Pouring. Shakeout and Cleaning of Castings. Foundry Mechanization and Management.

Module C: Special Casting Processes—Shell Mould Casting. Investment Casting. Pressure Die Casting. Centrifugal Casting. Continuous Casting. Miscellaneous Special Casting Processes. Module D: Conventional Metal Joining Processes—Arc Welding Processes. Resistance Welding Processes. Oxy-Fuel Gas Welding Processes. Brazing and Soldering Processes. Module E: Miscellaneous Welding and Allied Processes—Miscellaneous Old Welding Processes. Modern Welding Processes. Thermal Cutting Processes. Module F: Solidification of Metal and Casting Design—Solidification and Cooling of Castings. Casting Defects. Principles of Casting Design. Module G: Metallurgy of Welding and Design—Metallurgy of Welding. Welding Defects. Principles of Design for Welding and Drawing. Bibliography. Index.

Latest Print 2015 / 576 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-5077-9 / ₹ 495.00 / (e-book also available)

RAVI

Metal Casting: Computer-Aided Design and Analysis

B. RAVI, is Associate Professor of Mechanical Engineering at the Indian Institute of Technology Bombay.

This book presents a scientific approach to metal casting design and analysis supported by software tools. Unlike other books in metal casting focused only on the process *know-how*, this book uncovers the *know-why* as well. Besides serving the needs of students of mechanical, production and metallurgical engineering, this book is equally meant to benefit practicing engineers involved or interested in casting development, including product designers, tool-makers, foundry engineers, supply chain managers, engineering consultants, researchers, and software developers. The theory discussed in the book is applicable to all types of castings: ferrous and non-ferrous, produced in sand and metal moulds.

By gaining a better understanding of the theory and logic involved through creating, analysing and optimizing virtual castings, the readers will learn how to:

- Design process-friendly cast products, leading to shorter development time
- Manufacture assured quality castings, leading to fewer rejections and 'surprises'
- Manage material and energy utilization, leading to higher yield and lower costs.

Contents: Preface. Metal Casting—Overview. Solid Modelling of Castings. Pattern, Mould, and Core Design. Feeder Design and Analysis. Gating Design and Analysis. Process Planning and Costing. Design for Castability. Appendices. Index.

Latest Print 2015 / 168 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2726-9 / ₹ 225.00 / (e-book also available)

Metallurgical Chemical Kinetics

GHOSH & GHOSH

Textbook of Metallurgical Kinetics, A

AHINDRA GHOSH, Formerly Professor in the Department of Materials and Metallurgical Engineering, Indian Institute Technology Kanpur.

SUDIPTO GHOSH, Associate Professor in the Department of Metallurgical and Materials Engineering, Indian Institute Technology Kharagpur.

Mechanical kinetics constitutes one of the basic subjects for Metallurgical Engineering. This well-written book presents the subject of kinetics of metallurgical processes in a compressive fashion.

Organized in 14 chapters, the book begins with an introduction of the broad basic concepts. It then discusses the kinetics of homogeneous and heterogeneous chemical reactions with some real-life examples from the metallurgical field. The book adequately covers the concepts of diffusion, convective mass transfer and mixing in fluids, as well as mass transfer in fluids adjacent to a solid surface. Several important processes in metallurgical and materials engineering involve reactions of porous solids with gases. The book discusses this with the help of two important reactions, namely, reduction of iron ores and gasification of carbon. It also deals with mass transfer among two fields and presents the kinetics of electrochemical reactions and phase transformation in a simple manner.

The book also contains plenty of numerical worked-out examples and problems, some of which involve computer programs. The Appendix gives some important data useful for solving problems in kinetics.

The book is designed for one-semester course for undergraduate students of metallurgical discipline.

Contents: Preface. Introduction. Kinetics of Homogeneous Reactions. Gas–Solid and Gas–Liquid Interfacial Reactions. Diffusion. Applications of Diffusion Equations. Convection, Mass Transfer and Mixing in Fluids. Mass Transfer in Fluid at Solid–Fluid Interface. Kinetics of Reactions of Porous Solids with Gases. Mass Transfer between Two Fluids. Electrochemical Kinetics. Diffusivity and Mechanism of Diffusion. Kinetics of Phase Transformations. Miscellaneous Topics. Mathematical Modelling of Kinematics of Metallurgical Processes. Appendix. Index.

Latest Print 2014 / 344 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4828-8 / ₹ 350.00 / (e-book also available)

Physical Metallurgy

BHARGAVA

Engineering Materials: Polymers, Ceramics and Composites, 2nd ed.

A.K. BHARGAVA, *Professor, Department of Metallurgical and Material Engineering, Malaviya National Institute of Technology, Jaipur.*

This text, now in its second edition, continues to provide a balanced practical treatment of polymers, ceramics, and composites, covering all their physical properties as well as applications in industry. The text puts emphasis on developing an understanding of properties, characteristics and specifications of non-metallic engineering materials and focusing on the techniques for controlling their properties during processing. It provides students with the knowledge they need to make optimal selection and use of these materials in a variety of manufacturing applications.

The book focuses on structure-properties correlation of materials as it forms the basis for predicting their behaviour during processing and service conditions. The text also discusses the recently developed advanced materials. Each chapter includes the questions of fundamental importance and industrial significance, along with their answers.

This book is especially designed for Metallurgical and Materials Science students for a course in non-metallic engineering materials. Besides it should prove useful for the students of other engineering disciplines where materials science/materials engineering is offered as a compulsory course.

NEW TO THIS EDITION

- Addition of a new chapter on *Ceramics—A Material for Biomedical Applications* (Chapter 5)
- Inclusion of a number of questions and their answers in Chapters 2, 3 and 4, modifications of existing figures and the inclusion of new ones.
- Incorporation of plenty of numerical problem related to polymers, ceramics and composites.

Contents: List of Figures. List of Tables. List of Symbols. Preface. Preface to the First Edition. Properties of Non-Metallic Materials. Polymer Materials. Ceramic Materials. Composite Materials. Role of Ceramics in Biomedical Applications. Appendices—1: Periodic Table of Elements. 2: Some Physical Properties of Metals. 3: The Electronic Configuration of Elements. 4: Atomic and Ionic Radii of Elements. 5: The SI Base Units. 6: Derived SI Units. 7: Unit Conversion. 8: Prefixes: Names of Multiples and Submultiples. 9: Values of Constants. 10: Selective Greek Alphabets and Their Pronunciations. 11: Abbreviations of Commonly Used Polymers. 11A: Other Abbreviations. 12: Physical and Thermal Properties of Polymers. 13: Mechanical Properties of Some Representative Polymer Materials. 14: Major ASTM Standards for Polymers. 15: Repeating Chemical Structural Units and Morphology of Polymers. 16: Chemical Composition of

Some Ceramic Materials. 17: Some Common Ceramic Crystal Structures and Their Examples. 18: Functions and Applications of Advanced (or Technical) Ceramics. 19: Compositions of Glasses. 20: Compositions of Common Refractories. 21: Properties of Some Commonly Used Reinforcing Fibres. Bibliography. Index.

Latest Print 2012 / 440 pp. / 16.0 × 24.1 cm
ISBN-978-81-203-4621-5 / ₹ 350.00 / (e-book also available)

BHARGAVA & SHARMA

Mechanical Behaviour and Testing of Materials

A.K. BHARGAVA, *Professor, Department of Metallurgical and Materials Engineering, Malaviya National Institute of Technology Jaipur.*

C.P. SHARMA, *Professor, Department of Metallurgical and Materials Engineering, Malaviya National Institute of Technology Jaipur.*

This comprehensive book provides an insight into the mechanical behaviour and testing of metals, polymers, ceramics and composites, which are widely employed for structural applications under varying loads, temperatures and environments.

Organized in 13 chapters, this book begins with explaining the fundamentals of materials, their basic building units, atomic bonding and crystal structure, further describing the role of imperfections on the behaviour of metals and alloys. The book then explains dislocation theory in a simplified yet analytical manner. The destructive and non-destructive testing methods are discussed, and the interpreted test data are then examined critically.

Specifically designed for the undergraduate and postgraduate students of Metallurgical and Materials Engineering, the book will be equally beneficial for the undergraduate and postgraduate students of Mechanical engineering and related disciplines. Besides, the book will also be useful for the practising engineers.

KEY FEATURES

- **Practical Manual** in the form of **Appendices**
- **Question Bank** along with solutions
- **200 Objective Type Questions** (all from the GATE examination)
- **Glossary** of terms

Contents: Preface. Nature of Materials. Crystal Imperfections. Mechanical Properties. Dislocation Theory. Deformation of Metals. Strengthening Mechanisms in Materials. Fracture. Tensile Behaviour. Hardness Testing. Ductile-Brittle Transition Behaviour and Fracture Toughness Test. Fatigue Behaviour. Creep Behaviour. Non-destructive Testing. Glossary. Question Bank. Appendices. Bibliography. Index.

Latest Print 2014 / 588 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4250-7 / ₹ 425.00 / (e-book also available)

MITRA

Characterization of Materials

P.K. MITRA, *Professor, Department of Metallurgical & Materials Engineering, Jadavpur University, Kolkata.*

Designed as textbook for the students of metallurgical and materials engineering, this book is divided into two parts. The first part deals with understanding of structure and depiction of crystallographic planes and directions quantitatively, which is absolutely necessary for understanding of application of X-rays or Electron microscopes. The second part deals with basic principles and applications of X-ray and electron diffraction, small angle and grazing incidence X-ray scattering and spectroscopic analysis methods. The chapter on Electron microscopes includes almost whole range of instruments like TEM, SEM, FESEM, Microprobe Analyzer and AFM, used for characterizing micro and nanomaterials. The spectroscopic methods discussed are UV-VIS, IR & FTIR, Raman and Auger Electron spectroscopes.

Contents: Preface. Crystal Structure. Stereographic Projection. Reciprocal Lattice. Principle of X-Ray Diffraction. Application of X-Rays in Structure. Principles of SAXS and GIXS. Electron Microscopy. Spectroscopy. Index.

Latest Print 2014 / 160 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-4856-1 / ₹ 195.00 / (e-book also available)

RAGHAVAN

Physical Metallurgy: Principles and Practice, 2nd ed.

V. RAGHAVAN, *formerly Professor of Materials Science at the Indian Institute of Technology Delhi, taught materials science courses at Massachusetts Institute of Technology, USA, and at IIT Kanpur and IIT Delhi for many years.*

This well-established book, now in its Second Edition, presents the principles and applications of engineering metals and alloys in a highly readable form. This new edition retains all the basic topics such as phase diagrams, phase transformations, heat treatment of steels and nonferrous alloys, solidification, fatigue, fracture and corrosion covered in the First Edition. The text has been updated and rewritten for greater clarity. Also, more diagrams have been added to illustrate the concepts discussed.

This Edition gives New Sections on

- Thermoelastic martensite
- Shape memory alloys
- Rapid solidification processing
- Quaternary phase diagrams

Intended as a text for undergraduate courses in Metallurgy/Metallurgical and Materials Engineering, this book is also suitable for students preparing for associate membership examination of Indian Institute of Metals (AMIIM), as well as other professional examinations like AMIE.

Contents: Preface. Preface to the First Edition. Physical Constants. Conversion Factors. Structure of Metals and Alloys. Phase Diagrams. Phase Changes. Heat Treatment of Steels. Mechanical Properties. Corrosion and its Prevention. Engineering Alloys. Index.

Latest Print 2014 / 248 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-3012-2 / ₹ 225.00 / (e-book also available)

RAGHAVAN

Solid State Phase Transformations

V. RAGHAVAN, *formerly Professor of Materials Science at the Indian Institute of Technology Delhi, taught materials science courses at Massachusetts Institute of Technology, USA, and at IIT Kanpur and IIT Delhi for many years.*

One of the main fields of study of metallurgists, ceramists and other materials scientists is the interrelationships between structure and properties of materials. The subject of phase transformations plays a key role here. This book presents the fundamental principles that govern the kinetics and the mechanism of solid state phase transformations and provides a good balance between the advanced concepts evolved in research and the classroom teaching. The emphasis being on principles, the presentation is generally applicable to all groups of materials.

The book is intended for advanced level undergraduate students of metallurgy and materials science, first year postgraduate students of metallurgy and materials science, and M.Sc. students of solid-state physics and solid-state chemistry.

Contents: Preface. Foreword. Introduction. Diffusion in Solids. Thermodynamics of Transformations. Nucleation Kinetics. Growth Kinetics. Overall Transformation Kinetics. Particle Coarsening. Pearlitic Transformations. Massive Transformations. Recovery, Recrystallization and Grain Growth. Martensitic Transformations. Spinodal Decomposition. List of Symbols. Index.

Latest Print 2012 / 196 pp. / 16.0 × 24.1 cm

ISBN-81-203-0460-8 / ₹ 175.00

RAJAN, et al.

Heat Treatment: Principles and Techniques, 2nd ed.

T.V. RAJAN, C.P. SHARMA and ASHOK SHARMA, *Department of Metallurgical and Materials Engineering, Malviya National Institute of Technology, Jaipur.*

The study of heat treatment has assumed great significance because of the vital role heat treatment plays in achieving the designed characteristics in a given material. This comprehensive and well-organized text skillfully blends the theoretical and practical aspects of heat treatment. It discusses, in rich detail, about heat treatment of commercial steels, cast irons and non-ferrous metals and alloys. The book also offers an in-

depth analysis of topics such as nature of metals and alloys; principles of heat treatment of steels; heat treatment processes; possible defects, causes and remedies in heat treatment; and inspection and quality control in heat treatment.

This second edition of the successful text has gone through considerable modification on the basis of responses received. Additional figures have been added for greater clarity and understanding. Multiple choice questions and other pedagogically arranged questions help students to assess their subject knowledge.

Designed primarily as a text for undergraduate and postgraduate students of Metallurgy, the book is also useful for undergraduate students of mechanical, production, and chemical engineering. Besides, it meets the requirements of students of AMIE/AMIIM, and of diploma level courses in metallurgical and mechanical engineering. Furthermore, the book can serve as an invaluable reference for practising engineers.

Contents: Foreword. Preface. Preface to the First Edition. Introduction. Nature of Metals and Alloys. Iron-Cementite Phase Diagram. Principles of Heat Treatment of Steels. Heat Treatment Processes for Steels. Hardenability. Quenchants. Chemical Heat Treatment of Steels. Surface Hardening. Thermomechanical Treatment. Heat Treatment Furnaces and Atmospheres. Temperature Measurement and Control. Possible Defects, Causes and Remedies in Heat Treatment. Heat Treatment of Commercial Steels. Cast Irons and Their Heat Treatment. Heat Treatment of Non-Ferrous Metals and Alloys. Inspection and Quality Control in Heat Treatment. Materials Testing. Energy Economy in Heat Treatment. Appendices. Bibliography. Index.

Latest Print 2014 / 408 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4095-4 / ₹ 375.00 / (e-book also available)

SHARMA

Engineering Materials: Properties and Applications of Metals and Alloys

C.P. SHARMA, *Professor at Department of Metallurgical Engineering, Malaviya National Institute of Technology, Jaipur.*

This compact and student-friendly book provides a thorough understanding of properties of metallic materials and explains the metallurgy of a large number of metals and alloys.

The text first exposes the reader to the structure-property correlation of materials, that form the basis for predicting their behaviour during manufacturing and other service conditions, and then discusses the factors governing the selection of a material for specific applications. It further introduces the various specifications/designations, (including AISI/SAE system) used for steels and the alloying elements. The text also gives detailed coverage on mechanical behaviour of other engineering metals including Al, Mg, Cu, Ni, Zn and Pb.

Profusely illustrated with graphs and tables, the book presents a large number of questions and answers framed on the pattern of the university examinations. It thus enables the students to format compact and to-the-point answers.

This book would be highly valued by students of metallurgical engineering and also those pursuing various other engineering as well as polytechnic courses, besides professionals who deal with selection of materials.

Contents: Preface. List of Tables. List of Figures. Introduction to Engineering Materials. Carbon Steels. Alloy Steels. Cast Irons. Light Metals and Alloys. Copper and Its Alloys. Nickel, Cobalt and Their Alloys. White Metals and Their Alloys. Refractory Metals and Alloys. Multiple Choice Questions. Appendices. Index.

Latest Print 2015 / 272 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-2448-0 / ₹ 225.00 / (e-book also available)

SHETTY

Dislocations and Mechanical Behaviour of Materials

M.N. SHETTY, *formerly Professor, Indian Institute of Technology Kanpur. He also served as the Director of Manipal Institute of Technology, Manipal, Karnataka.*

Primarily intended for the senior undergraduate and postgraduate students of Metallurgical and Materials Engineering/Mechanical Engineering, the book begins with the description of elementary mechanical testing method and then moves on to the theory of elasticity, the micro-mechanics of high strain rate deformation phenomenon and quantitative methods of materials selection. Dislocation and their applications is the strength of this book. The topics such as creep, fatigue and fracture are comprehensively covered. The final chapter presents the principles of materials selection. The book contains numerous solved and unsolved examples to reinforce the understanding of the subject.

Contents: Preface. Materials Testing for Strength. Elasticity. Elements of Plastic Deformation and Dislocation Theory. Plastic Deformation and the Fundamentals of Strength. Creep. Fatigue. Fracture. Motion of Waves, Dislocations and Cracks in Solids. Materials Selection. Glossary of Symbols. Index.

Latest Print 2013 / 992 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4638-3 / ₹ 895.00 / (e-book also available)

Powder Metallurgy

ANGELO & SUBRAMANIAN

Powder Metallurgy: Science, Technology and Applications

P.C. ANGELO, *Professor and Head of Metals Testing and Research Centre at PSG College of Technology, Coimbatore.*

R. SUBRAMANIAN, *Assistant Professor in the Department of Metallurgical Engineering, PSG College of Technology, Coimbatore.*

This textbook is written primarily for undergraduate and postgraduate students of metallurgical and materials engineering to provide them with an insight into the emerging technology of powder metallurgy as an alternative route to conventional metal processing.

It will also be useful to students of materials science, mechanical engineering and production engineering to understand and appreciate the importance of powder metallurgy as an effective and profitable material processing route to produce a variety of products for engineering industries. The book will enable the students as well as practising engineers to understand and practise the science and technology of powder production and processing, as well as to choose the right method to suit the application in hand.

The various techniques used for powder production and the versatile nature of these techniques to produce a wide range of powders have been highlighted with suitable examples. Characterization of powders and subsequent compaction methods have been discussed with due reference to the final application. Novel consolidation techniques for advanced applications have been dealt with. Sintering of the compacts and the mechanisms involved in sintering have been discussed in detail.

The book covers most of the recent developments in powder metallurgy such as atomization, mechanical alloying, self-propagating high-temperature synthesis, metal injection moulding and hot isostatic pressing.

Questions and problems have been given at the end of each chapter. A glossary of relevant terms in powder metallurgy has also been included for ready reference.

Contents: Foreword. Preface. Powder Metallurgy: Basic Steps. Production of Powders. Powder Treatment and Handling. Metal Powder Characteristics. Compaction of Metal Powders. High-Temperature Compaction. Sintering. Postsintering Operations. Powder Metallurgy Products. Advanced Powder Metallurgical Processing Techniques. Appendix: Terminology. Bibliography. Index.

Latest Print 2014 / 312 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3281-2 / ₹ 350.00 / (e-book also available)

DATTA

Powder Metallurgy: An Advanced Technique of Processing Engineering Materials, 2nd ed.

B.K. DATTA, *Former Senior Faculty at the Indian Institute of Technology Kharagpur.*

The textbook introduces the students to the science and technology of powder metallurgy including the treatment of ceramic powders and powders of some intermetallic compounds.

With improved organization and enriched contents, the book explores a thorough coverage of various aspects of powder metallurgy involving raw materials, various methods of production of metallic powders and non-metallic powders, their characteristics, technological aspects of compacting and sintering, various applications of powder metallurgy technology using different techniques as well as most of the recent developments in powder metallurgy.

With all the latest information incorporated and several key pedagogical attributes included, this textbook is an invaluable learning tool for the undergraduate students of metallurgical and materials engineering for a one semester course on powder metallurgy. It also caters to the students of mechanical engineering, automobile engineering, aerospace engineering, industrial and production engineering for their courses in manufacturing technology, processes and practices.

HIGHLIGHTS OF SECOND EDITION

- Sections exploring the grinding in mills, disintegration of liquid metals and alloys, some more methods for the production of iron powder by reduction of oxides, metallothermic reduction of oxides, etc. have been included.
- Sections on mechanical comminution of solid materials, structural P/M parts, etc. have been modified highlighting an up to date version.
- Several types of questions have been incorporated in the additional questions given at the end of book to guide the students from examination and practice point of view.

Contents: Preface. General Introduction. Raw Materials: Their Production and Characteristics. Consolidation of Metal and Ceramic Powders. Applications of Powder Metallurgy. Additional Questions. Appendix—Recent Trends in Powder Metallurgy. Further Reading. Index.

Latest Print 2014 / 232 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-4942-1 / ₹ 295.00 / (e-book also available)

Thermodynamics and Engineering Materials

GHOSH

Textbook of Materials and Metallurgical Thermodynamics

AHINDRA GHOSH, *formerly Professor, Department of Materials and Metallurgical Engineering, Indian Institute of Technology Kanpur.*

Metallurgical Thermodynamics, as well as its modified version, Thermodynamics of Materials, forms a core course in metallurgical and materials engineering, constituting one of the principal foundations in these disciplines.

Designed as an undergraduate textbook, this concise and systematically organized text deals primarily with the thermodynamics of systems involving physico-chemical processes and chemical reactions, such as calculations of enthalpy, entropy and free energy changes of processes; thermodynamic properties of solutions; chemical and phase equilibria; and thermodynamics of surfaces, interfaces and defects. The major emphasis is on high-temperature systems and processes involving metals and inorganic compounds.

The many worked examples, diagrams, and tables that illustrate the concepts discussed, and chapter-end problems that stimulate self-study should enable the students to study the subject with enhanced interest.

Contents: Preface. List of Symbols with Units. Introduction. First Law of Thermodynamics. Heat Capacity and Enthalpy—Auxiliary Relations and Applications. Second Law of Thermodynamics and Entropy. Auxiliary Functions and Relations, Criteria for Equilibrium. Gibbs Free Energy and One-component Systems. Activity, Equilibrium Constant and Standard Free Energy of Reactions. Equilibria Involving Ideal Gases and Pure Condensed Phases. Thermodynamics of Solutions. Chemical Potential and Equilibria amongst Phases of Variable Compositions. Reaction Equilibria Involving Condensed Phases with Variable Compositions. Third Law of Thermodynamics, Statistical Thermodynamics, and Entropy. Thermodynamics of Electrochemical Cells. Thermodynamics of Surfaces, Interfaces and Defects. Appendix. Bibliography. Answers to Problems. Index.

Latest Print 2014 / 300 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-2091-8 / ₹ 250.00

MUKHERJEE

Metal Fabrication Technology

SYAMAL MUKHERJEE, *Senior Consultant in the Mechanical Engineering Department of the National Institute of Technical Teachers' Training and Research (NITTTR), Kolkata.*

This book is a comprehensive presentation of the fundamental concepts and applications of metal fabrication technology. Designed primarily for undergraduate and postgraduate students of mechanical engineering and production engineering, the book will also be useful for students of engineering diploma programmes in the above fields and certificate courses in metal fabrication and erection, as well as for practising engineers and consultants involved in welding, fabrication, erection, production planning, testing and design.

The initial chapters of the book provide an overview of the metal fabrication industry, as well as an exhaustive discussion of the properties of the various engineering materials, heat treatment processes, and frame analysis. The focus then shifts to production planning and control, production line design, as well as drawing, marking and layout. The ensuing chapters explain elaborately the various metal cutting processes, metal forming methods, and manufacturing processes. Assembly and erection, joining and welding, fault analysis and inspection, and metal finishing are covered subsequently. The various systematic guidelines for erection as well as the different prohibited welding methods and welding defects are elucidated. The final chapter of the book is devoted to health and safety issues relevant to fabrication and erection.

The book contains numerous illustrations that enable the students to gain a thorough understanding of the subject matter. The review questions at the end of each chapter help to test their comprehension of the underlying concepts.

Contents: Preface. Overview of Fabrication Industry. Engineering Materials, their Properties, Heat Treatment and Fracture Analysis. Production Planning and Control (PPC) in Fabrication and Production Line Design. Communication, Drawing, Marking and Layout. Metal Cutting Processes. Metal Forming Methods. Manufacturing Processes. Assembly Operation, Erection Guidelines and Fault Analysis. Joining, Welding, Soldering, Brazing and Inspection. Metal Finishing Operations. Health and Safety in Fabrication and Erection Work. Index.

Latest Print 2010 / 464 pp. / 17.8 × 23.5 cm
ISBN-978-81-203-4090-9 / ₹ 425.00 / (e-book also available)

SURENDER KUMAR

Technology of Metal Forming Processes

SURENDER KUMAR, *Professor and Head, Department of Production Engineering, Birla Institute of Technology, Ranchi.*

This comprehensive text presents the subject of metalworking by offering a clear account of the theory and applications of metal forming processes relevant to engineering practice. It is designed to serve as a textbook for undergraduate and postgraduate students of mechanical engineering, production engineering, industrial engineering, and metallurgical engineering.

The first seven chapters are devoted to basic concepts to equip the students with the background material on mechanics, material sciences and to provide them with a sound foundation in the theory of plasticity. In addition, the importance of friction and lubrication in metal forming processes is adequately highlighted. In the next nine chapters the reader is exposed to a richly detailed discussion of specific forming processes (including the lubricated metal forming processes) and new and powerful techniques are presented (load bounding and slip line field) for solving engineering problems in metal forming. The book then moves on to forming of polymers and also covers metal powder preforms, highlighting recent developments.

In the concluding portions of the book, the important factors such as force, power requirements, formability and machinability in the study of individual processes, are briefly discussed. Finally, the application of computer-aided analysis in the metalworking processes has been demonstrated, being the demand in this competitive scenario.

Several chapter-end exercises are included to aid better understanding of the theory.

Contents: Preface. Nomenclature. Introduction. State of Stress. Strain and Strain Rates. Stress–Strain and Stress–Strain Rate Laws. Yield Criteria and Flow Rules. Friction in Metalworking. Lubrication Mechanism and Metalworking Lubricants. Drawing and Extrusion of Cylindrical Bodies. Drawing and Extrusion in Plane Strain. Deep Drawing. Strip Rolling. Forging. Bending and Forming. Slip Line Field Technique. Load Bounding Technique. Lubricated Metalworking Processes. Cold Processing of Polymers. Processing of Metal Powder Preforms. High Energy Rate Forming. Advances in Material Processing. Computer Application in Metalworking. Appendices—A: Comparison of Various Methods of Analysis of Forming Load. B: Derivation of Reynolds Equation for Power Law Fluids. C: Useful Tables. D: Stress–Strain Curves for Various Materials. References/Bibliography. Index.

Latest Print 2011 / 376 pp. / 17.8 × 23.5 cm

ISBN-978-81-203-3425-0 / ₹ 295.00 / (e-book also available)

Transport Phenomena

MOHANTY

Rate Processes in Metallurgy, Rev. ed.

A.K. MOHANTY is former Principal, National Institute of Technology, Rourkela.

Primarily intended for the undergraduate students of metallurgical engineering, this book provides a firm foundation in the study of the fundamental principles of transport processes and the kinetics of the reactions that will greatly help to carry out a complete analysis of the rate processes in metallurgy.




























Systematically organized in eight chapters, the book provides a comprehensive treatment and balanced coverage of topics such as kinetic properties of fluids, heat transfer, mass transfer, techniques of dimensional analysis, treatment of transport problems by means of the boundary layer theory, reaction kinetics, and also makes a study of simultaneous transfer of heat, mass and momentum for various metallurgical phenomena. Every major concept introduced is worked out, through suitable solved examples, to a numerical conclusion. In addition, each chapter concludes with a wide variety of review questions and problems with answers to aid further understanding of the subject.


Contents: Preface. Acknowledgements. Introduction. Flow of Fluids. Heat Transfer. Mass Transfer. Dimensional Analysis and Similitude. Boundary Layer Theory. Reaction Kinetics. Coupled Phenomenon. Suggested Further Reading. Answers to Problems. Index.

Latest Print 2014 / 448 pp. / 16.0 × 24.1 cm

ISBN-978-81-203-3591-2 / ₹ 395.00




























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




















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